

Reg. No. :

Name :

Fourth Semester B.A./B.Sc. Degree Examination, March 2020

First Degree Programme Under CBCSS

Language Course (Additional Language IV) — Hindi

HN 1411.1 – POETRY, LONG POEMS AND CULTURE

(2014–16 Admission)

Time : 3 Hours

Max. Marks : 80

- I. एक या दो वाक्यों में उत्तर लिखिए।
1. बिहारी की रचना का नाम क्या है?
2. कौन परिमल के सदस्यों में थे?
3. 'संसद से सडक तक' किसका काव्य संकलन है?
4. प्रलय की छाया कविता के केन्द्र में कौन है?
5. किसने सूरदास को पुष्टिमार्ग का जहाज कहाँ है?
6. सीता के चरित्र पर ऊँगली उठाने वाला कौन है?
7. किसने दीन-ए-इलाही मत का प्रवर्तन किया?
8. मलयालम में किसने किलिप्पाट्टु शैली का सूत्रपात किया?

9. ज्ञानघाना के रचयिता कौन हैं?

(10 × 1 = 10 Marks)

10. भारतीय संस्कृति का प्राणतत्व क्या है?

II. किन्हीं आठ प्रश्नों के लघु उत्तर लिखिए। (करीब 50 शब्दों में)

11. जाकै मुंह माथा नहीं, नाहीं रूप कुरूप।

पुहुप बास तैं पातरा, औसा तत्त अनूप॥ यहाँ कबीर ने किसकी ओर संकेत किया है?

12. मेरी भव-बाधा हरौ, राधा-नागरि सोइ।

जा तन की झाँई परैं, स्यामु हरित-दुति होइ॥ यहाँ कवि ने किसका वर्णन किया है?

13. प्रौढ शिक्षा कविता का प्रतिपाद्य क्या है?

14. नदी के द्वीप कविता में नदी और द्वीप की प्रतीकात्मकता स्पष्ट करें।

15. कमलावती क्या करने का संकल्प लेती है?

16. राम की दृष्टि में राष्ट्र क्या है? स्पष्ट करें।

17. वैष्णव धर्म के सिद्धांतों पर प्रकाश डालिए।

18. धर्मनिरपेक्षवाद से क्या तात्पर्य है?

19. वेषु त्योहार पर एक टिप्पणी लिखिए।

20. रामनाट्य पर विचार करें।

21. मलयालम के पाट्टु साहित्य पर प्रकाश डालें।

22. भारतीय संस्कृति की विशेषताओं पर प्रकाश डालिए।

(8 × 2 = 16 Marks)

III. किन्हीं छः प्रश्नों के उत्तर करीब 120 शब्दों में उत्तर लिखिए।

23. ज्यों नैं ननि में पतरी, त्यों खालिक घट मांहि।

मूरिख लोग न जानहीं, बाहरि दूढ़न जाहिं॥ भावार्थ लिखिए।

24. 'प्रौढ शिक्षा' कविता में कल कवि ने क्या-क्या कहा था?

25. 'देशगान' कविता में चित्रित देश की दुर्दशा पर प्रकाश डालिए।

26. जिन दिन मनुष्य अभिव्यक्ति विहीन हो जाएगा

वह सब से अधिक

दुर्भाग्यपूर्ण दिन होगा! प्रवाद पर्व के संदर्भ में इस की आलोचना कीजिए।

27. कमलावती के चरित्र पर प्रकाश डालिए।

28. क्षेत्रीय सांस्कृतिक केन्द्रों की स्थापना का उद्देश्य क्या है?

29. आज़ादी के बाद स्त्रियों की स्थिति पर एक टिप्पणी लिखिए।

30. किष्णनाट्टम पर प्रकाश डालिए।

31. मणिप्रवालम पर एक टिप्पणी लिखिए।

(6 × 4 = 24 Marks)

IV. किन्हीं दो प्रश्नों के उत्तर करीब 250 शब्दों में लिखिए।

32. 'नदी के द्वीप' कविता की विशेषताओं पर चर्चा कीजिए।

33. केरल को क्यों दक्षिण का कश्मीर कहते हैं? आलोचनात्मक उत्तर लिखिए।

34. 'प्रवाद पर्व' मिथक में समकालीन राजनीतिक चिन्तन की अर्थ-गर्भिता के लिए विशेष उल्लेखनीय बन पड़ी है। इस कथन की समीक्षा कीजिए।

35. भारतीय संस्कृति के प्रारंभिक काल पर विस्तार से चर्चा कीजिए।

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fourth Semester B.A./B.Sc. Degree Examination, March 2020

First Degree Programme under CBCSS

Language Course (Additional Language) - Latin

LT 1411.1 CULTURE AND CIVILIZATION IN LATIN

(2014 Admission onwards)

Time : 3 Hours

Max. Marks : 80

PART – A : Responde omnibus

1. Explica 'trigon'.
2. Expande "DV".
3. Indica verum (T) an falsum (F)
Italian is the direct descendent of Latin.
4. Who was the greatest poet of the golden age of Latin?
5. What is known as the 'Bible of the Pagans'?
6. Who commissioned St. Jerome to bring out a new Latin edition of the Bible?
7. What is the ancient Roman game which resembled chess or checkers?
8. Qui est Juno?
9. Explica: *Sarracum*
10. Explica: *Pater familia*

(10 × 1 = 10 Marks)

PART – B: Responde octo de datis

11. Adepta aptum cum apto

- a. Cicero - Russian
- b. East slavic - Indian
- c. Upanishads - Ecclesiastical writer
- d. Venerable Bede - golden age of Latin

12. Explica

Casus in lingua Latina

13. Scribe breviter de sequentibus verbis

- a. *Strophium*
- b. *Vulgate*

14. Redde Anglice

- a. Magistri bonis pueris praemia dant.
- b. Pueri cum ancilla in horto ludunt.

15. Redde Latine

- a. The queen teaches the farmer's daughters.
- b. The sailor frightens the girls with a sword.

16. Write the Latin root of the following English words.

- a. Amateur
- b. Constellation

17. What the Ancient Romans did when a baby was born?
18. Briefly describe about the *Paludamentum*.
19. Explica 'Duodecim Scripta' et 'Latrunculi'.
20. Roman religion was animistic in its origin. Explain.
21. Explain the etymological difference between 'Pallum' and 'Palla'.
22. Briefly explain about ancient Roman theatre.

(8 × 2 = 16)

PART – C : Responde sex de datis

Explica sententias datas

23. Briefly explain the fashion and clothing of Ancient Roman people.
24. Explain Grimm's Law.
25. What are the major differences between Latin and English?
26. Explain Armenian language in the Indo – European family.
27. Explain the transportation system of the Ancient Roman civilization.
28. How the Ancient Romans buried a dead man?
29. What is dialect? What was the dialect of people of Latium?
30. Explain the education system of the Roman people.
31. Which are the eight living branches of indo-European family?

(6 × 4 = 24 Marks)

PART – D : Responde duo de datis

32. Write an essay on the Indo European Languages.
33. Ancient Roman RELIGION.
34. Vir longam.....1.....(epistolis, epistolae, epistolam) ad reginam mittit.
.....2.....(Parvus, Parvas, Parvi) pueri sub mensa ludunt.
Pueri, cum amicis vestris in 3.....(horto, hortum, hortus) ludite.
Domine, servus.....4.....(tuum, tuae, tuus) mendacium dicit.
Magister, parvus.....5.....(puerorum, pueris, puer) in aquam cadit.
Dues mundum.....6.....(regis, regimes, regit).
.....7.....(stultus, stultorum, Stulti) asini pulchram lunam non vident.
Equi reginae in 8.....(altus, altas, altam) aquam cadunt.
Dic, "Deus.....9.....(sum, es, est) Bonus".
Puer, epistolam.....10.....(meus, meis, meam) ad reginam mitte.
35. Regina cum poeta in scholam...1....(venimus, veniunt, venit)
Puellae per silvam ad.....2.....(scholam, schola, scholarum) veniunt.
Poeta cum.....3.....(nautarum, nautis, nauta) ad reginam venit,
Puellae post.....4.....(scholam, schola, scholarum) aquam potant.
.....5.....(Ancillae, Ancillis, Ancillas) rosis aram ornant.
Agricola in silva.....6.....(laborant, laboramus, laborat).
Regina ex.....7....(scholarum, scholis, schola) venit.
Agricola hasta.....8....(nauta, nautis, nautam) vulnerat.
.....9....(Filia, filiis, Filiae) rosis reginam delectant.
Aqua sub.....10.....(via, viarum, viam) venit.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fourth Semester B.A./B.Sc. Degree Examination, March 2020

First Degree Programme under CBCSS

Malayalam Language

Language Course — Additional Language IV

ML 1411.1 — വിനിമയം, സർഗ്ഗാത്മകരചന, ഭാഷാവബോധം

(2014-2017 admissions)

Time : 3 Hours

Max. Marks : 80

1. ഒരു വാക്കിലോ പരമാവധി രണ്ടു വാക്യത്തിലോ എല്ലാ ചോദ്യങ്ങൾക്കും ഉത്തരമെഴുതുക.

1. 'മാധ്യമം തന്നെയാണ് സന്ദേശം' എന്ന അഭിപ്രായം ആരുടേതാണ്?

2. പ്രതിഭയെ കാരയിത്രി എന്നും ഭാവയിത്രി എന്നും വർഗ്ഗീകരിച്ച ഭാരതീയ സാഹിത്യ ചിന്തകൻ ആര്?

3. ഐക്യകേരളം രൂപീകരിക്കപ്പെട്ടത് എന്തിന്റെ അടിസ്ഥാനത്തിലാണ്?

4. ഇന്ത്യയിലെ ആദ്യപത്രം ആയി അറിയപ്പെടുന്നത് ഏത്?

5. കേരളകൗമുദി പത്രത്തിന്റെ സ്ഥാപകൻ ആര്?

6. ഇന്ത്യൻ സിനിമയുടെ പിതാവ് എന്നറിയപ്പെടുന്നത് ആര്?

7. എന്താണ് ഗ്ലോഗ്?

8. കാവ്യതത്ത്വ പ്രവേശിക എന്ന ഗ്രന്ഥത്തിന്റെ കർത്താവാരാണ്?
9. "പ്രതീകങ്ങളുടെ ദേവാലയമാണ് പ്രകൃതി" എന്ന കൽപ്പന ആരുടേതാണ്?
10. അമ്പലമണി ആരുടെ കവിതാസമാഹാരമാണ്?

(10 × 1 = 10 Marks)

II. ഒരു ഖണ്ഡികയിൽ കവിയാതെ എട്ടു ചോദ്യങ്ങൾക്ക് ഉത്തരമെഴുതുക.

11. ഭരണഭാഷയെ നിർവ്വചിക്കുക.
12. കാവ്യഭാഷയെക്കുറിച്ച് ദാത്തേയുടെ നിലപാടുകൾ എന്തെല്ലാം?
13. ആശയവിനിമയ പഠന മേഖലയ്ക്ക് മാർഷൽ മക്ലൂഹന്റെ സംഭാവനകളെക്കുറിച്ചു ലഘു കുറിപ്പെഴുതുക.
14. എന്താണ് വ്യക്ത്യന്തര ആശയവിനിമയം (Inter Personal Communication)?
15. വിവരയുഗം വിവരവിസ്ഫോടനത്തിന്റെ മാത്രമല്ല, വിനിമയ വിസ്ഫോടനത്തിന്റേതു കൂടിയാണ് എന്ന് പറയുന്നതെന്തുകൊണ്ട്?
16. ബ്ലോഗിനെക്കുറിച്ച് ലഘു കുറിപ്പെഴുതുക.
17. താഴെപ്പറയുന്ന ശൈലികൾ മലയാളത്തിലേക്ക് പരിഭാഷപ്പെടുത്തുക.
 - (a) Writing on the wall
 - (b) Pregnant with meaning
 - (c) Shed crocodile tears
 - (d) Read between lines.
18. 'മുൻകൂട്ടി നിശ്ചയിച്ച ഒരു പദ്ധതിയും കഥയെഴുത്തിൽ നടന്നിട്ടില്ല' എന്ന് എം.ടി. പറയുന്നതെന്തുകൊണ്ട്?

19. താഴെപ്പറയുന്ന വാക്യങ്ങളിൽ തെറ്റുണ്ടെങ്കിൽ തിരുത്തുക.
- (a) ഏകദേശം മൂന്നുറോളം പേർ പങ്കെടുത്ത യോഗമാണ് നടക്കുന്നത്
- (b) കേവലം അഞ്ചു രൂപമാത്രമാണ് പുസ്തകത്തിന് നൽകേണ്ട വില.
20. എന്താണ് പ്രഭാഷണാത്മക (Rhetoric) ആശയവിനിമയം?
21. തേർഡ് പ്ലേണിൽ കഥ പറയുമ്പോഴുള്ള സൗകര്യങ്ങൾ എന്തൊക്കെയാണെന്ന് എം.ടി. പറയുന്നത്?
22. "അവളുടെ ജീവിതപശ്ചാത്തലം, മാനസികമായ വളർച്ച ഇതൊന്നും എനിക്കറിഞ്ഞുകൂടാ" - ആരുടെ? സന്ദർഭം എന്ത്?

(8 × 2 = 16 Marks)

- III. ഒന്നരപ്പറത്തിൽ കവിയാതെ ഏതെങ്കിലും ആറു ചോദ്യങ്ങൾക്ക് ഉത്തരമെഴുതുക.
23. നിന്റെ ഓർമ്മയ്ക്ക് എന്ന കഥയുടെ രചനാപശ്ചാത്തലം വിവരിക്കുക.
24. ഇന്റർനെറ്റിനെക്കുറിച്ച് വിവരിക്കുക.
25. വിവിധതരം ആശയവിനിമയങ്ങളെക്കുറിച്ച് ചുരുക്കി വിവരിക്കുക.
26. സിനിമ എന്ന മാധ്യമത്തിന്റെ സവിശേഷതകൾ എന്തെല്ലാം?
27. 'കവിത അനശ്വരതയിലേക്ക് നീട്ടുന്ന കൈയാണ്' എന്ന് സുഗതകുമാരി സ്ഥാപിക്കുന്ന തെങ്ങനെ?
28. ഭരണ ഭാഷയ്ക്കുണ്ടായിരിക്കേണ്ട ഗുണങ്ങൾ എന്തെല്ലാം?
29. ചുവടെക്കൊടുത്തിരിക്കുന്ന ലേഖനഭാഗം ഇംഗ്ലീഷിലേക്ക് പരിഭാഷപ്പെടുത്തുക.

ലോകത്തിലെ മിക്ക ജനവിഭാഗവും ജനാധിപത്യ സംവിധാനത്തിലൂടെ ഇംഗ്ലീഷിനെ തിരഞ്ഞെടുത്ത് തങ്ങളുടെ മാതൃഭാഷ ഭരണഭാഷയാക്കി മാറ്റിയ ചരിത്രമാണുള്ളത്. ജപ്പാൻ, റഷ്യ, നൈജീരിയ, ടാൻസാനിയ തുടങ്ങിയ വലുതും ചെറുതുമായ ലോകരാഷ്ട്രങ്ങൾ തങ്ങളുടെ ഭാഷയിലൂടെ ശക്തിയാർജ്ജിച്ചു കൊണ്ടിരിക്കുന്നു. മാതൃഭാഷയ്ക്കുവേണ്ടി സമരം ചെയ്ത ഒരു ചരിത്രം ഇംഗ്ലണ്ടിനുപോലുമുണ്ട്. 18-ാം നൂറ്റാണ്ടിന്റെ പൂർവ്വാർദ്ധത്തിൽ ഇംഗ്ലണ്ടിലെ കോടതികളിൽ ഭരണഭാഷയും വ്യവഹാരഭാഷയും ഇംഗ്ലീഷ് ആക്കണമെന്നാവശ്യപ്പെട്ട് ഒരു ബഹുജന പ്രക്ഷോഭം ഉണ്ടായി. 1731-ൽ ജോർജ്ജ് രണ്ടാമൻ നടത്തിയ നിയമനിർമ്മാണം മൂലമാണ് അതു സാധ്യമായത്.

30. റേഡിയോ എന്ന ബഹുജന മാധ്യമത്തിന്റെ സവിശേഷതകൾ എന്തെല്ലാം?
31. കാവ്യ ഭാഷയെക്കുറിച്ച് എം.കെ. സാനുവിന്റെ അഭിപ്രായങ്ങൾ ക്രോഡീകരിക്കുക.

(6 × 4 = 24 Marks)

IV. ഏതെങ്കിലും രണ്ടു ചോദ്യങ്ങൾക്ക് മൂന്നു പുറത്തിൽ കവിയാതെ ഉപന്യാസരൂപത്തിൽ ഉത്തരമെഴുതുക.

32. ആശയവിനിമയഘടകങ്ങളും പ്രക്രിയകളും വിവരിക്കുക.
33. ഇലക്ട്രോണിക് മാധ്യമങ്ങളും ആശയവിനിമയവും എന്ന വിഷയത്തെക്കുറിച്ച് ഉപന്യാസം തയ്യാറാക്കുക.
34. ഒരു കഥ ജനിക്കുന്നു എന്ന ലേഖനത്തിൽ സർഗ്ഗാത്മകതയുടെ തലങ്ങളെ എം.ടി. വിവരിക്കുന്നതെങ്ങനെ?
35. എന്റെ കവിതയെപ്പറ്റി എന്ന ലേഖനത്തിൽ തെളിയുന്ന കവയിത്രിയുടെ ചിന്തകൾ ക്രോഡീകരിക്കുക.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fourth Semester B.A./B.Sc. Degree Examination, March 2020

First Degree Programme Under CBCSS

LANGUAGE COURSE: READINGS IN LITERATURE

Common For B.A./B.Sc. EN 1411.1 (Language Course VIII)

And Career Related 2(a) (Language Course VI) EN1411.3

(2015 Admission Onwards)

Time : 3 Hours

Max. Marks : 80

I. Answer **all** questions, each in a word or a sentence.

1. Why is the boy 'creeping like snail' in 'All the World is a Stage'?
2. What does the title 'La Belle Dame Sans Merci' mean?
3. Why does Ulysses think of leaving his kingdom?
4. What has caused 'insensibility among soldiers'?
5. Where is the essay 'Tolerance' taken from?
6. What, according to Einstein, is the noblest motive for scientific research?
7. What was the persistent legend spun around Nehru's relation with the Prince of Wales?
8. What is Umkhonto we sizwe?
9. What reason did Vera give for the sudden exit of Mr. Nuttle?
10. Why was the cat named Sherlock?

(10 × 1 = 10 Marks)

- II. Answer any **eight** questions in a short paragraph not exceeding **50** words
11. Shakespeare's views on the stage of the soldiers.
 12. Resolution and perseverance of the leech gatherer.
 13. The employment of Greek myths on 'A Prayer for My Daughter'.
 14. The impact of the constable's visit on the narrator.
 15. The difference in the attitude of the poet and his neighbour in 'Mending Wall'.
 16. Social prescriptions on the use of language in 'An Introduction'.
 17. The idea of 'cosmic religious feeling' as enunciated by Einstein.
 18. The two solutions to deal with people whom we dislike, as proposed by E.M. Forster.
 19. Two of the most persistent legends about Nehru.
 20. The dilemma of Dr. Raman regarding the illness of Gopal.
 21. The bet between the Banker and the youngman.
 22. The reason for Chechi's dejection after receiving the call from Jayant.

(8 × 2 = 16 Marks)

- III. Answer any **six**, each in a paragraph not exceeding **100** words
23. The Knight's love for the beautiful lady.
 24. The significance of Arnold's statement- "Let us be true to one another".
 25. The implication of the dictum "good fences make good neighbours".
 26. Tolerance as a practical replacement for love.
 27. Einstein's account of three types of religions.

28. Poverty and misery of the Africans in South Africa.
29. Longing as a theme in 'Yellow is the Colour of Longing'.
30. The ending of the story 'The Open Window'.
31. Cat as a prominent character in 'Sherlock'.

(6 × 4 = 24 Marks)

IV. Answer any **two** in about **300** words

32. Describe the seven stages in human life as portrayed in 'All the World is a Stage'.
33. Comment on the atmosphere of oppression and fear in 'A constable Calls'.
34. Explain J.B. Priestley's arguments favouring idling.
35. Evaluate R.K. Narayan's craftsmanship as evident in 'The Doctor's Word'.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fourth Semester B.A./B.Sc. Degree Examination, March 2020

First Degree Programme under CBCSS

Malayalam Language

Language Course — Additional Language IV

ML 1411.1 — ആശയവിനിമയം, സർഗ്ഗാത്മകരചന, ഭാഷാവബോധം

(2018 admission)

Time : 3 Hours

Max. Marks : 80

- I. ഒരു വാക്കിലോ പരമാവധി രണ്ടു വാക്യത്തിലോ ഉത്തരമെഴുതുക.
1. മലയാളത്തിലെ വാക്യങ്ങളുടെ സ്വാഭാവികമായ പദക്രമം എങ്ങനെയാണ്?
 2. ഒരു വാക്യം അവസാനിച്ചിട്ട് അതിൽ പറഞ്ഞതിനു വിശദീകരണമോ ഉദാഹരണമോ നല്ലൂമ്പോൾ അന്യരും അവസാനിക്കുന്നിടത്തു ചേർക്കുന്ന ചിഹ്നമേത്?
 3. കാമികന്റെ കല എന്ന ലേഖനമെഴുതിയതാര്?
 4. Genius എന്ന പദത്തെ മലയാളത്തിലേയ്ക്ക് എങ്ങനെ പരിഭാഷപ്പെടുത്താം?
 5. സത്യവാങ്മൂലം എന്ന വാക്കിന് ഉചിതമായ ഇംഗ്ലീഷ് തർജ്ജമ എഴുതുക.
 6. Where there is a will there is a way എന്ന പഴഞ്ചൊല്ല് മലയാളത്തിലേയ്ക്ക് പരിഭാഷപ്പെടുത്തുക.
 7. വിവരസാങ്കേതികവിദ്യ നിത്യജീവിതത്തിൽ എന്ന പുസ്തകമെഴുതിയതാര്?

