



Reg. No. :

Name :

Third Semester B.A. Degree Examination, December 2017
First Degree Programme under CBCSS
COMPLEMENTARY COURSE FOR ECONOMICS
MM 1331.5 : Mathematics III (Mathematics for Economics – III)
(2013 Admission Onwards)

Time : 3 Hours

Max. Marks : 80

SECTION – I

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

1. Find an antiderivative of $f(x) = x^2 - 2x + 3$.
2. Evaluate $\int (2x + \cos x) dx$.
3. Evaluate $\int x^{-1/3} dx$.
4. Evaluate $\int (7x - 2)^3 dx$.
5. Find $\int \frac{dx}{x}$.
6. Given Marginal Cost $MC = \frac{dTC}{dQ} = 32 + 18Q - 12Q^2$. Find the Total Cost TC.
7. The marginal propensity to save is given by $\frac{dS}{dY} = 0.5 - 0.2Y^{-1/2}$. Find the savings function.
8. Find the sum of the series

$$\frac{1}{9} + \frac{1}{27} + \frac{1}{81} + \dots$$



9. Check whether the series is divergent : $1 + 3 + 3^2 + \dots$
10. Find the Maclaurin series for $f(x) = e^{-x}$.

SECTION - II

Answer **any 8** questions from among the questions 11 to 22. These questions carry **2 marks each**.

11. Evaluate $\int 10x (x^2 + 3)^4 dx$.
12. Evaluate $\int \frac{dx}{9x - 5}$.
13. Evaluate $\int x^3 e^{x^4} dx$.
14. Evaluate $\int 6x e^{x^2+7} dx$.
15. Find the area of the region enclosed by $y = x^2 - 2$ and $y = 2$.
16. The rate of net investment is given by $I(t) = 140 t^{3/4}$. Determine the function for capital K .
17. Find the value of $\int_0^{10} 2e^{-2x} dx$.
18. Given the demand function $P = 45 - 0.5 Q$. Find the Consumers' Surplus CS when $P_0 = 32.5$ and $Q_0 = 25$.
19. Check whether the series $\frac{2}{5} - \frac{2}{5.3} + \frac{2}{5.9} - \frac{2}{5.27} + \frac{2}{5.81} - \dots$ converges.
20. Find the Maclaurin series for $f(x) = \frac{1}{1+x}$.



21. Show that $\log(1+x) = x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \dots$

22. Find the sum of the series

$$\frac{9}{100} + \frac{9}{100^2} + \frac{9}{100^3} + \dots + \frac{9}{100^n} + \dots$$

SECTION - III

Answer **any 6** questions from among the questions **23** to **31**. These questions carry **4 marks each**.

23. Evaluate $\int \frac{3x^2 + 2}{4x^3 + 8x} dx$.

24. Find the area of the region between $y_1 = 3x^2 - 6x + 8$ and $y_2 = -2x^2 + 4x + 1$ from $x = 0$ to $x = 2$.

25. Evaluate $\int_1^2 4x e^{x^2+2} dx$.

26. Marginal cost is given by $MC = \frac{dTC}{dQ} = 12e^{0.5Q}$ and Fixed Cost $FC = 36$. Find the total cost.

27. Find a series representation of $\tan^{-1}x$; $-1 \leq x \leq 1$.

28. Find the Taylor series generated by $f(x) = \frac{1}{x}$ at $a = 2$.

29. Find the Taylor series generated by

$$f(x) = x^3 - 2x + 4 \text{ around } a = z.$$

30. Explain the law of growth.

31. Show that $\frac{5}{1.2.3} + \frac{7}{3.4.5} + \frac{9}{5.6.7} + \dots = 3\log 2 - 1$.

SECTION - IV

Answer any 2 questions from among the questions 32 to 35. These questions carry 15 marks each.

32. Explain with examples Domar's model of public debt and national income.

33. Use the Trapezoidal rule with $n = 4$ to estimate $\int_1^4 x^2 dx$.

34. Use Simpson's rule with $n = 4$ to approximate $\int_0^1 \frac{1}{1+x^2} dx$.

35. a) Evaluate $\int \frac{6x^2 + 4x + 10}{(x^3 + x^2 + 5x)^3} dx$.

b) Show that $\int_{-4}^4 (8x^3 + 9x^2) dx = \int_{-4}^0 (8x^3 + 9x^2) dx + \int_0^4 (8x^3 + 9x^2) dx$.