8. Precis എന്ന വാക്കിന്റെ മലയാളവിവർത്തനമെന്ത്?
9. www - പൂർണ്ണരൂപമെന്ത്?
10. മലയാളശൈലി എഴുതിയതാര്?

(10 × 1 = 10 Marks)

II. ഒരു ഖണ്ഡികയിൽ കവിയാതെ എട്ടു ചോദ്യത്തിന് ഉത്തരമെഴുതുക.

11. സംഗ്രഹിക്കുക.

കവിതകൾ മധുരമായി പാടിക്കൊണ്ട് മലയാളികളെ പുളകമണിയിക്കുകയും ചിന്തോദ്ദീപകമായ കവിതകളെഴുതുകയും ചെയ്തിട്ടുള്ള കവിയാണ് വി. മധുസൂദനൻ നായർ. കൂട്ടിക്കാലം മുതലേ കവിതകളെഴുതുമായിരുന്നുവെങ്കിലും, മധുസൂദനൻ നായരിലെ കവിയെ മലയാളികളറിയുന്നത് 1986-ൽ നാരാണത്തുഭ്രാന്തൻ എന്ന കവിത പ്രസിദ്ധീകരിക്കുന്ന തോടെയാണ്. എട്ടു വർഷത്തിനുള്ളിൽ 20 എഡിഷനുകൾ അച്ചടിച്ച ഏകമലയാളകൃതിയും ഇതാണെന്നതിൽ കവിക്ക് അഭിമാനിക്കാം.

12. ആശയം വിപുലമാക്കുക.

“നാട്യപ്രധാനം നഗരം ദരിദ്രം
നാട്ടിൻപുറം നന്മകളാൽ സമൃദ്ധം”.

13. സർഗ്ഗാത്മകതയുടെ ഉറവിടമെന്ത്?

14. അനുഭവാവിഷ്ണുരത്തിന്റെ സവിശേഷതകളെന്തെല്ലാം?

15. Face is index of mind, Brevity is the soul of art - മലയാളത്തിലേയ്ക്കു വിവർത്തനം ചെയ്യുക.

16. ഇംഗ്ലീഷിലേയ്ക്കു പരിഭാഷപ്പെടുത്തുക.
ഉടമ്പടി, മേൽനടപടി

17. റേഡിയോയുടെ സമകാലപ്രസക്തി.

18. സൈബറിടത്തിലെ സ്വാതന്ത്ര്യത്തിന്റെ സ്വഭാവമെന്ത്?
19. ഇന്റർനെറ്റിന്റെ ഉപയോഗങ്ങളെന്തെല്ലാം?
20. അച്ചടിമാധ്യമങ്ങൾ നേരിടുന്ന വെല്ലുവിളികൾ എന്തെല്ലാം?
21. വുഡ്സ്ത്രപ് എന്ന സാമൂഹ്യമാദ്ധ്യമം.
22. എം.ടി. യുടെ നിരീക്ഷണത്തിൽ കഥ രൂപംകൊള്ളുന്നതെങ്ങനെ?

(8 × 2 = 16 Marks)

III. നൂറ്റിയിരുപതു വാക്കിൽ കവിയാതെ ആറു ചോദ്യത്തിന് ഉത്തരമെഴുതുക.

23. വാക്യരചനയിൽ ശ്രദ്ധിക്കേണ്ട കാര്യങ്ങളെന്തെല്ലാം? വിശദീകരിക്കുക.
24. മലയാളത്തിലുപയോഗിക്കുന്ന പ്രധാന ചിഹ്നങ്ങൾ പ്രയോഗസാഹചര്യം നൽകി പരിചയപ്പെടുത്തുക.
25. സർഗ്ഗാത്മകതയെ സംബന്ധിക്കുന്ന വിവിധ കാഴ്ചപ്പാടുകൾ വിശദീകരിക്കുക.
26. ജന്മവാസനയും എഴുത്തും തമ്മിലുള്ള ബന്ധം വിശദീകരിക്കുക.
27. മലയാളത്തിലേയ്ക്കു വിവർത്തനം ചെയ്യുക.

Amazon.com., is an American multinational technology company based in Seattle that focuses on e-commerce, cloud computing, digital streaming, and artificial intelligence. It is considered one of the Big Four tech companies, along with Google, Apple, and Facebook.

28. ഇംഗ്ലീഷിലേയ്ക്കു പരിഭാഷപ്പെടുത്തുക.

കാളിദാസമഹാകവിയെക്കുറിച്ച് അദ്ദേഹത്തിന്റെ കാലത്തോ അതിനടുത്ത കാലത്തോ ജീവിച്ചിരുന്നവരിൽ ആരുംതന്നെ ഒന്നും എഴുതിയിട്ടില്ലാത്തതുകൊണ്ട് അദ്ദേഹത്തിന്റെ കാലത്തേയും മാതാപിതാക്കന്മാരേയും വിദ്യാഭ്യാസത്തേയും ഗുരുഭൂതന്മാരേയും കുറിച്ച് അറിയുന്നതിന് ഇപ്പോൾ ശരിയായ ഒരു മാർഗ്ഗവുമില്ല. ജീവിതകഥയെക്കുറിച്ചറിയുന്നതിനു തന്നെയും ചില ഐതിഹ്യങ്ങളല്ലാതെ വേറെ ഒരാധാരവുമില്ലാതെയാണിരിക്കുന്നത്. ഐതിഹ്യങ്ങളിൽത്തന്നെ ചിലത് പരസ്പരവിരുദ്ധങ്ങളായുമിരിക്കുന്നു. അദ്ദേഹത്തിന്റെ ജീവചരിത്രത്തിൽ അനേകം പക്ഷാന്തരങ്ങളും കാണുന്നുണ്ട്.

29. ടെലിവിഷൻ ചാനലുകളുടെ സാമൂഹികസ്വാധീനം വിലയിരുത്തുക.
30. സൈബറിടത്തിന്റെ സർഗ്ഗാത്മകസാധ്യതകളെന്തെല്ലാം?
31. മലയാളം കമ്പ്യൂട്ടിംഗിന്റെ വർത്തമാനകാലം വിശകലനം ചെയ്യുക.

(6 × 4 = 24 Marks)

IV. മൂന്നു പുറത്തിൽ കവിയാതെ രണ്ടു ചോദ്യത്തിന് ഉത്തരമെഴുതുക.

32. അവനവൻതന്നെ പ്രസാധകരാകുന്ന കാലമാണ് സൈബർസാഹിത്യത്തിന്റെ. വിശദീകരിക്കുക.
33. എം.ടി. വാസുദേവൻ നായരുടെ അഭിപ്രായത്തിൽ എഴുത്തുകാരൻ പിന്തുടരുന്ന രചനാമാർഗ്ഗങ്ങളെന്തെല്ലാം? വിശദമാക്കുക.
34. ഇന്റർനെറ്റ് അവതരിപ്പിക്കുന്ന പുതിയ വിനിമയസാധ്യതകൾ പരിചയപ്പെടുത്തുക.
35. കേരളത്തിലെ ഗ്രാമജീവിതം - ഉപന്യാസം തയ്യാറാക്കുക.

(2 × 15 = 30 Marks)

(Pages : 3)

J – 1033

Reg. No. :

Name :

Fourth Semester B.A. Degree Examination, March 2020

First Degree Programme Under CBCSS

History

Core Course V

HY 1442 – HISTORY OF MODERN WORLD – Part – I

(2014 Admission onwards)

Time : 3 Hours

Max. Marks : 80

PART – A

Answer all questions in one or two sentences each.

1. Columbus
2. Cape of Good Hope
3. Pieta
4. Anglicanism
5. Martin Luther
6. Society of Jesus
7. Simon Boliver
8. Boer wars

9. Robert Owen

10. Das Capital

(10 × 1 = 10 Marks)

PART – B

Answer any **eight** from the following not exceeding One paragraph.

11. Renaissance Art

12. Don Quixote

13. Counter Reformation

14. Laissez faire

15. Capitalism

16. Invention of printing press

17. Bolivian war of independence

18. Imperialism

19. Divine Right of Kingship

20. Third Estate

21. Second International

22. Utopian socialism

(8 × 2 = 16 Marks)

PART – C

Answer any **six** of the following.

23. How did the scientific revolution lead to the changing ideals of the enlightenment?

24. Factors responsible for the beginning of Industrial revolution in England.

25. Examine the consequences of Geographical exploration.
26. Factors responsible for the rise of nation states in Europe.
27. Describe the significance of American war of Independence.
28. Briefly describe Agrarian Revolution.
29. Explain the socio-economic condition of France on the eve of the French Revolution.
30. Give an account on colonialism in Africa.
31. Development of socialist ideas in modern world.

PART - D

(6 × 4 = 24 Marks)

Long Essay.

Write any **Two** of the following:

32. Define Renaissance and how it shape the European art, thought and religion.
33. Describe the significance of Glorious Revolution in Europe.
34. Examine Colonial expansion and Latin American resistance.
35. How far industrial revolution had its impact upon modern world.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fourth Semester B.A. Degree Examination, March 2020

First Degree Programme Under CBCSS

Complementary Course for Economics

MM 1431.5 : MATHEMATICS FOR ECONOMICS IV

(2014 admission onwards)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer the **first ten** questions are Compulsory. They carry **1** mark each.

1. Find the Degree of the differential Equation $y''' + 3(y'')^2 + y' = e^x$.
2. Form the differential Equation whose general solution is $y = bx$, (b is a constant).
3. The solution of the linear differential equation $\frac{dy}{dx} + Py = Q$ is _____.
4. A function $f(x, y)$ is homogeneous of degree n if $f(\lambda x, \lambda y) =$ _____.
5. A Differential Equation $M(x, y)dx + N(x, y)dy = 0$ is called an exact differential Equation of _____.
6. Find the general solution of $y'' + 9y = 0$.
7. Find the Particular integral of $y'' + 5y' + 6y = e^x$.

8. If $y = a^x$ satisfies the differential equation $dy/dx = y$, find a
9. The marginal Cost of manufacturing an item is given by $dc/dx = 2 + 0.15x$. Find the total Cost $C(x)$, given that $C(0) = 100$.
10. What will be the order of the differential Equation representing the system of parabolas $y = ax^2 + b$?

(10 × 1 = 10 Marks)

SECTION – B

Answer **any eight** questions from among the Questions 11 to 22. These Questions carry **2** marks each.

11. Show that $y = a e^{x^2}$ is an integral of $dy/dx = 2yx$.
12. Given, $dy/dx = \rho y$. Find y as a functions of x .
13. Show that the equation $\frac{dy}{dx} = e^{x+y} + x^2 e^y$ is variable separable type and hence solve.
14. Form the Differential Equation for which $xy = a e^x + b e^{-x} + x^2$ is a solution.
15. Define Linear Differential Equation.
16. Solve $y^2 + x^2 \frac{dy}{dx} = xy \frac{dy}{dx}$.
17. Find out the Integrating factor of $xy' + y = y^2 \log x$.
18. Solve $y'' - 4y = 0$.
19. Solve $y'' + 4y' + 13y = 0$.
20. Find a particular integral of the equation $y'' - 2y' + y = e^x$.

21. If π is the total cost of an output x , it is known that the marginal cost is always equal to the average cost, then show that π is a fixed multiple of x .
22. Define
- Marginal Cost
 - Utility Function.

(8 × 2 = 16 Marks)

SECTION – C

Answer **any six** questions among the 23 to 31. These questions carry **4** marks each.

23. Obtain the differential equation if $x^2 + y^2 - 2ax + 1 = 0$.
24. Solve $y(1-x)dx - x dy = 0$.
25. Find y , given that $dy/dx = \rho y \left(1 - \frac{y}{L}\right)$ where ρ, L are constants.
26. Solve $\frac{d^4 y}{dx^4} + 2\frac{d^2 y}{dx^2} + n^4 y = \cos mx$.
27. Solve $\frac{d^2 y}{dx^2} - 4\frac{dy}{dx} + 3y = \sin 3x \cos 2x$.
28. Solve $\frac{d^2 y}{dx^2} + y = x^2 e^{2x} + x \cos x$.
29. Write a short note on Euler equations.
30. The Marginal Cost is given by $MC = 25 + 30q - 9q^2$. The fixed cost is 65. Find the Total cost, average cost and variable cost functions.
31. Derive Domar's Capital Expansion Model.

(6 × 4 = 24 Marks)

SECTION – D

Answer **any two** questions from among the questions 32 to 35. These question carry **15** marks each.

32. (a) Form the Differential Equation that represents all parabolas each of which has a latus rectum $4a$ and whose axes are parallel to the x -axis.
- (b) Form the Differential Equation of all conics whose axes coincide with axes of co-ordinates.
33. (a) Solve $(x^2 - y^2 - 1)dx + 2xydy = 0$.
- (b) Solve $(x^2 + y^2)\left(y - x\frac{dy}{dx}\right) + x^2y^2\frac{d^2y}{dx^2} = 0$ by using the substitution $y = vx$.
34. An Individuals preference scale for two goods X and Y define by the marginal rate of substitution of Y for X , $R = \frac{x-a}{y-b}$. Show that $U = (x-a)^2 + (y-b)^2$ is one form of the utility function.
35. (a) The marginal revenue function for a product is given by $MR = \frac{6}{(x-2)^2} + 5$. Find the total revenue function. Also deduce the demand function.
- (b) The price elasticity of demand Curve $x = f(p)$ is of the form $a-bp$ where a and b are constants. Find the demand law.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fourth Semester B.A. Degree Examination, March 2020

First Degree Programme under CBCSS

PL 1432 – MODERN INDIAN THOUGHT

(2014-16 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions in one word or to a maximum of two sentences. **Each** question carries **1** mark. Write notes on the following.

1. Raja yoga.
2. Spiritual humanism.
3. Purnadvaita
4. Jivan devata.
5. Monism.
6. Three kinds of transformations according to Sri Aurobindo.
7. Illumined Mind
8. Yoga
9. Indian Renaissance.
10. Neo-Vedanta.

(10 × 1 = 10 Marks)

P.T.O.

SECTION – B

Answer **any eight** questions in a paragraph each. **Each** question carries **2** marks.

11. Briefly explain the eight fold path described by Sree Narayana Guru in his social philosophy.
12. How did Swami Vivekananda explain karma yoga?
13. What are the eight cords of being which are the expressions of reality according to Aurobindo?
14. Examine the concept of Divine life in the philosophy of Sri Aurobindo.
15. Why did Mohammed Iqbal consider God as the Supreme Ego?
16. Discuss the importance of the concept of freedom in the philosophy of J.Krishnamurti.
17. Why is Raja Ram Mohan Roy considered as the Father of Indian Renaissance?
18. Give a brief account of the three points with respect to immortality according to Iqbal.
19. Examine the importance of Religion of love in the philosophy of Chattampi Swamikal.
20. Analyse the important features of Renaissance movements in Kerala.
21. Write a short note on the seven fold ignorance in the philosophy of Sri Aurobindo.
22. Examine the concept of Saccidananda in Sri Aurobindo's philosophy.

(8 × 2 = 16 Marks)

SECTION – C

Answer **any six** questions in **120 words** each. Each question carries **4 marks**.

23. Give an exposition of the Universal Religion in Swami Vivekananda's philosophy.
24. Examine the concept of humanism in the philosophy of Rabindranath Tagore.
25. Briefly explain the different ways of realisation according to Swami Vivekananda.
26. What were the contributions of Chattampi Swamikal in reviving Advaita Vedanta?
27. Explain the process of evolution and involution in the philosophy of Sri Aurobindo.
28. Why is Aurobindo's Yoga termed as Integral Yoga?
29. Give an account of the concept of Super mind in Sri Aurobindo's philosophy.
30. Analyse the important features of the social philosophy of Chattampi Swamikal.
31. Examine the concept of 'One Caste, One Religion, One God for Humanity' in Sree Narayana Guru's philosophy.

(6 × 4 = 24 Marks)

SECTION – D

Answer **any two** questions in about **600 words** each. Each question carries **15 Marks**.

32. "All Contemporary Indian thinkers are in a sense of humanists." – Explain this statement by analysing the general characteristics of modern Indian thought.
33. Examine the important aspects of the social philosophy of Sree Narayana Guru.
34. 'Swami Vivekananda's philosophy is a re-interpretation of Vedanta in accordance with the demands and needs of time.' – Explain.
35. Explain the relevance of Sri Aurobindo's Integral Yoga in modern Indian thought.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fourth Semester B.A. Degree Examination, March 2020

First Degree Programme Under CBCSS

Economics

Core Course IV

EC 1441 : BASIC TOOLS FOR ECONOMICS — I

(2015 Admission Onwards)

Time : 3 Hours

Max. Marks : 80

SECTION – I

Answer in **one** or **more** sentences. Attempt **all** questions :

1. Diagonal matrix.
2. Determinant.
3. Marginal utility.
4. Cross elasticity of demand.
5. Linear equation.
6. Consumption function.
7. Rank of a matrix.
8. Limit of a function.

9. Exogenous variable.
10. Break-even point.

(10 × 1 = 10 Marks)

SECTION – II

Answer **any eight** questions not exceeding **one** paragraph. Each question carries **2** marks.

11. Distinguish between a constant and variable.
12. State the conditions of maxima.
13. Distinguish between symmetric matrix and skew-symmetric matrix.
14. Explain the relationship between AC and MC.
15. Explain the limit of a polynomial function.
16. Define a definite integral.
17. Distinguish between exponential function and logarithmic function.
18. Define inverse of a matrix.
19. What is meant by monotonically increasing and decreasing function.
20. Explain different types of elasticity of demand.
21. If $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ show that $A^2 - 5A + 7I = 0$.
22. Find the total differential of the function $x^2 + y^2 / x - y$.

(8 × 2 = 16 Marks)

SECTION – III

Answer **any six** questions not exceeding **120** words. Each question carries **4** marks.

23. Explain the role of mathematics in economic theory.

24. State the rules of differentiation.

25. Write a short note on economic applications of differential calculus.

26. Find AB and BA if $A = \begin{bmatrix} 4 & 6 & 2 \\ 1 & 7 & 4 \\ 3 & 9 & 2 \end{bmatrix}$ $B = \begin{bmatrix} 8 \\ 7 \\ 1 \end{bmatrix}$.

27. Briefly explain constraint maximization.

28. Examine the main properties of determinant.

29. Define the following scalar matrix, triangular matrix, unit matrix and idempotent matrix.

30. Find the extreme value of the function $Y = 3x^3 + 3x^2 - 12x$.

31. Find the inverse of matrix $A = \begin{bmatrix} 1 & 3 & 3 \\ 1 & 4 & 3 \\ 1 & 3 & 4 \end{bmatrix}$.

(6 × 4 = 24 Marks)

SECTION – IV

Answer **any two** questions, not exceeding **four** pages. Each question carries **15** marks.

32. State the conditions of maximum and minimum value of a function. Find the maxima and minimum value of the function $x^3 - 6x^2 + 9x - 5$.

33. Briefly explain rules of integral. Examine the applications of integral calculus in economics.
34. Solve the following equation using crammers rule.

$$x + y + z = 7$$

$$x + 2y + 3z = 16$$

$$x + 3y + 4z = 22$$

35. State the methods of solving a general quadratic equation and solve $(x - 2)^2 - (x - 2) - 2 = 0$.

(2 × 15 = 30 Marks)

St. Xavier's College

Reg. No. :

Name :

Fourth Semester B.A. Degree Examination, March 2020

First Degree Programme under CBCSS

Economics

Core Course V — EC 1442 — MACRO ECONOMICS – I

(2015 Admission Onwards)

Time : 3 Hours

Max. Marks : 80

SECTION – I

Answer in **one** or **two** sentences. Answer **all** questions.

1. Stock variable.
2. Endogenous variable.
3. Potential GNP.
4. GNP deflator.
5. Marginal Efficiency of Capital.
6. Exogenous variable.
7. Net Economic Welfare.
8. Full Employment.
9. General equilibrium.
10. Real Wage.

(10 × 1 = 10 Marks)

SECTION – II

Answer **any eight** questions not to exceeding **1** paragraph. **Each** question carries **2** marks.

11. What are the major macro variables?
12. Explain the Equation of Exchange.
13. Explain the difference between stock and flow variables.
14. What is meant by neutrality of money?
15. What is meant by the income effect of an increase in real wage?
16. Explain 'Pigou effect'.
17. Distinguish between partial and general equilibrium.
18. The classical firmly believed that the Say's Law will work in a money economy too. Why?
19. Explain Keynes's psychological law of consumption.
20. Differentiate between actual and potential GNP.
21. Explain Classical Dichotomy.
22. Explain the comparative statics and dynamics.

(8 × 2 = 16 Marks)

SECTION – III

Answer **any six** questions not exceeding **120** words. **Each** question carries **4** marks.

23. Compare and contrast macro-statics with macro-dynamics.
24. Explain the Say's Law of Markets.
25. Explain the concept NEW.

26. Explain the concept of Aggregate Demand.
27. Explain the relevance of multiplier concept in Keynesian theory.
28. Explain the Classical Quantity Theory of Money.
29. Examine the saving investment equality.
30. Explain the different National Income concepts.
31. Explain the methods of measuring National income.

(6 × 4 = 24 Marks)

SECTION – IV

Answer **any two** questions not to exceeding **4** pages. Each question carries **15** marks.

32. Explain how the classical interest rate theory rules out deviation from full employment due to any deficiency of aggregate demand.
33. Discuss the Classical Model of Employment and Output determination.
34. Explain in detail, the difference between classical and Keynesian theory.
35. Explain the Classical Theory of prices and show how real output and employment are invariant to the quantity of money?

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fourth Semester B.A Degree Examination, March 2020

First Degree Programme Under CBCSS

PL 1432 MODERN INDIAN THOUGHT

(Complementary Course)

(2017 Admission onwards)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer all questions is **one** word to a minimum of **two** sentences.

Each question carries **1** mark

1. The First and Last Freedom is a work by which Philosopher?
2. Name two important works of Sree Narayan Guru.
3. Which Philosopher's birthday is celebrated as National Youth Day?
4. 'Khudi' is the concept of which philosopher?
5. Sri Aurbbindo's philosophy is better known by which name?
6. What does the term Darshana mean?
7. The Philosopher who taught 'Work is Worship'.
8. The Life Divine is the work of which Philosopher?

9. Vivekannada belongs from which philosopher tradition.
10. Which work of Rabindranath Tagore fetched him the Nobel prize for Literature?

(10 × 1 = 10 Marks)

SECTION – B

Answer **any eight** questions in a paragraph each.

Each question carries **2** marks

11. Briefly describe the ideal of Universal religion in Vivekananda's philosophy.
12. Define Humanism.
13. What is Tagore's view on Religion?
14. What does the term Renaissance mean?
15. Expound the concept of truth in J Krishnamurti's philosophy.
16. What is the concept of Jivan Devata in Tagore's Philosophy?
17. What is *Vedadikara Nirupanam*?
18. What is the destiny of man according to Iqbal?
19. What is the essence of Tagore's humanism?
20. The modern Indian thought can be characterized as Neo-Vedanta, comment.
21. Comment on the universal religion of Vivekananda.
22. How is Contemporary Indian thought different from Classical Indian Philosophy?

(8 × 2 = 16 Marks)

SECTION – C

Answer **any six** questions in **120** words each.

Each question carries **4** marks

23. Sree Narayan Guru lead the Renaissance movement in Kerala, Justify.
24. Describe Sri Aurobindo's Integral Yoga.

25. What was Chattampi Swamikal's role in the revival of Kerala society?
26. Write a short note on The Indian Renaissance Movement.
27. Write a short note Dr. Ambedkar's Neo Buddhism.
28. What was Sree Narayana Guru's attitude towards other religions? Explain briefly
29. Describe the concept of ego as expounded by Mohammed Iqbal.
30. What are the characteristics of Practical Vedanta as suggested by Swami Vivekananda?
31. What is Freedom according to J Krishnamurti?

(6× 4 = 24 Marks)

SECTION – D

Answer **any two** questions in about **600** words each.

Each question carries **15** marks

32. Elucidate the chief characteristics of Modern Indian thought?
33. Describe the four methods of God realization, in Vivekananda's philosophy.
34. Describe how Sree Narayana Guru's presents his critique of caste.
35. Elaborate the concept of Creation in Sri Aurobindo's Philosophy.

(2× 15 = 30 Marks)

Reg. No. :

Name :

Fourth Semester B.Sc. Degree Examination, March 2020

First Degree Programme under CBCSS

Complementary Course

PY 1431.1/PY 1431.3 MODERN PHYSICS AND ELECTRONICS

(For Mathematics and Statistics)

(2014-2017 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION - A

Answer **all** questions in **One or Two** sentences. Each question carries **1** mark.

1. What is Bohr correspondence Principle
2. Define half life of a radioactive element
3. What is nuclear binding energy
4. Write time dependent Schrodinger equation.
5. What is Phase reversal of a transistor amplifier
6. Draw the circuit symbol of an OR Gate.
7. Define Q-point.
8. Define the Planck's hypothesis of quantum theory

9. Draw the frequency response curve of a single stage CE amplifier.
10. State De Morgan's theorems.

(10 × 1 = 10 Marks)

SECTION – B

Answer **any eight** questions, not exceeding a **paragraph**. Each question carries **2** marks.

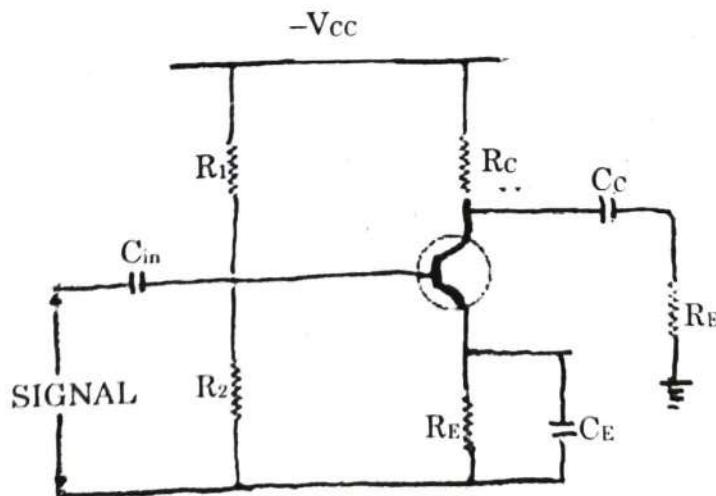
11. 1 gram of a radioactive substance disintegrates at the rate of 3.7×10^{10} disintegration per second. The atomic weight of a substance is 226. Calculate the mean life.
12. Describe the vector model of an atom and explain the different quantum numbers associated with it.
13. Explain the salient features of nuclear force.
14. What are the inadequacies in classical mechanics?
15. What is wave function? What is its importance in quantum mechanics?
16. Define Peak inverse voltage. What is the Peak inverse voltage of a half wave rectifier
17. Draw the circuit diagram and explain the functioning of affixed bias circuit.
18. Explain the forward bias characteristics of a pn junction diode.
19. Briefly discuss the characteristics of a zener diode
20. Convert the following numbers in to binary
 - (a) 74_{10}
 - (b) 136_{10}
21. Write a short note on hexadecimal numbers
22. Draw the block diagram and truth table of an NOR and NAND Gate.

(8 × 2 = 16 Marks)

SECTION – C

Answer **any six** questions. Each question carries **4** marks.

23. How long does it take for 60 percent of a sample of radon to decay? Half life of radon is 3.8 days.
24. Calculate the probability density for the wave function $\psi(x) = u(x)\exp[i\phi(x)]$, where u, ϕ are real.
25. A diode with $V_F = 0.7V$ is connected to as a half wave rectifier. The load resistance is 500Ω and the (rms) ac input is 22V. Determine the peak output voltage, the peak load current and the diode peak inverse voltage.
26. A transistor uses potential divider method of biasing. $R_1 = 50K\Omega$, $R_2 = 10K\Omega$ and $R_L = 1K\Omega$ if $V_{CC} = 12$, find
 - (a) The value of I_C ; given $V_{BE} = 0.1V$
 - (b) The value of I_C ; given $V_{BE} = 0.3V$. Comment on the result.
27. In a single stage amplifier, the parameters are $\beta = 150$, $r_i = 2K\Omega$, $R_c = 4.7K\Omega$, $R_L = 12K\Omega$. Find the power gain.
28. For a transistor amplifier shown in figure, $V_{CC} = 12V$, $R_1 = 20K\Omega$, $R_2 = 10K\Omega$, $R_C = 1K\Omega$, $R_E = 2K\Omega$ and $R_L = 1K\Omega$. Draw the AC load line for the circuit given below. (neglect V_{BE}).



29. Convert

(a) hexadecimal number into decimal (i) 56_{16} (ii) AF_{16}

(b) Octal number into decimal (i) 56_8 (ii) 137_8

30. Subtract the decimal numbers 38 from 25 in 2's complement form.

31. Simplify the Boolean expression: $X = \overline{A}\overline{B}C + \overline{A}BC + A\overline{B}C + ABC$.

(6 × 4 = 24 Marks)

SECTION – D

Answer **any two** questions. Each question carries **15** mark.

32. Draw the circuit diagram and explain the working of a single stage CE amplifier also explain the frequency response curve and mention the bandwidth.
33. Derive Schrodinger's time independent wave equation. Hence derive the expression for energy of a particle in a box.
34. State and explain the law of radioactive disintegration, show that the number of atoms of a radioactive element decreases exponentially with time.
35. Draw the circuit diagram and explain the working of a full wave bridge rectifier. Also derive the expression for I_{dc} , I_{rms} ripple factor, efficiency and Peak inverse voltage.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fourth Semester B.Sc. Degree Examination, March 2020

First Degree Programme under CBCSS

Complementary Course for Physics

CH 1431.1 PHYSICAL AND INORGANIC CHEMISTRY

(2014 – 2016 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION A (Answer in one word/ sentence)

Answer **all** questions :

1. Acid catalyzed hydrolysis of methyl acetate is a _____ reaction.
2. The rate of reaction _____ with increase of temperature.
3. Arrhenius equation is _____.
4. For a first order reaction the half life period is a _____.
5. Quantum yield is _____.
6. Name one law of photochemistry.
7. The process of producing Cold light is called _____.
8. The primary process in the hydrogen chlorine reaction is called the _____.
9. For a one component system the phase rule is _____.
10. Alum purifies muddy water by _____.

(10 × 1 = 10)

P.T.O:

SECTION B (short answer type)

Answer any **eight** questions.

11. Why most of the reactions does not occur at room temperature?
12. Define half life period of a reaction.
13. Define activation energy.
14. What do you understand by photosensetisation?
15. Write a few lines on freezing mixtures.
16. Define the term eutectic point.
17. Write the condition for the validity of Nernst distribution law.
18. Write the formula of stable hydrates in ferric chloride – water system.
19. What are azeotropes?
20. What is reverse osmosis?
21. What is syneresis of a gel?
22. What is a high spin complex?

(8 × 2 = 16)

SECTION C (Short essay)

Answer any **six** questions.

23. Explain the collision theory of reaction rates.
24. Derive the expression for the rate constant of a first order reaction.
25. Explain the adsorption theory of catalysis.

26. Explain the terms stable equilibrium and metastable equilibrium.
27. Explain how Raoult's is used for determination of molecular mass of non volatile solute?
28. Explain the $H_2 - Cl_2$ reaction in photochemistry.
29. Explain the determination of Avogadro number by using Brownian movement.
30. Explain the valence bond theory of octahedral complexes.
31. Write a note on fractional distillation.

(6 × 4 = 24)

SECTION D (long essay)

Answer any two questions.

32. (a) Briefly explain different laws of photochemistry. 8
- (b) Discuss the various factors affecting the rate of a reaction. 7
33. (a) Explain the calculation of Arrhenius parameters. 7
- (b) Explain the application of co-ordination chemistry in qualitative analysis. 8
34. (a) Explain the vapour pressure- composition curve for non ideal solutions. 8
- (b) Explain the crystal field theory of tetrahedral complexes. 7
35. (a) Explain the kinetic and optical properties of colloids. 8
- (b) Explain the phase diagram of $FeCl_3$ - water system. 7

(2 × 15 = 30)

Reg. No. :

Name :

Fourth Semester B.Sc. Degree Examination, March 2020

First Degree Programme Under CBCSS

Complementary Course

**PY 1431.2 – ATOMIC PHYSICS, QUANTUM MECHANICS AND
ELECTRONICS**

(For Chemistry and Polymer chemistry)

(2014 – 17 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions in one or two sentences. Each bunch carries **1** marks.

1. State Pauli's exclusion principle.
2. Write any two basic features of Bohr atom model.
3. What is the energy required to knock out electron from the innermost orbit of an atom?
4. What is isotope effect?
5. What is critical magnetic field?
6. What is a normalised wave function?
7. Write time dependent Schrodinger equation.

8. What is the order of reverse resistance of a diode?
9. A half wave rectifier is less efficient than full wave rectifier. Why?
10. During negative half cycle, what will be the nature of secondary voltage in a half wave rectifier?

(10 × 1 = 10 Marks)

SECTION – B

Answer **any eight** questions, not exceeding a paragraph. Each question carries **2 marks**.

11. State and explain Bohr's correspondence principle.
12. Explain the origin of line spectra.
13. Define transition temperature in super conductors. What is the transition temperature of liquid helium.
14. Briefly explain BCS theory.
15. Write expressions of energy and momentum operators in quantum mechanics. Explain their role in calculating energy and momentum.
16. What are the basic postulates of quantum mechanics?
17. Why do we use different spectrometers for each specific region of electromagnetic spectrum?
18. Explain the origin of absorption spectra.

19. What is a zener diode? Explain the difference between a diode and zener diode.
20. Compare any two transistor biasing techniques.
21. Briefly describe the factors influencing the performance of a transistor amplifier.
22. Briefly describe the input characteristics of common emitter connection.

(8 × 2 = 16 Marks)

SECTION – C

Answer **any six** questions. Each question carries **4** marks.

23. State and Prove Bohr's correspondence principle.
24. Calculate the wavelength of radiation emitted when He^+ makes a transition from state $n_i=5$ to $n_f=2$.
25. Derive an expression for the ground state wave function of a particle confined in a one dimensional box.
26. The critical fields at 6K and 8K for an alloy are 7.62 and 4.28 MAm^{-1} respectively. Determine the critical field at 0K.
27. Distinguish between Type I and Type II superconductors.
28. Describe the explain any method of studying UV spectrum.
29. Derive an expression for the efficiency of a bridge rectifier.

30. A centre tapped transformer with turn ratio 10:1, is working as bridge rectifier with four diodes. Calculate the d. c. output voltage (R. M. S. Primary voltage=230V and load resistance 100 ohm)
31. Prove that power gain of a transistor amplifier is the product of current gain and voltage gain.

(6 × 4 = 24 Marks)

SECTION – D

Answer **any two** questions. Each question carries **15** marks.

32. What is Meissner effect? Explain. Discuss the properties and application of high temperature ceramic superconductors.
33. Briefly describe ESR and NMR spectrometer. Draw block diagrams.
34. Derive an expression for time independent Schrodinger equation.
35. Construct d. c. load line on output characteristics of a CE amplifier.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fourth Semester B.Sc. Degree Examination, March 2020

First Degree Programming under CBCSS

Mathematics

Core Course III

MM 1441 : ALGEBRA AND CALCULUS II

(2014 – 17 Admissions)

Time : 3 Hours

Max. Marks : 80

UNIT I

Answer **all** questions from this unit. Each question carries **1** marks.

1. Find $(x^3 + 1)(2x^2 + 2)$ in $\mathbb{F}_3[x]$.
2. Find the remainder when $3x^2 - x - 1$ is divided by $x^3 - 2$.
3. For which values of k in $\mathbb{Q}$, does $x - k$ divide $x^3 - kx^2 - 2x + k + 3$.
4. State whether the polynomials $x - 1$ and $2x + 3$ are associates in $\mathbb{Z}/5\mathbb{Z}[x]$.
5. Give an example of an irreducible polynomial of degree 2 in $\mathbb{R}[x]$.
6. Suppose that $z = x^2y$, $x = t^2$, $y = t^3$. Use the chain rule to find $\frac{dz}{dt}$.

7. What is the natural domain of the function $f(x, y, z) = \sqrt{1 - x^2 - y^2 - z^2}$.
8. Write f_x if $f(x, y) = 2x^3 y^2 + 2y + 4x$.
9. Evaluate $\lim_{(x, y) \rightarrow (-1, 2)} \frac{xy}{x^2 + y^2}$.
10. Find $\int_0^3 \int_1^2 (1 + 8xy) dy dx$.

(10 × 1 = 10 Marks)

UNIT II

Answer **any eight** questions from this unit. Each question carries **2** marks.

11. Using Fermat's theorem, find two different polynomials of degree 3 with coefficients in $\mathbb{Z}/3\mathbb{Z}$.
12. Let $R = \mathbb{Z}/4\mathbb{Z} = \{0, 1, 2, 3\}$. Find all the units of $R[x]$.
13. Find all roots of $f(x) = x^2 - 2x$ in $\mathbb{Z}/5\mathbb{Z}$.
14. Let $N(e)$ be the number of elements of U_p , the group of units of $\mathbb{Z}/p\mathbb{Z}$ which have order e . Then show that $\sum_{e|p-1} N(e) = p-1$.
15. Let $f(x) = x^2 + bx + 4$ in $\mathbb{R}[x]$. For what values of b , $f(x)$ is irreducible?
16. Decompose into partial fractions: $\frac{t+1}{(t-1)(t+2)}$.
17. Describe the level surfaces of $f(x, y, z) = z^2 - x^2 - y^2$.
18. Find $\frac{\partial z}{\partial x}$ if $z = x^4 \sin(xy^3)$.

19. Show that when f is differentiable, a function of the form $z=f(x,y)$ satisfies the equation $x \frac{\partial z}{\partial x} + y \frac{\partial z}{\partial y} = 0$.
20. Show that the function $u(x,t)=\sin(x-ct)$ is a solution of $\frac{\partial^2 u}{\partial t^2} = c^2 \frac{\partial^2 u}{\partial x^2}$.
21. Find the parametric equation for the surface generated by revolving the curve $y=\frac{1}{x}$ about the x -axis where $1 \leq x \leq 5$.
22. Evaluate the triple integral $\iiint_G 12xy^2z^3 dV$ over the rectangular box G defined by the inequalities $-1 \leq x \leq 2, 0 \leq y \leq 3, 0 \leq z \leq 2$.

(8 × 2 = 16 Marks)

UNIT III

Answer any six question from this unit. Each question carries 4 marks.

23. Solve the equation $x^3+6x=20$ by Cardano's method.
24. In $Q[x]$, find the g.c.d. of x^6-1 and x^4-1 . Write the g.c.d. as in Bezout's identity.
25. State and prove Remainder Theorem. State roots theorem.
26. Prove that for any n , $\sum_{d|n} \phi(d) = n$.
27. Find the slope of the sphere $x^2+y^2+z^2=1$ in the y -direction at the points $\left(\frac{2}{3}, \frac{1}{3}, \frac{2}{3}\right)$ and $\left(\frac{2}{3}, \frac{1}{3}, -\frac{2}{3}\right)$.
28. Suppose that $w=x^2+y^2-z^2$ and $x=\rho \sin \phi \cos \theta, y=\rho \sin \phi \sin \theta, z=\rho \cos \phi$. Find $\frac{\partial w}{\partial \rho}$ and $\frac{\partial w}{\partial \theta}$.

29. Use Lagrange Multipliers to determine the dimensions of a rectangular box open at the top, having a volume of 32 ft^3 and requiring the least amount of material for its construction.
30. Find an equation of the tangent plane to the parametric surface $x=uv, y=u, z=v^2$ at the point which correspond to $(u, v) = (2, -1)$.
31. Use a polar double integral to find the area enclosed by the three petaled rose $r = \sin 3\theta$.

(6 × 4 = 24 Marks)

UNIT IV

Answer **any two** question from this unit. Each question carries **15** marks.

32. (a) Solve the equation $x^3 = 7x + 6$.
- (b) Find a solution of $y^4 = 5y + 6$.
33. (a) State fundamental theorem of Algebra.
- (b) Prove that: no polynomial $f(x)$ in $R[x]$ of degree > 2 is irreducible in $R[x]$.
34. (a) Find the absolute maximum and minimum values of $f(x, y) = 3xy - 6x - 3y + 7$ on the closed triangular region R with vertices $(0, 0)$, $(3, 0)$ and $(0, 5)$.
- (b) Locate all relative extrema and saddle points of $f(x, y) = 1 - x^2 - y^2$.
35. (a) Use a triple integral to find the volume of the solid within the cylinder $x^2 + y^2 = 9$ and between the plane $z = 1$ and $x + z = 5$.
- (b) Find the volume of the solid enclosed between the paraboloids $z = 5x^2 + 5y^2$ and $z = 6 - 7x^2 - y^2$.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fourth Semester B.Sc. Degree Examination, March 2020

First Degree Programme under CBCSS

Complementary Course for mathematics

ST 1431.1- TESTING OF HYPOTHESIS AND ANALYSIS OF VARIANCE

(2014 – 17 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions. Each question carries **1** mark.

1. What is a null hypothesis?
2. Define power of a test.
3. What do you mean by p – value?
4. Give an example for a composite hypothesis.
5. Give a test statistic following students t distribution.
6. Give one situation where F test can be used.
7. What do you mean by two tailed test?
8. What is uniformly most powerful test?
9. Give the two factor ANOVA model.
10. What do you mean by assignable causes?

(10 × 1 = 10 Marks)

SECTION – B

Answer **any eight** questions. Each one carries **2** marks.

11. What is statistical hypothesis? Give an example.
12. Distinguish between acceptance region and critical region.
13. What are the major assumptions of ANOVA?
14. State Neyman Pearson Lemma.
15. What is the role of standard error in testing of hypothesis?
16. What are the two types of errors involved in a statistical test?
17. How is the d.f. of the Chi-square for goodness of fit determined?
18. Mention the test statistic and critical region for testing the value of population mean using small samples.
19. Explain what do you mean by testing of homogeneity.
20. A sample of 50 observations were taken from a population with s.d 300. If the mean of the sample is 2200, test the hypothesis that the mean of the population is greater than 2000.
21. Explain random causes affecting variations in observations with example.
22. If 60 out of a group of 1000 insured persons died within a year examine whether the assumption that only less than 4% are likely to die within a year is justifiable.

(8× 2 = 16)

SECTION – C

Answer **any six** questions. Each one carries **4** marks.

23. Explain small sample tests and large tests. Distinguish between their applicational roles with illustration.
24. Distinguish between one way and two way classifications to test the equality of population means.
25. Random samples of sizes 500 and 400 are found to have means 11.5 and 10.9 respectively. Can the samples be regarded as random samples drawn from the same population whose s.d. is 5?
26. If $x \geq 1$ is the critical region for testing $\theta = 2$ against the alternative $\theta = 1$ on the basis of a single observation from the population with p.d.f. $f(x) = \theta e^{-\theta x}$, $0 \leq x \leq \infty$. Obtain the probability of type 1 error.
27. Explain briefly the procedure followed in the testing of statistical hypothesis.
28. Sample of sizes 10 and 18 are taken from two normal populations gave s.d.'s 14 and 20 respectively. Test the hypothesis that the samples have come from populations with the same s.d.
29. A random sample of size 16 has 53 as the mean and the sum of squares of the deviations taken from the mean is 150. Can the sample be regarded as arisen from the population with mean 56.
30. Obtain the most power test of size α for testing $H_0: \theta = \theta_0$ against $H_1: \theta = \theta_1$ where $\theta_1 > \theta_0$ if the population follows $N(\theta, 2)$.
31. The standard deviation of the scores of 10 candidates in an examination is 3.5. Is their justification in the belief that the s.d of the population is less than 3?

(6 × 4 = 24 Marks)

SECTION – D

Answer **any two** questions, each one carries **15** marks.

32. (a) Explain how the χ^2 distribution may be used to test goodness of fit.
- (b) Explain the Chi square test of independence of two attributes. Obtain the formula for testing the independence of two attributes using a 2x2 table where the observed frequencies are a,b,c and d respectively.
33. (a) Explain in detail the use of t statistic in two different situations of testing hypothesis.
- (b) Three women take an advanced typing course in order to increase their speed. Before the course their rates are 40,42 and 40 words per minute. After the course their speeds are 45, 50 and 42 respectively. Is the course effective?
34. (a) How do you test the hypothesis of equality of proportions of successes in two binominal distributions?
- (b) A sample of 200 boys who passed S.S.L.C. examination are found to have mean marks 50 with s.d. 5 for English. The mean marks of 100 girls was found to be 48 with s.d. 4. Does this indicate any significant difference between the abilities of boys and girls assuming the s.d. the same. ($\alpha = 0.05$).
35. Explain in detail the one way ANOVA giving the assumptions, model and layout.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fourth Semester B.Sc. Degree Examination, March 2020

First Degree Programme Under CBCSS

Physics

Core Course III

PY 1441 – ELECTRODYNAMICS

(2014-17 Admissions)

Time : 3 Hours

Max. Marks : 80

Symbols used in this question paper have their usual meanings.

SECTION – A

Answer **all** questions. Each question carries **1** mark.

1. What is electric potential?
2. Write Differential form of Gauss's law?
3. Give electric field in terms of surface charge density
4. Write one dimensional wave equation.
5. What is Lorentz force in electro magnetism?
6. What do you mean by monochromatic plane waves?
7. Give wave impedance in electromagnetic wave propagation.

8. Explain Faraday's law.
9. What is time constant in C-R circuit?
10. What do you mean by capacitive impedance?

(10 × 1 = 10 Marks)

SECTION – B

Answer **any eight**. Each question carries **2** marks.

11. Describe the electric field as negative gradient of potential.
12. Derive the equation for electric displacement in dielectric medium.
13. Describe the Cyclotron motion of charge in magnetic field and get its frequency.
14. Arrive at the relation between dielectric constant and electric susceptibility.
15. Derive Poisson's and Laplace equations.
16. Describe the hysteresis of a ferromagnetic material.
17. Write the electromagnetic equations and bring about the corrections introduced by Maxwell.
18. Write about magnetic vector potential.
19. Explain the high resistance measurement by leakage method.
20. Explain resonance in a series LCR circuit.
21. What do you mean by skin effect?
22. Explain thevenins theorem.

(8 × 2 = 16 Marks)

SECTION – C

Answer **any six**. Each question carries **4** marks.

23. Find the electric field due to a uniformly charged solid cylinder both inside and outside the cylinder.
24. A soap bubble is formed at one end of an open glass tube with soap solution of surface tension $T = 0.025 \text{ N/m}$. What should be the charge on it to keep its radius as 6mm. (Given, inward pressure due to surface tension is $4T/R$).
25. A point charge of 10^{-7} C is situated at the centre of a cube of 1 cm side. Calculate the electric flux through its surface.
26. If the relative permittivity of silicon crystal at optical frequencies is 12, determine the velocity of light inside silicon crystal.
27. A cyclotron has an oscillator frequency of 12×10^6 cycles per second and a disc radius of 50 cm. What value of magnetic induction B is needed to accelerate protons? Mass of proton = $1.67 \times 10^{-27} \text{ Kg}$.
28. A particle of charge 10^{-20} C is moving with a velocity $8 \times 10^6 \text{ m/s}$. It enters a region of electric field 10^6 V/m and magnetic field 0.2 k T . Find the force on it.
29. A capacitor of capacitance 0.01 micro Farad is first charged and then discharged through a resistance of 10 mega ohm. Find the time the potential will take to fall half its original value.
30. Prove that for an ideal constant voltage source the internal resistance of the source should be zero.
31. An ac of 200V, 50 HZ is applied to a capacitor in series with a 20 V, 5 W lamp. Find the capacitance.

(6 × 4 = 24 Marks)

SECTION – D

Answer **any two** questions. Each question carries **15** marks.

32. What do you mean by electric field intensity? Find out the electric field due to a charged sheet, and two parallel infinite sheets.
33. Give physical interpretation of bound charges in an insulator. Also show that the surface charge density is equal to the amount of polarization normal to the face and volume charge density is negative divergence of polarization for a non uniformly polarized object.
34. Discuss about the growth and decay of current in an inductor through a resistor.
35. Explain Maximum power transfer theorem with proof. Deduce the maximum efficiency.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fourth Semester B.Sc. Degree Examination, March 2020

First Degree Programme Under CBCSS

Complementary Course for Physics

**MM 1431.1 MATHEMATICS IV (COMPLEX ANALYSIS, FOURIER SERIES
AND FOURIER TRANSFORMS**

(2014 – 2017 Admissions)

Time : 3 Hours

Max. Marks : 80

SECTION – I

All the first **ten** questions are compulsory. They carry **1** mark each.

1. If $z_1 = 6 + 3i, z_2 = -2 + 3i$, what is the real part of $\frac{z_1}{z_2}$?
2. Using D'Moivre's Theorem, express $\cos 4\theta$ in terms of powers of $\cos \theta$ and $\sin \theta$.
3. Define analyticity of a complex function $f(z)$ at a point $z = z_0$ in a domain D in the complex plane.
4. Define harmonic functions.
5. State Cauchy's Integral theorem.
6. Obtain the singular points of the function $f(z) = \cot z$.
7. Find the residue of $f(z) = \frac{1}{(z^2 + 1)^3}$ at $z = i$.

8. State Dirichlet conditions for the convergence of a Fourier series of a function $f(x)$ of period 2π .
9. Write the standard form of Fourier Cosine series and formulae for Fourier coefficients of the half range Cosine series of a function $f(x)$ in $(0, \pi)$.
10. If $F(s)$ is the Fourier transform of $f(x)$ then what is the Fourier transform of $f(ax)$ where $a \neq 0$.

(10 × 1 = 10 Marks)

SECTION – II

Answer **any eight** questions from among the questions 11 to 22. These questions carry **2 marks** each.

11. Find all distinct cube roots of i .
12. Show that an analytic function is constant if its modulus is constant.
13. Find an analytic function $f(z)$ whose real part is $u(x, y) = x^2 - y^2$.
14. Evaluate $\int_C \operatorname{Re} z \, dz$ where C is the shortest path from $1 + i$ to $3 + 2i$.
15. Find the centre and radius of convergence of the power series $\sum_{n=1}^{\infty} (z + i\sqrt{2})^n$.
16. Determine the location and nature of singularities of $f(z) = \frac{2}{z^3} - \frac{1}{z}$.
17. Find the residues of $f(z) = \frac{1}{(z^2 - 1)^2}$.
18. Expand $f(z) = \frac{1}{z^3 - z^4}$ as a Laurent's series that converges for $0 < |z| < 1$.
19. Evaluate $\int_{|z|=1} \frac{z}{(4z + i)^2} dz$.
20. Find the half range sine series of $f(x) = x$, $0 < x < \pi$.

21. Find the Fourier series of periodicity 2 for $f(x) = \begin{cases} 0, & -1 < x < 0 \\ 1, & 0 < x < 1 \end{cases}$

22. Prove that Fourier transform is a linear operator.

(8 × 2 = 16 Marks)

SECTION - III

Answer any six questions from among the questions 23 to 31. These questions carry 4 marks each.

23. Prove that the function $f(z) = |z|^2$ is differentiable at the origin but not analytic at the origin.

24. What are the values of $\int_C \frac{z+1}{z^2(z-2)} dz$ around the circles C where C is

(a) $|z| = 1$ and

(b) $|z - 2 - i| = 2$.

25. Expand $f(z) = \frac{1}{z(z^2 - 3z + 2)}$ in the region $0 < |z| < 1$.

26. Obtain the residues of $f(z) = \frac{z^2 - z + 2}{(z + 3i)(z - 3i)(z + i)(z - i)}$ at its poles.

27. State Cauchy's Residue Theorem. Use Cauchy's Residue Theorem to evaluate the integral of the function $f(z) = \frac{z^5}{1 - z^3}$ around the circle $|z| = 2$, in the positive sense.

28. Show that $\int_{-\infty}^{\infty} \frac{\cos 3x}{(x^2 + 1)^2} dx = \frac{2\pi}{e^3}$.

29. Obtain the Fourier series of the periodic function defined by

$$f(x) = \begin{cases} -\pi & \text{if } -\pi < x < 0 \\ x & \text{if } 0 < x < \pi \end{cases}$$
. Deduce that $\frac{\pi^2}{8} + \frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \dots = \infty$.
30. Expand $f(x) = x - x^2$ as a Fourier series in $-1 < x < 1$.
31. Find the Fourier transform of $f(x) = \begin{cases} 1, & |x| < 1 \\ 0, & |x| > 1 \end{cases}$. Hence evaluate $\int_0^\infty \frac{\sin x}{x} dx$.

(6 × 4 = 24 Marks)

SECTION – IV

Answer **any two** questions from among the questions **32 to 35**. These questions carry **15 marks each**.

32. (a) Show that the function $u(x, y) = x^3 - 3xy^2 + 3x^2 - 3y^2 + 1$ is harmonic and find the corresponding analytic function $f(z)$ in terms of z .
- (b) If $f(z) = \sqrt{xy}$, check whether the Cauchy Riemann equations are satisfied at the origin. Is the function analytic at the origin? Justify your answer.
33. (a) Expand $\frac{1}{1-z^2}$ as a Taylor series about $z = i$.
- (b) Evaluate $\int_C \frac{dz}{z^3(z+2)}$ where C is $|z| = 3$.
34. Expand $f(x) = x^2, -\pi < x < \pi$ as a Fourier series of periodicity 2π . Hence deduce the following
- (a) $\sum \frac{1}{n^2} = \frac{\pi^2}{6}$
- (b) $\frac{\pi^2}{12} = \frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \dots \dots \dots \infty$ and
- (c) $\frac{\pi^2}{8} = \frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \dots \dots \dots \infty$.
35. Find the Fourier transform of $e^{-a|x|}$, $a > 0$. Deduce that

$$\int_{-\infty}^{\infty} \frac{\cos sx}{a^2 + s^2} ds = \frac{\pi}{2a} e^{-ax}, x > 0.$$

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fourth Semester B.Sc. Degree Examination, March 2020

First Degree Programme under CBCSS

Complementary Course For Chemistry/ Polymer Chemistry

MM 1431.2 : MATHEMATICS IV (ABSTRACT ALGEBRA, AND LINEAR
TRANSFORMATIONS)

(2014 – 17 Admission)

Time : 3 Hours

Max. Marks : 80

PART – I

Answer **all** questions. Each question carries **1** mark.

1. Give an example of a non abelian group.
2. Write the generators of Z_6 .
3. True or false. Every Cyclic group is abelian.
4. State whether true or false. Every field is also a ring.
5. Give an example of a ring that is not a field.

P.T.O.

6. Check whether the vectors $\begin{bmatrix} 1 \\ -1 \end{bmatrix}, \begin{bmatrix} 1 \\ 1 \end{bmatrix}, \begin{bmatrix} 1 \\ 2 \end{bmatrix}$ are linearly independent.
7. Define a linear transformation.
8. If $T: \mathbb{R}^2 \rightarrow \mathbb{R}^2$ is defined by $T(x) = Ax$, Where $A = \begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix}$. Find the image of $\begin{bmatrix} 1 \\ -3 \end{bmatrix}$.
9. Find the standard matrix A for the dilation transformation $T_x = 2x$ for $x \in \mathbb{R}^3$.
10. Define a 1-1 mapping.

(10 × 1 = 10 Marks)

PART – II

Answer **any eight** questions. Each question carries **2** marks

11. Determine whether the binary operation $*$ defined on $\mathbb{Z}$ by $a * b = a - b$ is commutative and whether $*$ is associative.
12. If G is a group with binary operation $*$, show that $a * b = a * c$ implies $b = c$ for all $a, b, c, \in G$.
13. Find the generators of $\mathbb{Z}_4$.
14. Show that every cyclic group is abelian.
15. Define a ring. Give an example.

16. Find the number of generators of the cyclic subgroup of Z_{30} generated by 25.
17. Check whether the vectors $v_1 = \begin{bmatrix} 3 \\ 1 \end{bmatrix}$, $v_2 = \begin{bmatrix} 6 \\ 2 \end{bmatrix}$ are linearly independent.
18. Let $T: \mathbb{R}^3 \rightarrow \mathbb{R}^3$ be defined by $T(x) = Ax$, where $A = \begin{bmatrix} 1 & 0 & -3 \\ -3 & 1 & 6 \\ 2 & -2 & -1 \end{bmatrix}$. Find $T(b)$ where $b = \begin{bmatrix} -2 \\ 3 \\ 1 \end{bmatrix}$.
19. Does the transformation $T: \mathbb{R}^2 \rightarrow \mathbb{R}^3$ defined by $T(x_1, x_2) = (x_1 - 2x_2, x_1 - 3, 2x_1 - 5x_2)$ linear?
20. Illustrate the transformation rotation. What is the matrix of this transformation?
21. Describe geometrically what T does to each vector x in $\mathbb{R}^2$, where $T(x) = \begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$.
22. Find the value of h such that $\begin{bmatrix} 2 \\ -2 \\ 4 \end{bmatrix}, \begin{bmatrix} 4 \\ -6 \\ 7 \end{bmatrix}, \begin{bmatrix} -2 \\ 2 \\ h \end{bmatrix}$ are linearly dependent.

(8 × 2 = 16 Marks)

PART – III

Answer **any six** questions. Each questions carries **4** marks

23. Define $*$ on the set of positive rational numbers Q^+ by $a * b = \frac{ab}{2}$. show that $\langle Q^+, * \rangle$ is a group.
24. Draw a subgroup diagram for the Klein-4 group.
25. Find all orders of the subgroups of Z_{20} .
26. Check whether the set $\{a + b\sqrt{2} / a, b \in Z\}$ with the usual addition and multiplication forms a ring. Is it a commutative ring?
27. Describe all units in the ring Z_5 .
28. Determine whether the columns of the matrix $A = \begin{bmatrix} 0 & -3 & 9 \\ 2 & 1 & -7 \\ -1 & 4 & -5 \\ 1 & -4 & -2 \end{bmatrix}$ form a linearly independent set.
29. Find all x in R^4 that are mapped into the zero vector by the transformation $x \rightarrow Ax$ for the matrix $A = \begin{bmatrix} 1 & -3 & 5 & -5 \\ 0 & 1 & -3 & 5 \\ 2 & -4 & 4 & -4 \end{bmatrix}$.

30. Let T be the linear transformation whose standard matrix is

$$A = \begin{bmatrix} 1 & -4 & 8 & 1 \\ 0 & 2 & -1 & 3 \\ 0 & 0 & 0 & 5 \end{bmatrix} \text{ Does } T \text{ map } R^4 \text{ onto } R^3? \text{ Is } T \text{ a 1-1 mapping?}$$

31. Let $T: R^2 \rightarrow R^2$ be a linear transformation such that $T(x_1, x_2) = (x_1 + x_2, 4x_1 + 5x_2)$. Find x such that $T(x) = (3, 8)$.

(6 × 4 = 24 Marks)

PART – IV

Answer **any two** questions. Each question carries **15** marks

32. (a) Find all subgroups of Z_{18} and give their subgroup diagram.

(b) Define permutation group. Find $\mu\sigma$ and σ^2 where $\mu = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 3 & 1 & 4 & 5 & 6 & 2 \end{pmatrix}$

and $\sigma = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 2 & 4 & 1 & 3 & 6 & 5 \end{pmatrix}$.

33. (a) Define a field. Give an example.

(b) Show that $2\mathbb{Z}$, the set of all even integers is a ring under usual addition and multiplication. Is the ring commutative?

34. (a) Prove that $T: R^2 \rightarrow R^2$ defined by $T(x_1, x_2) = (4x_1 - 2x_2, 3|x_2|)$ is not linear.

(b) Find the standard matrix of the linear transformation that first reflects the points through the horizontal x_1 axis and then reflects the points through the line $x_2 = x_1$.

35. (a) Show that an indexed set $s = \{v_1, v_2, \dots, v_p\}$ of two or more vectors is linearly independent if and only if at least one of the vectors in s is a linear combination of the others.
- (b) If the matrix given below determines a linear transformation T , find all x such that $T(x) = 0$.

$$\begin{bmatrix} -9 & -4 & -9 & 4 \\ 5 & -8 & -7 & 6 \\ 7 & 11 & 16 & -9 \\ 9 & -7 & -4 & 5 \end{bmatrix}$$

(2 × 15 = 30 Marks)

(Pages : 4)

J – 1207

Reg. No. :

Name :

Fourth Semester B.Sc. Degree Examination, March 2020

First Degree Programme Under CBCSS

Chemistry

Core Course

CH 1441 : ORGANIC CHEMISTRY – I

(2017 Admission onwards)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions. Answer in **one word** to maximum two sentences.
Each question carries 1 mark.

1. What are electrophiles?
2. What is a symmetry element?
3. Define mesomeric effect?
4. What are carbenes?
5. What are dyes?
6. What are enantiomers?
7. What is angle strain in cycloalkanes?

P.T.O.

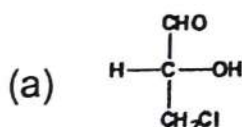
8. What is homolytic bond fission?
9. What are conformational isomers?
10. What are photosensitizers?

(10 × 1 = 10 Marks)

SECTION – B

Short answer type, Answer any **eight** questions. **Each** question carries **2** marks.

11. Explain Hoffmann elimination with suitable example.
12. Why 2-butene is more stable than 1-butene?
13. Explain the stability of tropylium cation.
14. What are electrocyclic reactions? Explain with examples.
15. Explain the mechanism of Friedel Craft's alkylation reaction.
16. Assign the configuration R or S to the following compounds.



17. Draw and label the Sawhorse representation for the two extreme conformations of ethane.
18. Explain Bayer's strain theory.
19. Distinguish between relative and absolute configurations.
20. Explain *cis*-hydroxylation with a suitable example.
21. What are the different types of arrows used for writing reaction mechanism? Explain.
22. Explain Markownikoff's rule with a suitable example.

(8 × 2 = 16 Marks)

SECTION – C

Short essay type. Answer any **six** questions. **Each** question carries **4** marks.

23. Explain the mechanism of E1 and E2 reactions.
24. Discuss the elimination-addition mechanism of aromatic nucleophilic substitution reactions with suitable examples.
25. Discuss the stereochemical aspects of S_N1 and S_N2 reactions.
26. Explain Huckel's rule of aromaticity.
27. Write a brief note on the optical activity of tartaric acid.
28. What is inductive effect? How does it influence the acidity of organic acids?
29. Discuss the uniqueness of carbon.
30. Explain the mechanism of aromatic electrophilic substitution reactions.
31. Explain Norrish type-I and Norrish type-II reactions.

(6 × 4 = 24 Marks)

SECTION – D

Answer any **two** questions. **Each** question carries **15** marks.

32. Discuss with suitable examples, structure, formation, stability and reactions of carbocations, carbanions and free radicals.
33. Explain
 - (a) Conformational isomerism in cyclohexane.
 - (b) Geometrical isomerism in ketoximes.

34. Give an account on

(a) Methods of resolution of racemic mixtures.

(b) Carcinogenic polynucleararenes.

35. Discuss the theories of colour and constitution.

(2 × 15 = 30 Marks)

St. Xavier's College

Reg. No. :

Name :

Fourth Semester B.Sc. Degree Examination, March 2020

First Degree Programme Under CBCSS

Complementary Course for Mathematics

ST 1431.1: STATISTICAL INFERENCE

(2018 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions. **Each** question carries **1** mark.

1. Define consistent estimator.
2. Define maximum likelihood estimator.
3. Discuss what you mean by confidence coefficient.
4. Describe P-value.
5. Define type I error.
6. Describe null hypothesis.
7. Define power of a test.
8. Define critical region.

9. Identify composite hypothesis in the following
- (a) $H_0: \mu = 0, \sigma^2 = 1$ in $N(\mu, \sigma^2)$
 - (b) $H_0: \lambda < 10$ in $P(\lambda)$
 - (c) $H_0: \mu = 0$ in $N(\mu, \sigma^2)$
10. Define chance causes of variation.

(10 × 1 = 10 Marks)

SECTION – B

Answer **any eight** questions. **Each** question carries **2** marks.

- 11. Describe sufficient statistics.
- 12. Describe relative efficiency.
- 13. State factorization theorem. Mention its uses.
- 14. Prove that in sampling from normal population with mean μ and variance σ^2 , sample mean is a consistent estimator of population mean.
- 15. State Neymann – Pearson lemma.
- 16. Distinguish between one tailed and two tailed tests.
- 17. A sample of 900 members has a mean 3.4 and standard deviation 2.61. Is the sample from a large population of mean 3.25 at 5% level?
- 18. A sample 15 values shows the standard deviation 6.4. Is this compatible with the hypothesis that the sample is from a normal population with standard deviation 5?
- 19. Discuss the test procedure for testing the significance of single proportion based on large samples.
- 20. Obtain the maximum likelihood estimator of μ based on a random sample of size n from $N(\mu, 1)$.
- 21. What are the assumptions used to conduct analysis of variance.
- 22. Explain the term randomization.

(8 × 2 = 16 Marks)

SECTION – C

Answer **any six** questions. **Each** question carries **4** marks.

23. Let (x_1, x_2, x_3) be three independent observations drawn from a population with mean μ and variance σ^2 . Consider the following estimators.

$$t_1 = x_1 + x_2 - x_3; t_2 = 2x_1 + 3x_2 - \mu x_3$$

Are t_1 and t_2 unbiased estimators of μ ? Which one is more efficient?

24. Examine the consistency of sample variance based on a random sample of size n drawn from $N(\mu, \sigma^2)$ when
- (a) Sample size is small.
 - (b) For large samples.
25. Describe the method of moment estimation.
26. Critically examine how interval estimation differ from point estimation?
27. Obtain the 100(1-2)-1- confidence interval for the mean of normal population when variance is unknown.
28. Discuss large sample test for testing the significant difference of two proportions.
29. Discuss χ^2 -test for goodness of fit.
30. Height of 10 males in a given locality are found to be 70, 67, 62, 68, 61, 68, 70, 64, 64, 68. Is it reasonable to believe that average height is greater than 64 inches (at 5% level).
31. Explain how will you control experimental error using replication.

(6 × 4 = 24 Marks)

SECTION – D

Answer any **two** questions. **Each** question carries **15** marks.

32. (a) Find a sufficient estimator of σ^2 based on a random sample of size n from $N(0, \sigma^2)$. Also find the $100(1 - \alpha)\%$ confidence interval of σ^2 , $nN(0, \sigma^2)$.
- (b) Find the maximum likelihood estimators of μ and σ^2 based on a random sample of size n from $N(\mu, \sigma^2)$.
33. (a) Describe small sample test for testing the difference of means of two independent normal populations.
- (b) Below are given the gain in weights of Pigs fed on two diets A and B. Test whether the two diets differ significantly with respect to their gain in weight.

Gain in weight

Diet A 25, 32, 30, 34, 24, 14, 32, 24, 30, 31, 35, 25

Diet B 44, 34, 22, 10, 47, 31, 40, 30, 32, 35, 18, 21, 35, 29, 22

34. (a) Discuss F-test for testing the equality of two variances.
- (b) Discuss the additive model and hypotheses to be tested in a two way ANOVA.
35. Describe χ^2 -test for independence of attributes out of 8000 graduates in a town 800 are females. Out of 1600 graduate employees 120 are females. Use χ^2 -test to determine if any distinction is made, in appointment on the basis of sex.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fourth Semester B.Sc. Degree Examination, March 2020

First Degree Programme Under CBCSS

Complementary Course

PY 1431.1 : MODERN PHYSICS AND ELECTRONICS

(For Mathematics)

(2018 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions in **one** or **two** sentences. Each question carries **1** mark.

1. Name the spectral series of hydrogen atom in the visible region.
2. Write the Schrodinger equation in time independent form.
3. Define packing fraction.
4. Write Plank's law of black body radiation.
5. What is the origin of leakage current in a pn junction diode.
6. Define current amplification factor in common emitter configuration.
7. What is ripple factor?
8. Write down the truth table of NAND gate.

9. The BCD equivalent for 37_{10} is _____.
10. What is De Morgan's theorem?

(10 × 1 = 10 Marks)

SECTION – B

Answer any **eight** questions, not exceeding a paragraph. Each question carries **2** marks.

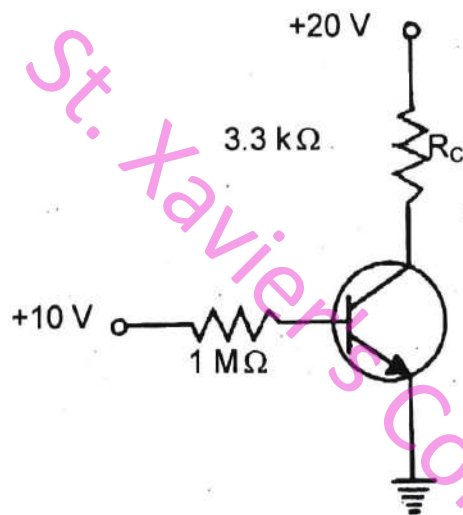
11. Draw the input and output characteristics of Common emitter transistor configuration. What do you infer from these characteristics?
12. The mass of nucleus is always less than the sum of the masses of its nucleons. Why?
13. Sketch construction and working of half wave rectifier. Sketch its output wave form.
14. What is Zener diode? How its characteristics differ from an ordinary diode.
15. Which of the following wave functions cannot be a solutions of Schrodinger's equation for all positive values of x ? Why not (a) $\psi = Ae^{x^2}$ (b) $\psi = Ae^{-x}$.
16. Briefly explain any two inadequacies of classical mechanics.
17. Explain ac and dc load line.
18. Write a short note on nuclear spin and nuclear magnetic moment.
19. What are various quantum numbers in vector atom model?
20. Explain the laws of Boolean Algebra.
21. Using 2's complement subtract 11011 from 10101.
22. Draw logic implementation of an AND gate and OR gate using NAND gates.

(8 × 2 = 16 Marks)

SECTION – C

Answer any **six** questions. Each question carries **4** marks.

23. An electron is contained in a one-dimensional box of width 1.0 nm. Calculate energy of electrons for the level up to $n = 4$.
24. Write a short note on Radioactive equilibrium.
25. Find the binary and decimal equivalent of (a) $(17E)_{16}$ (b) $(762)_8$
26. Draw dc load line. Calculate operating point if $V_{BE} = 0.7 \text{ V}$ and $\beta = 500$.



27. The four semiconductor diodes used in a bridge rectifier circuit have forward resistance which can be considered constant at 0.1Ω and infinite reverse resistance. They supply a mean current of 100 mA to a resistive load from a sinusoidally varying alternating supply of 20 V rms. Determine resistance of the load and efficiency of the circuit.
28. In a transistor employed in common emitter configuration, the base current is $68 \mu\text{A}$ and current gain is 440. Find Collector current and Emitter Current. Also find the current gain in common base configuration.
29. Calculate the binding energy of an α particle in Joules. Mass of α particle = 4.03188 u and Mass of proton = 1.00728 u, Mass of neutron = 1.00866 u.

30. Simplify the following Boolean expressions

(a) $ABC + ABC + ABC + ABC$

(b) $AB + AC + B$

31. A 9 volts stabilized voltage supply is required to run a car stereo system from the car's 12 volt battery. A zener diode with $V_z = 9\text{ V}$ with $P_{max} = 0.27\text{ W}$ is used as a voltage regulator. Find the value of the series resistor if the load resistance is $450\ \Omega$.

(6 × 4 = 24 Marks)

SECTION – D

Answer any **two**. Each carries **15** marks.

32. What are the essential features of Bohr atom model? Derive expressions for the radii of stationary orbits for electrons and the total energy of electron in the orbit. Discuss the origin of the spectral series of hydrogen.
33. What are the basic laws of radio activity? Derive an expression for mean life and half life of a radioactive element.
34. With the help of neat diagram explain construction and working of a single stage transistor amplifier. Hence explain frequency response curve, gain and band width.
35. Discuss the normalization and probability interpretation of a wave function. Give physical interpretation of wave function. Obtain Schrodinger steady state equation.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fourth Semester B.Sc. Degree Examination, March 2020

First Degree Programme Under CBCSS

Physics

Core Course III

PY 1441: CLASSICAL AND RELATIVISTIC MECHANICS

(2018 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions in **one** or **two** sentences. **Each** question carries **1** mark.

1. Determine the number of degrees of freedom for a mass less rod, moving freely in space with a particle which is constrained to move on the rod.
2. What are the two fundamental postulates of the special theory of relativity?
3. Why is the Hamiltonian formulation is preferred over the Lagrangian formulation?
4. What is generalized momentum?
5. What is inverse square law force?
6. The Lagrangian of a particle moving in a plane under the influence of a central potential is given by $L = \frac{1}{2}m(\dot{r}^2 + r^2\dot{\theta}^2) - V(r)$. Find the generalized momenta corresponding to r and θ .

7. What are inertial and non-inertial frames?
8. State Kepler's third law of planetary motion.
9. Write down the Hamilton's canonical equations of motion.
10. In the laboratory one particle A has the velocity v and another particle B had velocity $-v$ opposite to each other. What is the velocity of A relative to B?

(10 × 1 = 10 Marks)

SECTION – B

Answer **any eight** questions in a paragraph each. **Each** question carries **2** marks.

11. Explain conservative and non-conservative forces with examples.
12. Prove that angular momentum is a constant to motion under central force.
13. What are the postulates of special theory of relativity? Mention the consequences of the postulates.
14. Explain the terms 'length contraction' and 'time dilation'.
15. What is a central force? Give two examples.
16. Write a note on holonomic and non-holonomic constraints with two examples of each type.
17. Show that work done by constraint forces in a rigid body is zero.
18. Moving clock appears to go slow. Explain.
19. Discuss the importance of negative results of Michelson – Morley experiment.
20. What type of difficulties arise due to the constraints in the solution of mechanical problems and how these are removed?
21. What do you understand by covariance of physical laws?
22. Briefly discuss the relativistic law of addition of velocities.

(8 × 2 = 16 Marks)

SECTION – C

Answer any **six** questions; not exceeding a paragraph. **Each** question carries **4** marks.

23. Derive Lagrange's equations of motion.
24. A clock keeps correct time. With what speed should it be moved relative to an observer so that it may seem to lose 2 minutes in 24 hours?
25. A hypothetical train moving with a speed of $0.6c$ passes by the platform of a small station without being slowed down, the observer on the platform note that length of the train is just equal to the length of the platform which is 200 m.
 - (i) Find the rest length of the train.
 - (ii) Find the length of the platform as measured by the observer in the train.
26. A beam of pions has velocity $v = 0.6 c$. The pion has a half-life of 1.8×10^{-8} sec. How long will it take for the pions to decay? How far will they travel in this time?
27. Write the Hamiltonian for a simple pendulum and deduce its equations of motion.
28. The Lagrangian for anharmonic oscillator is given by $L = \frac{1}{2} \dot{x}^2 - \frac{1}{2} w^2 x^2 - \alpha x^3$. Find the Hamiltonian.
29. Write the Lagrangian for the following systems:
 - (i) A mass m is suspended to a spring of force constant k and allowed to swing vertically.
 - (ii) A uniform rod of mass m and length a , pivoted at a distance l from the centre of mass, swings in a vertical plane.
30. Obtain the equation of motion of a simple pendulum by using Lagrangian method and hence deduce the formula for its time period for small amplitude oscillations.
31. When a particle moves under a central force, show that its angular momentum is conserved and the areal velocity remains constant.

(6 × 4 = 24 Marks)

SECTION – D

Answer any **two** questions; not exceeding a paragraph. **Each** question carries **15** marks.

32. (i) Describe the Michelson-Morley's experiment. What was the purpose of this experiment and what was the conclusion?
- (ii) What significant change this experiment could introduce in the Galilean theory of relativity?
33. Using the Hamiltons principle of least action derive the Lagrange equations for system of particles.
34. (i) Explain what is meant by generalized coordinates, holonomic constraints and the principle of virtual work.
- (ii) Obtain the D'Alembert's principle in generalized coordinates and use it to obtain the Lagrange's equations of motion for a holonomic conservative system.
35. (i) Using Newton's laws of motion, deduce the conservation theorems of linear momentum, angular momentum and energy for the motion of a particle.
- (ii) What are first integrals of motion?

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fourth Semester B.Sc. Degree Examination, March 2020

First Degree Programme under CBCSS

Complementary Course for Physics

**MM 1431.1 : MATHEMATICS IV – COMPLEX ANALYSIS, SPECIAL
FUNCTIONS AND PROBABILITY THEORY**

(2018 Admission)

Time : 3 Hours

Max. Marks : 80

PART – A

Answer **all** questions. Each question carries **1** mark

1. Define harmonic function.
2. Define regular point.
3. Write Cauchy's integral formula.
4. What is the residue of e^z at $z = 0$?
5. Define Beta function.
6. What is the value of $\sqrt{\left(\frac{1}{2}\right)}$?
7. A single card is drawn at random from a shuffled deck. What is the probability that it is red?

8. Define Poisson probability function.
9. What is the standard deviation of Binomial distribution?
10. What is the mean and variance of standard normal distribution?

(10 × 1 = 10 Marks)

PART – B

Answer **any eight** questions. Each question carries **2** marks

11. Find the real and imaginary part of $\cosh z$.
12. Check whether the following function is analytic or not $f(z) = z^2$.
13. Show that $f(x, y) = e^x \sin y$ satisfies the Laplace equation.
14. Evaluate $\oint_C \frac{dz}{z-a}$ where is the curve $|z-a|=r$.
15. Expand in Laurent's series $\frac{1}{z(z-1)^2}$ at the point $z=1$.
16. Define Gamma function of negative numbers and evaluate $\sqrt{-3}$.
17. Prove that $B(p, q) = B(q, p)$.
18. Evaluate $\int_0^\infty x^{1/4} e^{-\sqrt{x}} dx$.
19. Two dice are thrown together. What is the probability that sum is greater than 8.
20. Criticize the statement "The mean of a binomial distribution is 5 and standard deviation is 3".

21. If x is a poisson variate such that $P(x = 1) = P(x = 2)$, then evaluate $P(x = 4)$.
22. The diameter of an electric cable is assumed to be a continuous random variate with probability density function $f(x) = 6x(1 - x)$, $0 \leq x \leq 1$ find mean.

(8 × 2 = 16 Marks)

PART – C

Answer **any six** questions. Each question carries **4** marks

23. Find an analytic function whose imaginary part is $3x^2y - y^3$ and which vanishes at $z = 0$.
24. Evaluate $\int_{-\infty}^{\infty} \frac{dx}{x^2 + 4x + 5}$.
25. Evaluate $\int_0^{2\pi} \frac{d\theta}{13 + 5 \sin \theta}$.
26. Prove that $\sqrt{p+1} = p\sqrt{p}$.
27. Show that $1.3.5...(2n-1) = \frac{2^n \sqrt{n + \frac{1}{2}}}{\sqrt{\pi}}$.
28. Express $\int_0^{\pi/2} \sin^p x \cos^q x dx$ in terms of Gamma function.
29. From group of 8 children, 5 boys and 3 girls, three children are selected at random. Calculate the probability that the selected group contains atleast one girl.
30. In a certain factory turning out razor blades, there is a chance (1/100) for any blade to be defective. The blades are in packets of 10. Use Poisson distribution to calculate the approximate number of packets containing no, one and two defective blades respectively in a consignment of 10000 packets.
31. Find the number r such that the area under the normal distribution curve $y = f(x)$ from $\mu = r$ to $\mu + r$ is equal to 1/2.

(6 × 4 = 24 Marks)

PART – D

Answer **any two** questions. Each question carries **15** marks

32. State and prove the necessary and sufficient condition for $f(z)$ to be analytic.
33. Prove that $B(p, q) = \frac{\sqrt{p}\sqrt{q}}{\sqrt{p+q}}$.
34. (a) Suppose it is known that 1% of the population have a certain kind of cancer. It is also known that a test for this kind of cancer is positive in 99% of the people who have it but is also positive in 2% of the people who do not have it. What is the probability that a person who tests positive has cancer of this type?
- (b) A doctor is to visit the patient and from past experience it is known that the probabilities that he will come by train, bus or scooter are respectively $3/10$, $1/5$ and $1/10$, the probability that he will use some other means of transport being, therefore, $2/5$. If he comes by train, the probability that he will be late is $1/4$ if by bus $1/3$ and if by scooter $1/12$, if he uses other means of transport it can be assumed that he will not be late. When he arrives he is late. What is the probability that he comes by train.
35. (a) Find the probability of exactly 52 heads in 100 tosses of a coin using the binomial distribution and using the normal approximation.
- (b) If there are 100 misprints in a magazine of 40 pages, on how many pages would you expect to find no misprints? Two misprints? Five misprints?

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fourth Semester B.Sc. Degree Examination, March 2020

First Degree Programme under CBCSS

Complementary Course for Chemistry/Polymer Chemistry

MM 1431.2: MATHEMATICS IV-DIFFERENTIAL EQUATIONS, VECTOR
CALCULUS AND ABSTRACT ALGEBRA

(2018 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION - I

All the first 10 questions are compulsory. They carry 1 mark each.

1. The order and degree of the differential equation $\frac{d^2y}{dx^2} + (dy/dx)^3$ is _____.
2. Write down the differential equation corresponding to $y = cx$.
3. The integrating factor of $dy/dx + py = a$ is _____.
4. Double Integrals are also called _____.
5. The transformation J (Jacobian) from Cartesian co-ordinate to polar co-ordinate is _____.
6. The value of $\int_0^1 \int_0^1 xy^2 dy dx$ is _____.

7. An element $a \in G$ (G is a group) is called idempotent if _____
8. The inverse of an element a in the additive group of integer modulo n is _____
9. The symmetric group S_n contains _____ elements.
10. Any cyclic group is _____.

(10 × 1 = 10 Marks)

SECTION – II

Answer **any eight** questions from the following **11 to 22** questions. They carry **2 mark each**.

11. Form the differential equation for which $xy = ae^x + be^{-x} + x^2$ is a solution.
12. Verify whether $e^y dx + (xe^y + 2y) dy = 0$ is exact or not.
13. Write Clairaut's equations.
14. Solve $(y'' + y' + 1)^2 = 0$.
15. If $R(u) = u^2 \vec{i} + 2u^3 \vec{j} - 5\vec{k}$ then find $\int R(u) du$.
16. Define the Divergence theorem.
17. Find the area of the ellipse $x = a \cos \theta$, $y = b \sin \theta$.
18. Prove a sufficient condition in which $\oint \vec{A} \cdot d\vec{v} = 0$ for every closed curve C such that $\nabla \times \vec{A} = 0$ identically.
19. Prove that in a group the identity element and inverse elements are unique.
20. Prove that in an abelian group G , $(ab)^2 = a^2 b^2$ for all $a, b \in G$.

21. If $\alpha = \begin{bmatrix} 1 & 2 & 3 & 4 \\ 2 & 4 & 1 & 3 \end{bmatrix}$, $\beta = \begin{bmatrix} 1 & 2 & 3 & 4 \\ 3 & 4 & 1 & 2 \end{bmatrix}$ then compute $\alpha\beta$, α^{-1} .

22. If H and K are subgroups of a group G then prove that $H \cap K$ is also a subgroup of G .

(8 × 2 = 16 Marks)

SECTION III

Answer any **six** questions **23** to **31**. These questions carry **4** marks each.

23. Solve $x dy/dx + 3x + y = 0$.

24. Write a short note about Homogeneous equations.

25. Solve $dy/dx = \frac{-1}{2xy} \left(y^2 + \frac{2}{x} \right)$.

26. Solve $xp^2 + 2px - y = 0$.

27. Express the vector field $\vec{a} = yz\vec{i} - y\vec{j} + xz^2\vec{k}$ in cylindrical polar co-ordinates and calculate its divergence.

28. Evaluate the line integral $I = \oint ((e^x y + \cos x \sin y) dx + (e^x + \sin x \cos y) dy)$ in cylindrical polar co-ordinates and hence calculate its divergence.

29. Determine whether the following form a group under matrix multiplication $A = \begin{pmatrix} a & a-b \\ 0 & b \end{pmatrix}$ where a, b are integers (mod 5) $a \neq 0, b \neq 0$.

30. P.T. the relationship $x \sim y$ defined by $x \sim y$ if Y can be expressed in the form $Y = \frac{ax+b}{cx+d}$ (a, b, c, d are integers) is an equivalence relation.

31. Explain briefly counting irreps using characters.

(6 × 4 = 24 Marks)

SECTION-IV

Answer any **two** questions from among the questions **32** to **35**. These questions carry **15** marks each.

32. (a) Show that the equation $2xy' + 3x + y = 0$ are exact (or) can be made exact and solve the equation.
- (b) Solve $(y - x)dy/dx + 2x + 3y = 0$.
33. (a) Explain the method of variation of parameters.
- (b) Use the variation of parameters method to solve $d^2y/dx^2 + y = \operatorname{cosec} x$ subject to the boundary conditions $y(0) = y(\pi/2) = 0$.
34. (a) For a compressible fluid with time varying position dependent density $\rho(r, t)$ and velocity $v(r, t)$ in which fluid is neither being created nor destroyed. show that $\frac{\partial \rho}{\partial t} + \nabla \cdot (\rho v) = 0$.
- (b) Given the vector field $\vec{a} = y\vec{i} - x\vec{j} + z\vec{k}$ verify Stokes theorem for the hemispherical surface $x^2 + y^2 + z^2 = a^2$, $z \geq 0$.
35. (a) Write about
- (i) Equivalent representation
- (ii) Reducibility of a representation
- (b) State and prove the orthogonality theorem for irreducible representation.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fourth Semester B.Sc. Degree Examination, March 2020

First Degree Programme under CBCSS

Complementary Course

**PY 1431.2 – ATOMIC PHYSICS, QUANTUM MECHANICS AND
ELECTRONICS**

(For Chemistry)

(2018 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **ALL** questions in **one** or **two** sentences. Each question carries **1** mark

1. State Paul's exclusion principle.
2. Define magnetic moment of orbital electrons.
3. Define isotope effect.
4. Define superconductivity.
5. Define probability density.
6. Define emission spectra.
7. What type of source is used to produce microwave radiations.
8. What are the materials of the prism used in ultraviolet spectrometers.
9. Define ripple factor.
10. Write the truth table of AND gate.

(10 × 1 = 10 Marks)

SECTION- B

Answer **any eight** questions, not exceeding a paragraph. Each question carries **2** marks

11. Briefly explain the quantum numbers associated with vector atom model.
12. Explain the various Coupling schemes.
13. Discuss briefly the modern periodic table
14. Distinguish between type I and type II superconductors.
15. Briefly discuss the limitations of classical physics.
16. Explain the physical significance of wave function.
17. State and explain Planck's hypothesis.
18. Write the Schrodinger time-independent equation.
19. Briefly discuss the principle of spectrometer used in the infrared region.
20. Distinguish between zener breakdown and avalanche breakdown.
21. Distinguish between ac and dc load lines.
22. Define NAND operator and write its truth table.

(8 × 2 = 16 Marks)

SECTION- C

Answer **any six** questions, Each question carries **four** marks

23. Find the longest wavelength limit of Balmer series, given Rydberg constant as $1.097 \times 10^7 \text{ m}^{-1}$.
24. Calculate the frequency of revolution of the electron of the Bohr hydrogen atom in its ground state.

$$E_0 = 8.85 \times 10^{-12} \text{ C}^2 \text{ N}^{-1} \text{ M}^{-2} \quad h = 6.625 \times 10^{-34} \text{ J}$$

25. An electron typically spends about 10^{-8} s in an excited state before it drops to a lower state by emitting a photon. How many revolutions does an electron in an $n=2$ Bohr orbit make in 10^{-8} s?
26. A particle limited to the x axis has the wavefunction $\Psi = ax$ between $x=0$ and $x=1$; $\Psi = 0$ elsewhere. Find the probability that the particle can be found between $x=0.45$ and $x=0.55$.
27. For an electron in a one dimensional infinite potential well of width $1\text{\AA}$, Calculate the separation between the two lowest energy levels.
28. An ac supply of 230 V is applied to a half-wave rectifier circuit through a transformer of turn ratio $10:1$. Find (i) the output dc voltage and (ii) peak inverse voltage. Assume the diode to be ideal.
29. The zener diode has $V_z = 18\text{V}$. The voltage across the load stays at 18V as long as I_z maintained between 200mA and 2A . Find the value of series resistance R so that E_o remains 18V while input voltage E_i is free to vary between 22V and 28V .
30. If the collector current changes from 2mA to 3mA in a transistor when collector-emitter voltage is increased from 2V to 10V , what is the output resistance?
31. Find the 2's complement of
 - (a) 1001_2
 - (b) 1110_2
 - (c) 100_2

(6 × 4 = 24 Marks)

SECTION– D

Answer **any two** questions, Each question carries **15** marks

32. (a) State the important postulates of Bohr atom model. What are its limitations?
- (b) Derive an expression for the energy of the electron in the n^{th} orbit of hydrogen atom.

33. Using Schrodinger wave equation for a particle in a potential box, obtain the eigen functions and eigen values.
34. Explain the rectifying action of a pn junction diode. With the help of a neat circuit diagram, explain the working of a full wave bridge rectifier.
35. With the help of a neat circuit diagram, explain the working of a single stage transistor amplifier. Obtain expression for its current gain, voltage gain and power gain.

(2 × 15 = 30 Marks)

St. Xavier's College

Reg. No. :

Name :

Fourth Semester B.Com. Degree Examination, March 2020

First Degree Programme under CBCSS

Language Course: EN 1411.2 READINGS IN LITERATURE

(2014 Admissions)

Time : 3 Hours

Max. Marks : 80

- I. Answer **all** questions, each in a word or a sentence.
1. In *Fail Not Our Feast*, why did the judge call Nora's crime 'despicable'?
2. According to Lynd, what does the happiness of a naturalist depend on?
3. Where did Martin Luther King make his 'Memorial Speech'?
4. In 'To Sir, With Love', how did Pamela Dare enter the classroom?
5. What is the dilemma that Hamlet experiences?
6. In 'The Tiger', what do the words "deadly terrors" signify?
7. With reference to 'Lucy Gray' differentiate between "fawn" and "roe".
8. In 'Leave This Chanting', what does "Telling of Beads" refer to?
9. In 'Ode to Autumn', who thinks that the warm days will never end?
10. In Ted Hughes' poem, what makes little Frieda very excited?

(10 × 1 = 10 Marks)

II. Answer **any eight**, each in a short paragraph not exceeding 50 words.

11. Who is Ratan and what help was she rendering the Postmaster?
12. In *A Day's Wait*, what was Schatz waiting for, and why?
13. Why did everyone admire the statue of the Happy Prince?
14. In *The Last Leaf*, what was Johnsy's belief?
15. Why is it that 'men of science have no reason to weep over their lost ignorance'?
16. Martin Luther believes that the Negro is not free in his own country. Why?
17. According to 'Leave This Chanting', what should we do to meet God?
18. In 'Ode to Autumn', what is the music of autumn?
19. Sum up the teacher's advice to boy students in *To Sir, With Love*.
20. In *Fail Not Our Feast*, why is Matilda afraid of Nora's appearance at the reunion?
21. What does Hamlet mean, when he says 'there's the rub'?
22. What is Little Frieda's excitement compared to?

(8 × 2 = 16 Marks)

III. Answer **any six**, each in a paragraph not exceeding 100 words.

23. Bring out the irony in the play *Fail Not Our Feast*.
24. What broke the heart of the Happy Prince?
25. In *The Last Leaf*, how do Sue and Johnsy make their living?
26. In *A Cup of Tea*, why did Rosemary send the girl off?
27. 'A Day's Wait is an exercise in child psychology.' - Discuss

28. Trace the evolution of thought in 'Lucy Gray'.
29. Is the title 'The Tiger' apt for the poem?
30. In 'Full Moon and Little Frieda', what does the word 'boulders' signify?
31. With reference to *The Postmaster*, comment on the 'foolish human heart' of Ratan.

(6 × 4 = 24 Marks)

IV. Answer **any two**, each in about 300 words.

32. How does the title 'Fail Not Our Feast' work as a suitable one for the play?
33. What are Catherine Mansfield's major concerns in *A Cup of Tea*?
34. Discuss the value of friendship in the light of *The Last Leaf*.
35. Discuss *The Happy Prince* as an allegory on happiness.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fourth Semester B.Com. Degree Examination, March 2020

First Degree Programme Under CBCSS

LANGUAGE COURSE : EN 1411.2 – READINGS IN LITERATURE

(2015 Admission onwards)

Time : 3 Hours

Max. Marks : 80

I. Answer **all** questions, each in a word or a sentence.

1. What does the soldier seek at the cannon's mouth?
2. What does the title 'La Belie Dame Sans Merci' mean?
3. Whom does Ulysses call as 'savage race'?
4. Why do the veins of the soldiers run cold?
5. Where is 'An Introduction' taken from?
6. Why do hunters disrupt the wall?
7. What is the sound foundation for a civilization, according to E.M. Forster?
8. Why was Dr Raman so anxious about Gopal's illness?
9. What is the pseudonym of H.H.Munro?
10. What was the discussion during the party arranged by the banker?

(10 × 1 = 10 Marks)

II. Answer **any eight** questions in a short paragraph not exceeding **50** words

11. The first and second stages of life, according to Shakespeare?
12. The Knight's dream in 'La Belle Dame Sans Merci'.
13. The life of the people of Ithaca.
14. The front line soldiers as described in 'Insensibility'.
15. The married life of the poet in 'An Introduction'.
16. The difference in the attitude of the poet and of his neighbour in 'Mending Wall'.
17. E.M. Forster's ideas on war-time reconstruction.
18. Einstein's portrayal of the religion of fear.
19. Two of the most persistent legends about Nehru.
20. Truthfulness of Dr Raman.
21. The Banker's attempt to murder the prisoner.
22. Chechi's reaction after receiving the call from Jayant.

(8 × 2 = 16 Marks)

III. Answer **any six** of the following questions in a paragraph.

23. The seven stages in human life as described in 'All the World is a Stage'
24. The Knight's love for the beautiful lady..
25. The poet's opinion about the use of language in 'An Introduction'.
26. E.M.Forster's views on love's inability to rebuild civilizations.
27. Einstein's idea of 'cosmic religious feeling'.

28. Nehru's views on hero-worship.
29. Dr. Raman's final word to Gopal and its impact on him.
30. The ending of the story 'The Open Window'
31. The bet between the Banker and the young man. (6 × 4 = 24 Marks)

IV. Answer **any two** of the following questions in about **300** words.

32. Consider 'Mending Wall' as a profound statement against a world divided by walls.
33. Comment on Ulysses' philosophy of life as portrayed by Tennyson.
34. Evaluate E.M. Forster's arguments on the inevitability of maintaining tolerance.
35. Describe K.R. Meera's treatment of longing as a theme in 'Yellow is the Colour of Longing'. (2 × 15 = 30 Marks)
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Reg. No. :

Name :

Fourth Semester B.Com. Degree Examination, March 2020

First Degree Programme under CBCSS

Elective Course II: Stream I- Finance

CO 1461.1 – PROJECT FINANCE

(2014 – 17 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions in **one** word or to a maximum of **two** sentence each. Each question carries **1** mark

1. Define project.
2. What is bridge financing?
3. What is trademark?
4. What are crash project?
5. What do you mean by network?
6. What is financial risk?
7. IDBI was established in _____
8. What is project appraisal?
9. List out the source of business idea.
10. What is feasibility report?

(10 × 1 = 10 Marks)

SECTION – B

Answer **any eight** questions in not exceeding one paragraph each. Each question carries **2** marks.

11. Explain project appraisal.
12. What is cost benefit analysis?
13. What is decision tree analysis?
14. Define a development bank.
15. List out the constraints faced in project.
16. What do you mean by project management?
17. What do you mean by project formulation?
18. Give two examples of sectoral project.
19. How project appraisal differs from project evaluation?
20. What is techno economic analysis?
21. Which is the difference between trademark and patent?
22. What are the objectives of feasibility analysis?

(8 × 2 = 16 Marks)

SECTION – C

Answer **any six** questions in about 120 words each. Each question carries **4** marks.

23. State the advantages of retained earnings as a method of project financing.
24. Explain the functions of IDBI.
25. Explain the methods of demand forecasting.

26. Describe the significance of project formulation.
27. State the features of a project.
28. Explain the types of project.
29. Explain the methods of project identification.
30. Which are the barriers in project management?
31. Explain the phases of project life cycle.

(6 × 4 = 24 Marks)

SECTION – D

Answer **any two** questions in not exceeding 4 pages. Each question carries 15 marks.

32. What is project report? State the contents of a project report.
33. Explain the institutions at state and national level that provides project financing. Explain its functions.
34. What is project planning? Explain the stages in project planning.
35. What is risk? Explain the techniques for risk analysis.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fourth Semester B.Com. Degree Examination, March 2020

First Degree Programme Under CBCSS

Core Course CO 1441/CC 1442

CAPITAL MARKET

(Common for Commerce/Commerce with Computer Application)

(2014-17 admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions to a maximum of **two** sentences. Each question carries **1** mark.

1. What is new issue market?
2. What are Options?
3. What is Pre-emptive right?
4. What is Gilt-edged market?
5. Who are Arbitrageurs?
6. What do you mean by listing of securities?
7. What are stock market indices?
8. Expand STRIPS.

9. What do you mean by call money?
10. What is IPO?

(10 × 1 = 10 Marks)

SECTION – B

Answer **any eight** questions in not exceeding one paragraph each. Each question carries **2** marks.

11. What is private placement?
12. Trace the difference between primary and secondary market.
13. Who is a Bull speculator?
14. What are repos?
15. Explain any two index prices in India.
16. What is Offer for Sale?
17. What do you mean by unorganised money market?
18. Discuss how commodity futures differ from financial futures.
19. What is Insider trading?
20. What are financial services?
21. Examine the role of OTCEI.
22. Explain the concept of book building.

(8 × 2 = 16 Marks)

SECTION – C

Answer **any six** questions in not exceeding **120** words each. Each question carries **4** marks.

23. Discuss the defects of Indian money market.
24. Describe the various types of Bonds.
25. Examine the functions of Capital market.
26. Write a brief note on NSE.
27. Distinguish between futures and forwards.
28. What is online stock trading? Discuss its advantages.
29. Explain the role of NSDL in dematerialization.
30. Briefly describe the operation of Option contract. Explain the different types of options.
31. Discuss the eligibility norms for public issues.

(6 × 4 = 24 Marks)

SECTION – D

Answer **any two** questions in not exceeding **4** pages each. Each question carries **15** marks.

32. Who are the major players in derivative market? What kind of risk are they exposed to?
33. Give an account of SEBI and its functions.
34. Discuss briefly the various types of instruments that are dealt in money market.
35. Examine the weaknesses of stock exchanges in India.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fourth Semester B.Com. Degree Examination, March 2020

First Degree Programme under CBCSS

Core Course : CO 1442/TT 1442/CX 1442/HM 1442/CC 1443

BANKING THEORY AND PRACTICE

**(Common for Commerce/Commerce and Tourism and Travel Management/
Commerce and Tax Procedure and Practice/ Commerce and Hotel
Management and Catering/Commerce with Computer Application)**

(2014 – 2017 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer all questions in **one** word or to a maximum of **two** sentences. **Each** question carries **1** mark.

1. What is Scheduled Bank?
2. Expand RTGS.
3. What is Mobile Banking?
4. What is ECS?
5. What is Credit Card?
6. What is MICR?

7. What is CRR?
8. What is Account Payee crossing?
9. What is Stale Cheque?
10. What is Prime Lending Rate?

(10 × 1 = 10 Marks)

SECTION – B

Answer **any eight** questions in not exceeding **1** paragraph. **Each** question carries **2** marks

11. Write a note on New generation bank.
12. What you mean by Internet banking?
13. What are the essentials of a valid cheque?
14. Who is holder in due course?
15. What is EFT?
16. What is Direct Action?
17. Write a note on Farm loans.
18. Distinguish General and Special Lien.
19. What is Retail Banking?
20. What do know about Capital Adequacy Norms of Banks?
21. Why banker is called an agent of a customer?
22. What you mean by 'Sans Recourse' endorsement?

(8 × 2 = 16 Marks)

SECTION – C

Answer **any six** questions in about **120** words each. **Each** question carries **4** marks.

23. Write a note on banking Ombudsman.
24. What are the essential features of Special Crossing?
25. What are the General Duties of Collecting Banker?
26. What are situations where a banker refuse payment of cheques?
27. What are the precautions to be taken while opening account in the name of a minor?
28. What are the functions of NABARD?
29. Give a brief note on NPA.
30. Write a note on Personal Loans.
31. Explain credit creation.

(6 × 4 = 24 Marks)

SECTION – D

Answer **any two** questions in not exceeding **4** pages each. **Each** question carries **15** marks.

32. Describe the role of commercial banks in economic development.
33. What are the functions of Reserve Bank of India?
34. Explain the General and Special Relationship between banker and customer.
35. Explain different types of banks.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fourth Semester B.Com. Degree Examination, March 2020

First Degree Programme Under CBCSS

Core Course : CO 1441/CC 1442

INDIAN FINANCIAL MARKETS

(Common for Commerce/ Commerce with Computer Application)

(2018 Admission).

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions in one or two sentences each. Each question carries **1** mark.

1. What is REPO?
2. What do you mean by listing?
3. What is underwriting?
4. What do you mean by ESOP?
5. What is Stock Split?
6. Explain Kerb Trading.
7. What are MMMF?
8. Define Derivatives.
9. What is Yankee Bonds?
10. What do you mean by NASDAQ?

(10 × 1 = 10 Marks)

P.T.O.

SECTION – B

Answer any **eight** questions in not exceeding one paragraph each. Each question carries **2** marks.

11. What are deep discount bonds?
12. What is an NBFC?
13. Who is a depository participant?
14. What are currency swaps?
15. Distinguish between Speculator and Investor.
16. What is meant by commercial papers?
17. What are the types of Mutual funds?
18. How future differs from option?
19. What is insider trading?
20. Write a short note on arbitrage.
21. What is the difference between investment and speculation?
22. Describe any two innovative financial instruments.

(8 × 2 = 16 Marks)

SECTION – C

Answer any **six** questions in not exceeding **120** words each. Each question carries **4** marks.

23. State the defects of Indian Money Market.
24. Explain the Book Building process.

25. Give a brief account of the issue management functions performed by the managers to the issue.
26. How trading take place in Indian stock exchange?
27. Distinguish between money market and capital market.
28. What is SEBI? Discuss the objectives of SEBI.
29. Write a note on NSE & BSE.
30. Analyse the various modes of issuing securities.
31. Give a brief account on the intermediaries in new issue market.

(6 × 4 = 24 Marks)

SECTION – D

Answer any **two** questions in not exceeding 4 pages each. Each question carries **15** marks.

32. "The role of SEBI developmental and regulatory"- Discuss.
33. Describe the structure of Indian financial system.
34. Elucidate about the instruments used in capital market.
35. Explain the concept of mutual fund. Discuss its advantages.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fourth Semester B.Com. Degree Examination, March 2020

First Degree Programme Under CBCSS

Core Course : CO 1443/CC 1444

CORPORATE ACCOUNTING

(Common for Commerce/Commerce with Computer Application)

(2018 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions in one or two sentences each. Each carries **1** mark.

1. What do you mean by diluted EPS?
2. What do you mean by accounting standards?
3. What do you mean by subdivision of shares?
4. Distinguish between internal and external reconstruction.
5. What do you mean by EPS?
6. What is EBT?
7. What do you mean by life insurance?

8. What do you mean by financial statements analysis?
9. What do you mean by reinsurance?
10. What is IAS?

(10 × 1 = 10 Marks)

SECTION – B

Answer **any eight** questions in not exceeding one paragraph each. Each question carries **2** marks.

11. Write note on internal reconstruction.
12. From the following information, calculate the benefits paid as per the Insurance Regulation Act.

Claims by death	4,20,600
Annuities	80,900
Surrenders	1,12,800
Bonus in cash	7,800
Bonus in reduction of premium	10,200
Further bonus in reduction of premium	5,000
Claims recovered under reinsurance	47,500

13. What are the needs of Accounting Standards?
14. On 1st March 2016 a bill of 5 Lakhs is discounted with a bank @ 18% per annum. The due date of the bill is 30th April 2016. Pass necessary journal entries in the books of the bank assuming that the bill is collected on the due date. Accounting year closes on 31st March every year.

15. Write note on statutory reserve, CRR.
16. What is Capital Adequacy Ratio?
17. What is meant by unexpired risk reserve?
18. On the date of capital reduction, a company finds that its building has appreciated by 80,000 and the value of stock has gone up by 40,000. Pass journal entries.
19. How will you calculate Basic EPS?
20. Write note on internal reconstruction and profit price to incorporation.
21. What is the role of Accounting Standards Board?
22. What are the process in development of Accounting Standards?

(8 × 2 = 16 Marks)

SECTION – C

Answer **any six** questions in about 120 words each. Each question carries **4** marks.

23. As per the capital reduction scheme adopted by a company 5000 7% debentures of Rs. 100 each are to be reduced to Rs. 80 each and the trade creditors have agreed to reduced their claims by 50,000. Journalize.
24. Differentiate between life policy and endowment policy.
25. State the main objective of capital reduction.
26. Distinguish between cash bonus and reversionary bonus.
27. Mention any five ways of alteration of share capital.
28. Write a note on NPA.

The following relate to a Life Insurance Company for the year 31 st March 2017	
29. The following relate to a Life Insurance Company for the year 31 st March 2017	45,32,000
Premium received during the year	3,48,000
Outstanding premium on 1.4.2016	4,36,000
Outstanding premium on 31.3.2017	1,12,000
Premium received in advance on 1.4.2016	88,000
Premium received in advance on 31.3.2017	6,40,000
Reinsurance premium for 2016-17	28,000
Bonus in reduction of premium for 2016-17	

Show the amount of premium to be credited to Revenue Account.

30. Write proforma of Form A form of Balance Sheet.

31. Following balances are extracted from the books of Adarsh general insurance in respect of fire insurance for the year 2011

Premium less reinsurance = 82,00,000

Interest dividend less tax = 2,00,000

Commission on direct business = 4,00,000

Commission on reinsurance ceded = 1,00,000

Commission on reinsurance accepted = 1,60,000

Claims paid less reinsurance = 41,00,000

Expenses of management = 5,40,000

Reserve for unexpired risk on 1-1-2011 = 30,00,000

Additional reserve on 1-1-2011 = 1,00,000

Reserve for unexpired risk to be maintained at 50% of net premium income and additional reserve to be increased by 10% of net premium income.
Prepare Revenue Account.

(6 × 4 = 24 Marks)

SECTION – D

Answer **any two** questions in not exceeding **4** pages each. Each question carries **15** marks.

32. The following is the Balance Sheet of A Ltd. on 31.12.2018.

	Rs.		Rs.
Shares of Rs. 10 each	10,00,000	Goodwill	2,00,000
10% cumulative preference		Machinery	10,00,000
shares of Rs. 100 each	2,00,000	Stock	2,50,000
Sundry liabilities	10,00,000	Debtors	2,00,000
		Bank	50,000
		Profit and loss a/c	5,00,000
	<u>22,00,000</u>		<u>22,00,000</u>

Preference dividends are in arrears for the last four years. The following scheme is approved by the court.

- (a) Equity shares to reduce to Rs. 1 each
- (b) 50% preference dividend in arrears to be paid in cash immediately and balance of arrears is agreed to be foregone.
- (c) Machinery to be depreciated by 5% and 10% RBD on the debtors to be provided.
- (d) All intangibles assets to be written off
- (e) Balance of reconstruction Account if any to be capitalized.

Prepare the reconstructed balance sheet.

33. The share capital of X Ltd, consist of the following :

- (a) 10000 6% preference shares of Rs. 100 each.
- (b) 50000 equity shares of Rs. 10 each

The shares were fully paid up. The Co. has accumulated losses to the extend of Rs. 3,50,000 , preliminary expenses 20000 and fixed assets overvalued to the extend of Rs. 4,00,000

The scheme of capital reduction permits to write off overvalue of fixed assets, losses and expenses. Under this scheme 6% preference shares are to be converted into 7.5% preference shares of Rs. 60 each and equity shares are converted into shares of Rs. 2 each.

Pass necessary journal entries.

34. What are the applicability of Accounting Standards?

35. Prepare revenue account of fire insurance business.

Claims admitted but not paid	50,851
Commission paid	60,000
Commission on reinsurance ceded	14,400
Share transfer fee	2,400
Expenses of management	93,600
Bad debts	3,000
Claims paid	18,000
Premium received less reinsurance	6,62,400
Reserve for unexpired risk on 1-04-2017	2,76,000
Additional reserve on 1.4.2017	48,000
Claims outstanding as on 1.4.2017	32,400
Dividend on share capital	22,200

The following further information has also to be considered.

- (a) Premium outstanding at the end of the year 48,000
- (b) It is the policy of the company to maintain 50% of premium towards reserve for unexpired risks.
- (c) Additional reserve 10% of net premium to be maintained.

(2 × 15 = 30 Marks)

St. Xavier's College

Reg. No. :

Name :

Fourth Semester B.Com. Degree Examination, March 2020

First Degree Programme under CBCSS

Elective Course II : Stream I – Finance

CO 1461.1 : PROJECT FINANCE

(2018 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions in **one word** or to a maximum of two sentences each. Each question carries **1** mark.

1. What is Project Finance?
2. What do you mean by project life cycle?
3. What do you mean by risk mitigation?
4. What is bridge capital?
5. What do you mean by quantifiable project?
6. What is meant by Financial Risk?
7. Define Project.
8. How contribution is calculated?

- 9 What is SIDBI?
- 10 What do you mean by lease financing?

(10 × 1 = 10 Marks)

SECTION – B

Answer **any eight** questions in not exceeding **one** paragraph each. Each question carries **2** marks.

11. What is the key difference between discounted and undiscounted cash flows?
12. Give a note on social cost benefit analysis.
13. What do you mean by feasibility study?
14. What is meant by BEP?
15. Why is project life cycle important?
16. Write notes on :
- (a) Balancing project and
 - (b) Modernisation project.
17. Give any two advantages of PBP method.
18. State the importance of resource allocation.
19. What do you mean by risk identification?
20. What do you mean by securitization of loans?
21. Why is NPV is superior to IRR?
22. Give a note on different debt instruments in India.

(8 × 2 = 16 Marks)

SECTION – C

Answer **any six** questions in about **120** words each. Each question carries **4** marks.

23. What is 'Monte Carlo simulation'?
24. Discuss the different stages of risk assessment.
25. What are the Equator Principles?
26. Write a note on Currency risk analysis.
27. What are the features of development bank?
28. Briefly explain any four project risk.
29. Write any two advantages of loan syndication.
30. Explain the role of Tax planning in project financing.
31. State the advantages and disadvantages of lease financing.

(6 × 4 = 24 Marks)

SECTION – D

Answer **any two** questions in not exceeding **4** pages. Each question carries **15** marks.

32. What is project report? Explain the contents of project report.
33. What is meant by project appraisal? Explain its different types.
34. Briefly explain the institutional finance available for projects.
35. Explain the importance of Risk analysis in Project management. Discuss different risk adjusted capital budgeting techniques.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fourth Semester B.A. Degree Examination, March 2020

Career Related First Degree Programme under CBCSS

Malayalam and Mass Communication

Core Course VI

MX 1441 — സാഹിത്യനിരൂപണം : സിദ്ധാന്തവും പ്രയോഗവും

(2014–2017 admissions)

Time : 3 Hours

Max. Marks : 80

I. ഒരു വാക്കിലോ പരമാവധി രണ്ടു വാക്യത്തിലോ എല്ലാ ചോദ്യത്തിനും ഉത്തരമെഴുതുക.

1. ധ്വനി അപ്രധാനമായ കാവ്യം ഏത്?
2. ഘടനാവാദത്തിന്റെ ആചാര്യൻ ആര്?
3. 'പതിനാലിന്നാറുഗണം പാദം രണ്ടിലുമൊന്നുപോൽ' - വൃത്തമേത്?
4. 'തെല്ലിതിൻ സ്പർശമില്ലാതെയില്ലലങ്കാരമൊന്നുമേ' - ഏതിന്റെ?
5. കവിപ്രതിഭയ്ക്ക് രാജശേഖരൻ നൽകുന്ന പേരെന്ത്?
6. 'റപ്പബ്ലിക്' എന്ന കൃതി രചിച്ചതാര്?
7. റൊമാന്റിസിസം പിറവിയെടുത്തത് ഏതു രാജ്യത്താണ്?
8. സോഷ്യലിസ്റ്റ് വിമർശനത്തിന്റെ പിറവിക്ക് കാരണമായ സിദ്ധാന്തമേത്?

9. 'വീണപുവ' ഒരു പ്രതീകാത്മക വിലാപകാവ്യം - എന്ന ലേഖനം ആരുടേതാണ്?
10. വൃത്തമഞ്ജരി എഴുതിയതാര്?

(10 × 1 = 10 Marks)

11. ഒരു ഖണ്ഡികയിൽ കവിയാതെ ഏതെങ്കിലും എട്ടു ചോദ്യത്തിന് ഉത്തരമെഴുതുക.
12. കവി എന്ന വാക്കിന്റെ അർത്ഥതലങ്ങൾ പരിചയപ്പെടുത്തുക.
13. പ്രതിഭ എന്നാൽ എന്ത്? വ്യക്തമാക്കുക.
14. സഹൃദയർ എത്രവിധം? ഏതെല്ലാം? കുറിപ്പെഴുതുക.
15. കവിശിക്ഷ എന്നാലെന്ത്? പ്രതിപാദിക്കുക.
16. കാവ്യപ്രയോജനങ്ങളെന്ന നിലയിൽ മമ്മടൻ അവതരിപ്പിക്കുന്നത് എന്തെല്ലാം കാര്യങ്ങളാണ്? സംഗ്രഹിക്കുക.
17. 'അലങ്കാരങ്ങളെത്തീർക്കാൻ നാലുതാനിഹസാധനം' - ഏതെല്ലാമെന്ന് പ്രതിപാദിക്കുക.
18. സമവൃത്തം, അർദ്ധസമവൃത്തം ഇവയെന്തെന്ന് വ്യക്തമാക്കുക.
19. 'ഉപേന്ദ്രവജ്ര' എന്ന വൃത്തത്തിന്റെ ലക്ഷണമെഴുതി സോദാഹരണം സമർത്ഥിക്കുക.
20. ധ്വനികാരന്റെ കാവ്യവിഭജനത്തെക്കുറിച്ച് വിവരിക്കുക.
21. കിളിപ്പാട്ട് വൃത്തങ്ങൾ ഏവ? സ്വഭാവസവിശേഷതകൾ എന്തെല്ലാം?
22. ശബ്ദാലങ്കാരം, അർത്ഥാലങ്കാരം എന്ന വിഭജനത്തിന്റെ അടിസ്ഥാനമെന്ത്?
23. കുറിപ്പെഴുതുക - ന്യൂ ക്രിട്ടിസിസം.

(8 × 2 = 16 Marks)

III. ഓരോന്നിനും **120** വാക്കിൽ കവിയാതെ ഏതെങ്കിലും ആറു ചോദ്യത്തിന് ഉത്തരമെഴുതുക.

23. സ്ത്രീവാദവിമർശനത്തിന്റെ സവിശേഷതകൾ വിശദമാക്കുക.

24. സാമ്യോക്തി അലങ്കാരത്തെക്കുറിച്ച് ഒരു കുറിപ്പെഴുതുക.

25. മോഡേണിസം എന്ന സാഹിത്യപ്രസ്ഥാനത്തിന്റെ സവിശേഷതകൾ എന്തെല്ലാം?

26. ഹിസ്റ്റോറിക്ക് വിമർശനം എന്നാൽ എന്ത്? വിശദീകരിക്കുക.

27. മലയാളനിരുപണശാഖക്ക് കൂട്ടികൃഷ്ണമാരാർ നൽകിയ സംഭാവനകൾ വിലയിരുത്തുക.

28. കെ.പി. അപ്പന്റെ വിമർശനശൈലിയുടെ സവിശേഷതകൾ എന്തെല്ലാം?

29. പ്രാസവാദം മലയാളസാഹിത്യമണ്ഡലത്തിൽ ചെലുത്തിയ സ്വാധീനമെന്ത്? വിശദമാക്കുക.

30. മലയാളവിമർശനത്തിലെ നവോത്ഥാനഘട്ടത്തെക്കുറിച്ച് ഒരു വിവരണം തയ്യാറാക്കുക.

31. വൃത്താലങ്കാരപഠനമേഖലക്ക് ഏ.ആർ. രാജരാജവർമ്മ നൽകിയ സംഭാവനകൾ എന്തെല്ലാം?

(6 × 4 = 24 Marks)

IV. മൂന്നു പുറത്തിൽ കവിയാതെ ഏതെങ്കിലും രണ്ടു ചോദ്യത്തിന് ഉത്തരമെഴുതുക.

32. ആനന്ദവർദ്ധനന്റെ ധ്വനിദർശനത്തിന്റെ സവിശേഷതകൾ വിശദമാക്കുക.

33. ഉപന്യസിക്കുക - മലയാളത്തിലെ ശബ്ദാലങ്കാരങ്ങൾ.

34. ആധുനികോത്തരവിമർശനത്തിന്റെ സവിശേഷതകൾ വിവരിക്കുക.

35. ബി. രാജീവന്റെ നിരുപണശൈലിയുടെ സവിശേഷതകൾ വിലയിരുത്തുക.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fourth Semester B.A. Degree Examination, March 2020

Career Related First Degree Programme under CBCSS

Malayalam and Mass Communication

Vocational Course VI

MX 1472 CORPORATE COMMUNICATION AND MEDIA MANAGEMENT

(2014 Admission onwards)

Time : 3 Hours

Max. Marks : 80

PART – A

Answer **all** the **ten** questions, each one in **one** or **two** sentences.

1. PRSI
2. Goodwill
3. House Journal
4. External Public
5. Corporate Advertisements
6. PR Agency
7. Ivy Lee
8. Grapevine
9. Spin
10. Marketing Communication

(10 × 1 = 10 Marks)

P.T.O.

PART – B

Answer any **eight** of the following each one not exceeding **60** words.

11. Write a note on the PR activities of government.
12. Write a note on the various internal publics in PR
13. Explain the relationship between PR and advertisement
14. What is the relevance of PR in modern business world?
15. Explain the term Lobbying.
16. Write a note on any one of the PR campaigns of the Kerala government.
17. What is corporate identity?
18. What is the significance of Press Conferences in PR process?
19. Explain the qualities of a Corporate Communications Manager.
20. Exhibition as a tool of PR.
21. Financial PR
22. What is online marketing?

(8 × 2 = 16 Marks)

PART – C

Answer any **six** of the following, each one not exceeding **120** words.

23. Explain the tools of Corporate Communications.
24. How is propaganda used in PR? Provide examples.
25. Explain the objectives and functions of PR.
26. Discuss the importance of Media relations in PR.

27. Explain the stages of PR campaigns.
28. Discuss the various functions of Management.
29. Elaborate the role of CSR in reputation media management.
30. Identify the major publics of India Post. Make a communication plan targeting them.
31. Explain the need for efficient media management.

(6 × 4 = 24 Marks)

PART – D

Write essays on any **two** of the following, each one not exceeding **500** words.

32. Analyse the modern trends in corporate communications.
33. Discuss in detail the different tools of Public Relations in a PR campaign.
34. Trace the evolution of PR as a professional discipline.
35. Critically analyse the major problems faced by small newspapers in India.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fourth Semester B.A. Degree Examination, March 2020

Career Related First Degree Programme under CBCSS

Malayalam and Mass Communication

Core Course VI

MX 1441 — മലയാളസാഹിത്യനിരൂപണം

(2018 admission)

Time : 3 Hours

Max. Marks : 80

- I. ഒരു വാക്കിലോ വാക്യത്തിലോ എല്ലാ ചോദ്യത്തിനും ഉത്തരമെഴുതുക.
1. കുമാരനാശാനെ 'വിപ്ലവത്തിന്റെ ശുക്രനക്ഷത്രം' എന്ന് വിശേഷിപ്പിച്ച നിരൂപകൻ.
2. "ചെറുശ്ശേരിയുടെ ശൃംഗാരം സഭ്യതയുടെ ആഭ്യന്തരങ്ങളെ ഉല്ലംഘിക്കുന്നു." ഈ നിരീക്ഷണം ആരുടേത്?
3. 'ചെറുകുമാപ്രസ്ഥാനം' എന്ന കൃതിയുടെ ആദ്യ പേരെന്ത്?
4. 'കേരളകവിതയിലെ കലിയും ചിരിയും' - കർത്താവാരാണ്?
5. തനിക്കുറ്റവും ഇഷ്ടപ്പെട്ട സാഹിത്യരൂപമായി എം.ടി. ചൂണ്ടിക്കാണിക്കുന്നത് ഏതിനെ?
6. "ജീവൽസാഹിത്യം സ്വപ്നത്തിന്റെയും നിയന്ത്രണത്തിന്റെയും മദ്ധ്യവേണം സ്ഥിതിചെയ്യുവാൻ" - പ്രസ്താവന ആരുടേത്?
7. 'ഖസാക്കിന്റെ ഇതിഹാസ'ത്തെ നിരാനന്ദത്തിന്റെ ചിരി എന്ന് വിളിച്ചത്.

8. 'ആത്മപോഷിണി' മാസികയുടെ പത്രാധിപരായിരുന്ന കവി.
9. സംസ്കൃതപഠനത്തിന് മോഹഭോരിയം പ്രഖ്യാപിക്കണമെന്ന് പറഞ്ഞ നിരൂപകൻ.
10. ആണിയച്ചുകളിൽ മഷിപുരട്ടി അച്ചടിച്ച ആദ്യമാസിക.

(10 × 1 = 10 Marks)

II. ഒരു ഖണ്ഡികയിൽ ഏതെങ്കിലും എട്ടു ചോദ്യത്തിന് ഉത്തരമെഴുതുക.

11. സി.പി. അച്യുതമേനോനും വിദ്യാവിനോദിനിയും മലയാളനിരൂപണത്തിന് നൽകിയ സംഭാവനകൾ.
12. സി. അന്തപ്പായിയും മലയാളനാടക നിരൂപണവും.
13. ആദ്യകാല സാഹിത്യമാസികകൾ.
14. സി.ജെ. തോമസും മലയാള നിരൂപണവും.
15. പ്രാസവാദം.
16. എം.കെ. സാനുവിന്റെ അഭിപ്രായത്തിൽ സാഹിത്യനിരൂപണത്തിന്റെ ഉറവിടം എന്താണ്?
17. ടി.എസ്. എലിയട്ട് നിരൂപണത്തിന് ചൂണ്ടിക്കാണിച്ച രണ്ട് തലങ്ങൾ ഏതൊക്കെ?
18. ആധുനികവിദ്യാഭ്യാസത്തെ പ്രൊഫ. എം.എൻ. വിജയൻ നിർവ്വചിക്കുന്നത് എങ്ങനെ?
19. പുരോഗമനസാഹിത്യത്തിന്റെ മൗലികസിദ്ധാന്തങ്ങൾ ഏതൊക്കെയാണ്?
20. മനുഷ്യാവസ്ഥയെക്കുറിച്ചുള്ള കാല്പനികധ്യാനങ്ങളാണ് എം.ടി. യുടെ കൃതികൾ. ശരിയോ?

21. 'ജോസഫ്' മുണ്ടശ്ശേരി മലയാളത്തിലെ കാല്പനിക കവിതയുടെ നിരൂപകനാണ് - സാംഗത്യം പരിശോധിക്കുക.

22. റിയലിസത്തോടുള്ള മാരകരുടെ സമീപനം എന്തായിരുന്നു?

(8 × 2 = 16 Marks)

III. സൂറിയിരുപത് വാക്കിൽ കുറയാതെ ഏതെങ്കിലും ആറു ചോദ്യത്തിന് ഉത്തരമെഴുതുക.

23. നല്ല നിരൂപണ കൃതികളുടെ പൊതുസവിശേഷതകൾ വിശദമാക്കുക.

24. 'കാലം പ്രധാന ഘടകമായിത്തീരുന്നതുകൊണ്ടാണ് മഞ്ഞിന് ഇത്രമേൽ സംഗീതസൗന്ദര്യമുണ്ടായത്.' വിശദീകരിക്കുക.

25. 'പുരോഗമനസാഹിത്യകാരന്മാരുടെ പ്രചാരോദ്ദേശ്യത്തെ പഴിക്കുന്നവർക്ക് വാല്മീകിയെയും കൂടി പഴിക്കാതെ ഗത്യന്തരമില്ല' - പൊരുൾ വ്യക്തമാക്കുക.

26. വർത്തമാനകാലനിരൂപണത്തിന്റെ അപചയകാരണങ്ങളായി എം.എൻ. വിജയൻ ചൂണ്ടിക്കാണിക്കുന്നത് എന്തെല്ലാമാണ്?

27. നിരൂപക ചതുഷ്ടയം - വിശദീകരിക്കുക.

28. ആധുനിക സാഹിത്യപ്രസ്ഥാനങ്ങളെ അവയുടെ സ്ഥായിഭാവങ്ങളുടെ അടിസ്ഥാനത്തിൽ കേസരി വിഭജിക്കുന്നത് എങ്ങനെ?

29. "സാഹിത്യപഞ്ചാനനൻ മലയാളത്തിലെ സാഹിത്യവിമർശനത്തിന്റെ പ്രതിഷ്ഠാപകനാണ്" - തെളിയിക്കുക.

30. സ്വദേശാഭിമാനി രാമകൃഷ്ണപിള്ളയ്ക്ക് മലയാളനിരൂപണത്തിലുള്ള സ്ഥാനം നിർണ്ണയിക്കുക.

31. "കവിത മാത്രമല്ലാ ചെറുകഥയും നോവലും നിരൂപിക്കപ്പെടാം എന്ന് മലയാളത്തിൽ ആദ്യം സ്ഥാപിച്ചത് എം.പി. പോളാണ്" - ശരിയോ? വിശദമാക്കുക.

(6 × 4 = 24 Marks)

IV. മൂന്നു പുറത്തിൽ കവിയാതെ ഏതെങ്കിലും രണ്ടു ചോദ്യത്തിന് ഉത്തരമെഴുതുക.

32. "ഒരു കാലഘട്ടത്തെ അടക്കിഭരിക്കാൻ പോന്ന മേധാശക്തിയുമായി പിറന്ന വിമർശകനാണ് പ്രൊഫ. ജോസഫ് മുണ്ടശ്ശേരി." - തെളിയിക്കുക.

33. 'വാല്മീകിയുടെ രാമൻ' മുമ്പോട്ടുവരുന്ന പ്രധാന ദർശനങ്ങൾ വിശദമാക്കുക.

Reg. No. :

Name :

Fourth Semester B.Sc. Degree Examination, March 2020

Career Related First Degree Programme under CBCSS

**Common For Group 2 (a) Botany and Biotechnology and
Group 2(b) Biotechnology (Multimajor)**

Core course VII

**BB 1442/BV 1442 1-CELL BIOLOGY, PLANT BREEDING AND
EVOLUTIONARY BIOLOGY**

(2014 Admission onwards)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions in a **word** or **one** or **two** sentences. **Each** question carries **1** mark.

Define the following.

1. Cytokinesis
2. Autosomes
3. Centromere
4. Tonoplast
5. Polysomes
6. Variation

7. Cristae
8. Karyoplasm
9. Diploid
10. Grana

(10 × 1 = 10 Marks)

SECTION – B

Answer any **eight** questions. **Each** question carries **2** marks. Answer not to exceed **one** paragraph.

Write short notes on the following

11. Nucleolus
12. Acclimatization
13. Chiasmata
14. Mutation breeding
15. Heterosis
16. Inversion
17. Histones
18. Telomere
19. Genetic drift
20. Mass selection
21. Lysosomes
22. Convergent evolution

(8 × 2 = 16 Marks)

SECTION – C

Answer any **six** questions. **Each** question carries **4** marks. Answer not to exceed **120** words.

23. Give an account on speciation.
24. Explain Nucleosome model of DNA.
25. Comment on the numerical aberrations of chromosome.
26. Describe progressive and retrogressive evolution.
27. Discuss in brief the events in cell cycle.
28. Mention the significances of Mitosis.
29. Give a brief account on Euchromatin and Heterochromatin.
30. Comment on Darwinism.
31. Explain the shape of chromosomes based on the position of centromere.

(6 × 4 = 24 Marks)

SECTION – D

Answer any **two** questions. **Each** question carries **15** marks. Answer not to exceed **3** pages.

32. Describe the events in Meiosis. Draw labeled diagrams.
33. Write a detailed account on Plant introduction.
34. Give an account of special types of chromosomes.
35. Write a descriptive account on the components of a eukaryotic plant cell.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fourth Semester B.Sc. Degree Examination, March 2020

Career Related First Degree Programme Under CBCSS

2(a) – Botany and Biotechnology

Complementary Course

BB 1431 : METABOLISM

(2014 Admission onwards)

Time : 3 Hours

Max. Marks : 80

SECTION – I

(Very Short Answer Type- maximum two sentences)

Answer **all** questions.

1. What is meant by 'energy investment phase' of glycolytic pathway?
2. Name a hormone that acts as an activator of glycogen phosphorylase.
3. Name an ω 3 fatty acid which is essential to humans.
4. How many ATP molecules are produced by the complete oxidation of one molecule of palmitic acid?
5. Name a protein digesting enzyme found in the stomach of infants and children, but absent in adults.
6. Which is the reaction catalysed by alanine amino transferase?

7. Define P/O ratio.
8. What are uncouplers of oxidative phosphorylation?
9. What is the wobble position of a codon?
10. What is meant by a primary transcript?

(10 × 1 = 10 Marks)

SECTION – II

(Short Answer Questions- not to exceed one paragraph)

Answer any **eight** questions.

11. Describe the extend up to which carbohydrates are digested in the mouth.
12. List out the irreversible reactions of glycolysis.
13. Compare mitochondrial and peroxisomal β oxidation of fatty acids.
14. What are micelles? Describe the role of micelle formation in the digestion of lipids.
15. Name the proteolytic enzymes of the GI tract. Why they do not cause any proteolytic damage to the cells of their formation?
16. Compare the absorption of D and L amino acids in the small intestine.
17. Differentiate between oxidative and substrate level phosphorylations.
18. Why ATP is considered as a high energy compound? Explain with the help of its structure.
19. Give two examples for inhibitors of electron transport chain. How do they act?
20. How do you explain degeneracy of genetic code?
21. Define start and stop codons.
22. What are promoters? Where are they located?

(8 × 2 = 16 Marks)

SECTION – III

(Short Essay - not to exceed 120 words)

Answer any **six** questions.

23. Describe cori cycle and explain its significance.
24. How glycogen metabolism is allosterically regulated?
25. What is meant by emulsification? How emulsifiers play a major role in the digestion and absorption of lipids?
26. Describe the physiological functions of phospholipids.
27. Give an account of urea cycle.
28. Explain why the process of ATP production by electron transport in mitochondrial membrane is called oxidative phosphorylation.
29. Explain the role of high energy phosphate groups in bioenergetics.
30. Give an account of the arrangement of DNA in chromosomes.
31. Give an account of the structure and functions of tRNA.

(6 × 4 = 24 Marks)

SECTION –IV

(Long Essay)

Answer any **two** questions.

32. Give an account of the digestion and absorption of carbohydrates.
33. Explain the biosynthesis of cholesterol and bile acids. Describe their functions.
34. Explain the process of mitochondrial electron transport and ATP production.
35. Describe the major events involved in prokaryotic transcription.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fourth Semester B.Sc. Degree Examination, March 2020

Career Related First Degree Programme under CBCSS

Group 2(a) — Botany and Biotechnology

Vocational Course — BB 1471 : MOLECULAR BIOLOGY

(2015 Admission onwards)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** the questions in a **word** or **1** or **2** sentences. **Each** question carries **1** mark.

1. Name the Indian-born scientist who is involved in the discovery of the genetic code.
2. Which enzyme is involved in the joining of DNA fragments?
3. Define exons.
4. What should be the complementary strand of 3' ATGGCTTGA 5'?
5. Which RNA is responsible for bringing amino acids to ribosome during translation?
6. Give one triplet codon which codes for the amino acid Glycine.
7. Nucleosome consists of _____.
8. Which is the starting amino acid in eukaryotic translation?
9. What is the size of human mitochondrial genome?
10. Give an example of a repressible operon.

(10 × 1 = 10 Marks)

SECTION – B

Answer **any eight** questions. **Each** question carries **2** marks. (Answer not to exceed **1** paragraph).

11. What is the importance of Hershey-Chase experiment?
12. Which are the major components of eukaryotic transcription -initiation complex?
13. How the enhancer is different from a promoter?
14. What is the importance of the post-transcriptional modification of mRNAs?
15. List out any three post-translational modifications.
16. Briefly explain the Wobble hypothesis.
17. What is the major difference between a *lac* and *trp* operon?
18. Comment on the importance of promoters in gene expression.
19. Write down the names of any three enzymes involved in DNA replication.
20. What is meant by an open reading frame?
21. What are transposons?
22. Write a brief note on chloroplast DNA.

(8 × 2 = 16 Marks)

SECTION – C

Answer **any six** questions. **Each** question carries **4** marks. (Answer not to exceed **120** words).

23. Explain the organization of eukaryotic genome.
24. Write down the properties of genetic code.

25. Write three major differences in the DNA replication process between prokaryotes and eukaryotes.
26. Explain the mechanisms of gene regulation in eukaryotes.
27. Explain the kind of regulation in *trp* operon.
28. Give an account on the three stages of the process of transcription.
29. Write any three differences between prokaryotic and eukaryotic translation.
30. Write a note on mRNA degradation after translation.
31. Write a note on human mitochondrial genome.

(6 × 4 = 24 Marks)

SECTION – D

Answer **any two** questions. **Each** question carries **15** marks. (Answer not to exceed **3** pages).

32. Explain the organization, regulation and mechanism of *lac* operon.
33. With the help of diagrams, explain in details the various steps involved in DNA replication in eukaryotes.
34. Write an essay on eukaryotic translation and the role of different types of RNAs in the process.
35. Write an essay on the post transcriptional modifications of mRNAs and post translational modifications of proteins.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fourth Semester B.A. Degree Examination, June 2020

First Degree Programme Under CBCSS

Political Science

Complementary Course : VII

PS 1431 — INTERNATIONAL POLITICS

**(Common for Philosophy, Economics, History, English, Islamic History,
Sociology)**

(2014 – 2016 Admission)

Time : 3 Hours

Max. Marks : 80

Answer in **one** or **two** sentences. Each question carries **1** Mark. Answer **all** questions.

1. Cold War.
2. Politics among Nations.
3. Bipolarity.
4. Uniting for Peace Resolution.
5. State System.
6. 'War on Terror'.
7. UNDP.
8. NAM.
9. UDHR.
10. Detente.

(10 × 1 = 10 Marks)

P.T.O.

II. Answer in a paragraph. Answer **any eight** questions.

11. Examine the relationship between Domestic Politics and International Politics.
12. Explain different forms of Terrorism.
13. Why Security Council is known as the primary body of the United Nations?
14. What do you understand by Collective Security?
15. Distinguish between Disarmament and Arms Control.
16. Examine the relationship between Terrorism and Guerrilla War.
17. Explain the importance of Article 27 of the UN Charter.
18. Examine the limitations of International Court of Justice.
19. Explain the methods of resolving international disputes through Pacific Settlement.
20. Examine the reasons for Global Warming.
21. Examine the dangers of Weapons of Mass Destruction.
22. Explain the weaknesses of the United Nations.

(8 × 2 = 16 Marks)

III. Short Essay (Not to exceed **120** words). Answer **any six** questions.

23. Discuss Morton A Kaplan's Systems theory.
24. Examine the impact of Globalization on Developing countries.
25. Explain the unique features of State system.
26. Examine the composition and functions of Economic and Social Council.
27. Explain the causes and effects of Global Warming.

28. Discuss the powers and functions of the General Assembly.
29. Why has effective nuclear arms control been so difficult under the auspices of the United Nations?
30. Discuss the main problems confronted before the SAARC today.
31. Why has the United Nations been more successful than the League of Nations? Give your views.

(6 × 4 = 24 Marks)

IV. Essay questions. Answer **any two** questions.

32. "International Politics is a struggle for power among nations". Discuss.
33. Critically analyse six principles of Political Realism as expounded by Morgenthau.
34. Write a detailed essay on the evolution and growth of State system.
35. Discuss and assess the prevailing counter terrorism strategies to prevent International Terrorism.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fourth Semester B.A. Degree Examination, June 2020

First Degree Programme Under CBCSS

Political Science

Complementary Course : VII

PS 1431 - INTERNATIONAL POLITICS

**(Common for Philosophy, Economics, History, English, Islamic History,
Sociology)**

(2017 Admission Onwards)

Time : 3 Hours

Max. Marks : 80

PART – A

I. Answer all the questions in one or two sentences. Each carries 1 mark.

1. Power
2. Diplomacy
3. Globalization
4. National Internet
5. Woodrow Wilson
6. Balance of power
7. IMF

8. Stockholm Conference
9. Totalitarian Nationalism
10. The Atlantic Charter

(10 × 1 = 10 Marks)

II. Answer **any eight** questions. **Each** carries **2** marks.

11. Write down the differences between International Relations and International Politics.
12. Write a note on Nationalism.
13. National Morale is an essential feature of national power. Explain.
14. Write a brief note on Security Council.
15. Briefly explain the objectives of SAARC.
16. What do you understand by the concept Global Warming?
17. Comment on International Terrorism.
18. What are the major characteristics of Sovereignty?
19. What are the different types of weapons of mass destruction?
20. Prepare a short note on ASEAN.
21. Write a note on the impact of Ideology on International Relations?
22. Define International Law.

(8 × 2 = 16 Marks)

III. Answer **any six** questions. **Each** carries **4** marks.

23. Outline the structure and purposes of E.U.
24. Discuss the principal organs of UNO.

25. Explain Morton Kaplan's system approach.
26. Examine the basic features of Modern State System.
27. Trace the evolution of International Politics.
28. Write a note on Idealistic approach to the study of International Politics.
29. Suggest possible solutions to global energy crisis.
30. Examine the constituent elements of Nationalism.
31. Discuss the impact of climate change in global politics.

(6 × 4 = 24 Marks)

IV. Essay question. Answer **any two**. Each carries **15** marks.

32. Elaborate the scope of International Politics.
33. Explain the Realist theory of Morgenthau.
34. Define the term National Power and explain the elements of National Power.
35. Examine the impact of globalization on Developing Countries.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fourth Semester B.Com. Degree Examination, June 2020

First Degree Programme Under CBCSS

Complementary Course : CO 1431/CX 1431/CC 1431

BUSINESS STATISTICS

**(Common for Commerce/Commerce and Tax Procedure and Practice/
Commerce with Computer Application)**

(2014 – 2017 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions in **one** or **two** sentences **each**. Each question carries **1** mark.

1. Describe 'distrust of statistics'.
2. What is mean by meso kurtic?
3. What is probable error?
4. Describe simple linear regression.
5. When Spearman's rank correlation method is used?
6. What is mean by concurrent deviation?
7. Describe factor reversal test.
8. What is mean by inflation index?

9. How will you construct simple aggregative index numbers?
10. Describe time series analysis.

(10 × 1 = 10 Marks)

SECTION – B

Answer **any eight** questions. Each question carries **2** marks.

11. What is mean by business statistics?
12. What are measures of central tendency?
13. Compare correlation and causation.
14. In which situation moving average method of analysis is used?
15. Explain the importance of chain base index numbers.
16. Describe the properties of correlation co-efficients.
17. What are the methods of studying dispersion?
18. Describe Dissimilarities of regression and correlation.
19. What are the features of index numbers?
20. How will you compute median under continuous series?
21. What is mean by weighted arithmetic mean?
22. What is mean by grouping table?

(8 × 2 = 16 Marks)

SECTION – C

Answer **any six** questions. Each question carries **4** marks.

23. Explain cumulative frequency curves or orgives.
24. Explain the procedure of computing geometric mean.

25. What are the objectives of measuring dispersion?
26. Calculate range and co-efficient of range from the following distribution :
- | | | | | | |
|-------------|----------|-------|-------|-------|----------|
| Income: | below 10 | 10-20 | 20-30 | 30-40 | above 40 |
| Frequency : | 7 | 8 | 15 | 7 | 3 |
27. Distinguish between absolute measure of dispersion and relative measure of dispersion.
28. If the co-variance between X and Y is 488 and variance of X and Y are 824 and 325 respectively, find out co-efficient of correlation.
29. Explain different types of index numbers.
30. Compare cost of living and consumer price index numbers.
31. Explain the utilities of interpolation techniques.

(6 × 4 = 24 Marks)

SECTION – D

Answer **any two** questions. **Each** carries **15** marks.

32. Describe the uses of index numbers. What are the problems in construction of index numbers?
33. From the following prepare quantity index number of Laspeyer's Passche's, Bowley and Dorbish.

Commodities	Price		Value	
	2014	2015	2014	2015
A	7	8	49	72
B	4	6	40	72
C	6	8	90	160
D	5	7	25	21

34. From the following observations find the extend of correlation between age and crime by using direct method based on deviation.

Age :	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Persons in lakhs :	80	60	50	40	30	25	20	15	10	5
No.of crimes in lakhs :	50	45	40	35	30	20	15	10.5	8	3

35. Calculate standard deviation and co-efficient of variation from the following :

Age :	under 10	"20	"30	"40	"50	"60	"70	"80
No.of person dying :	15	30	53	75	100	110	115	125

(2 × 15 = 30 Marks)

St. Xavier's College

Reg. No. :

Name :

Fourth Semester B.Com. Degree Examination, June 2020

First Degree Programme Under CBCSS

Complementary Course : CO 1431/CX 1431/CC 1431/HM 1431

BUSINESS STATISTICS

**(Common for Commerce / Commerce and Tax Procedure and Practice /
Commerce with Computer Application / Commerce and Hotel Management
and Catering)**

(2018 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions in one or two sentences each. Each question carries **1** mark.

1. Define statistics.
2. What is mean deviation?
3. What is primary data?
4. What is a histogram?
5. What is sampling?
6. What is probable error?
7. What is Regression?

8. What are index numbers?
9. What is time series?
10. What is extrapolation?

(10 × 1 = 10 Marks)

SECTION – B

Answer **any eight** questions. Each carries **2** marks.

11. What are the components of time series?
12. State the unweighted indices.
13. What is random sampling?
14. What is a scatter diagram?
15. What is false base line?
16. What is a simple and complex tables?
17. What is chronological classification?
18. What is size of sample?
19. What is Median?
20. What is multiple correlation?
21. What is judgement sampling?
22. What is harmonic mean?

(8 × 2 = 16 Marks)

SECTION – C

Answer **any six** questions. Each carries **4** marks.

23. Explain the law of statistical regularity.
24. What are the significance of tabulation?
25. Explain geometric mean and its properties.
26. If $r = 0.6$ and $n = 64$, find probable error and standard error.
27. You are given the following data :

	X	Y
Arithmetic mean	36	85
Standard deviation	11	8

Correlation coefficient between X and Y = 0.66.

- (a) Find the two regression equations
 - (b) Estimate the value of X when Y = 75.
28. What are the requisites of a good average?
 29. What is coefficient of variation?
 30. Calculate coefficient of range :

Marks	No. of students
10-20	8
20-30	10
30-40	12
40-50	8
50-60	4

31. What is Laspeyres index?

(6 × 4 = 24 Marks)

SECTION – D

Answer any two questions. Each carries 15 marks.

32. Explain different methods for selecting samples.

33. Calculate mean and standard deviation of the following :

Marks	No. of students
0-10	5
10-20	12
20-30	30
30-40	45
40-50	50
50-60	37
60-70	21

34. Calculate coefficient of correlation from the following data :

X	100	200	300	400	500	600	700
Y	30	50	60	80	100	110	130

35. Explain the utility of Time Series analysis.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fourth Semester B.Sc. Degree Examination, June 2020

Career Related First Degree Programme under CBCSS

Group 2 (a) Botany and Biotechnology

Vocational Course — BB 1472 : IMMUNOLOGY

(2015 Admission onwards)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** the questions in a word or **one** or **two** sentences. Each question carries **1** mark.

1. What are memory cells?
2. Define immunity.
3. What are haptens?
4. Give an example for an oral vaccine.
5. What are chemokines?
6. What is RIA?
7. Define epitope.
8. What is the function of T helper cells?
9. Define allotypes.
10. What are super antigens?

(10 × 1 = 10 Marks)

SECTION – B

Answer **any eight** questions. Each question carries **2** marks. Answers not to exceed **one** paragraph.

11. What are toxoids?
12. Explain humoral immunity.
13. What is agglutination reaction?
14. Discuss the role of dendritic cells in immune system.
15. What are B cells?
16. Explain immunodiffusion.
17. What are isotypes?
18. What is MHC? Explain its role.
19. Brief a note on myeloid cells.
20. What are immunogens?
21. Explain acquired immunity.
22. What are DNA vaccines?

(8 × 2 = 16 Marks)

SECTION – C

Answer **any six** questions. Each question carries **4** marks. Answers not to exceed **120** words.

23. Explain structure and function of thymus.
24. Comment on Rh incompatibility in ABO blood groups.
25. Explain ELISA.
26. What is hypersensitivity? Explain its types.

27. Give an account on cell mediated immunity.
28. Brief a note on secondary lymphoid organs.
29. What are attenuated vaccines?
30. Explain antigen antibody interaction.
31. Discuss immune response to infections.

(6 × 4 = 24 Marks)

SECTION – D

Answer **any two** questions. Each question carries **15** marks. Answers not to exceed **3** pages.

32. Write an essay on genetic basis of antibody diversity.
33. Explain the structure and functions of antibodies.
34. Discuss autoimmune diseases with examples.
35. What is hybridoma technology? Explain the production of monoclonal antibodies.

(2 × 15 = 30 Marks)

Reg. No. :

Name :

Fourth Semester B.Sc. Degree Examination, June 2020

First Degree Programme under CBCSS

Mathematics

Complementary Course for Economics

MM 1431.5 : MATHEMATICS FOR ECONOMICS IV

(2014 Admission onwards)

Time : 3 Hours

Max. Marks : 80

SECTION - I

All the first ten questions are compulsory. They carry 1 mark each :

1. Find the degree of the differential equation $(y^2 + x)\frac{d^2y}{dx^2} + 2y\left(\frac{dy}{dx}\right)^2 = 7$.
2. Find $\frac{dy}{dx}$ if $2x + 3y = 0$.
3. Give an example for homogeneous differential equation.
4. Write the general form of a linear differential equation of the first order.
5. The total cost $c(x)$ in rupees associated with the production of x units of an item is given by $c(x) = 0.007x^3 - 0.003x^2 + 15x + 4000$. Find the marginal cost when 17 units are produced.

6. Represent the family of curves $e^x y = c$ by a differential equation.
7. Find the general solution of $\frac{d^2 y}{dx^2} - 4 \frac{dy}{dx} + 4y = 0$.
8. If the marginal revenue is zero. What will be the elasticity of demand?
9. Find the average cost function from the total cost function $T = 60 + 10x + 15x^2$.
10. If $y = a^x$ is a solution of the differential equation $\frac{dy}{dx} = y$. Find a .

SECTION – II

Answer **any eight** questions from among the questions 11 to 22. These questions carry **2** marks each.

11. Solve $\frac{d^2 y}{dx^2} = x^{-4}$.
12. Solve $\frac{dy}{dx} = \cos 5x$.
13. Find the general solution of $y'' + y' = 0$.
14. Find the general solution of $x^2 \frac{d^2 y}{dx^2} - 2.5x \frac{dy}{dx} - 2y = 0$.
15. Find the second order differential equation given $y = x^2 + x^{1/2}$.
16. Verify that $y = e^{-3x}$ is a solution of the differential equations $\frac{d^2 y}{dx^2} - y = 8e^{-3x}$.
17. Show that $y = ae^{x^n}$ is an integral of $\frac{dy}{dx} = ny x^{n-1}$.

18. Find the differential equation of the family of parabola $y = c$.
19. Solve $(x - y)dx + xdy = 0$.
20. Solve $\cos^2 x \frac{dy}{dx} + y = \tan x$.
21. Find the slope of the average cost curve in terms of average cost and marginal cost.
22. Find the average revenue and marginal revenue function from the total revenue function $R = 100x - x^2$.

SECTION – III

Answer **any six** questions from among the questions 23 to 31. These questions carry **4** marks each.

23. Derive Domar's capital expansion model.
24. Solve $(D^2 + 4D + 5)y = e^{2x} + \cos 4x$.
25. Solve $\frac{d^2 y}{dx^2} - 2\frac{dy}{dx} = 12x - 10$.
26. Find the differential equation of which $y = c_1 e^{-2x} + c_2 e^{3x}$ is a solution, where c_1 and c_2 are constants.
27. Solve $\frac{d^2 y}{dx^2} - 2\frac{dy}{dx} + 2y = 0$.
28. At the price x , the demand function is $= 27 + \frac{1}{x} - \frac{x}{2}$. Find the marginal revenue at $x = 3$.
29. Find the elasticity of demand for the function $y = 100 - x - x^2$ when $y = 70$.
30. Solve $xy \frac{dy}{dx} = x^2 + y^2$.
31. Solve $x \frac{dy}{dx} + 2y = 3$.

SECTION – IV

Answer **any two** questions from among the questions 32 to 35. These questions carry **15** marks each.

32. (a) For the demand law $p = 10 - \frac{x}{2}$. Find (i) The elasticity of demand, (ii) Total revenue and (iii) Marginal revenue.
- (b) If $Q = 100 + 10k - k^2$ is a production function, where k represents the capital, find the marginal productivity when the capital is 2.
33. (a) Find the differential equation corresponding to the family of curves $y = cx + x$.
- (b) Solve the differential equation $y \frac{dy}{dx} + 25x = 0$.
34. (a) Solve $(x^2 + y^2)dx = (xy - x^2)dy$.
- (b) Solve $x^2 \frac{dy}{dx} = y^2 + 5xy + 4x^2$.
35. (a) Find a general solution of the following differential equation
- (i) $(D^2 + 2kD + k^2)y = 0$
- (ii) $(D^2 + 4)y = \sin 2x$.
- (b) Solve $y'' + 2y' + y = e^{-x}$, $y(0) = -1$, $y'(0) = 1$.
-