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S – 1640

Reg. No. :

Name :

Fifth Semester B.Sc. Degree Examination, December 2023

First Degree Programme under CBCSS

Physics

Core Course VII

PY 1543 : ELECTRONICS

(2013-2017 Admission Onwards)

Time : 3 Hours

Max. Marks : 80

- I. Answer **all** questions. **Each** carries **1** mark.
1. What do you mean by ripple factor?
 2. What do you mean by extrinsic semi-conductors?
 3. What is meant by peak inverse voltage.
 4. What is the function of a filter circuit.
 5. Mention two advantages of RC coupled amplifier.
 6. What is modulation?
 7. What is meant by damped oscillation
 8. Why JFET is called unipolar transistors?
 9. What is meant by modulation factor?
 10. Explain sideband power.

(10 × 1 = 10 Marks)

P.T.O.

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

11. What is the function of a filter circuit?
12. Describe the working of a capacitor filter circuit.
13. Explain how voltage stabilization take place in Zener diode.
14. What is the principle of class B power amplifier?
15. What is DIAC?
16. What is the importance of side band frequencies?
17. What is meant by closed loop voltage gain of an OP-Amp?
18. What is a carrier wave?
19. What is DC load line?
20. What is Barkhausen criteria for oscillation?
21. Explain how E-MOSFET work.
22. What are the characteristics of a tunnel diode?

(8 × 2 = 16 Marks)

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

23. A full wave bridge rectifier is constructed to a 12V stepdown transformer .If the forward resistance of each diode is 4 ohm and the load resistance is 400 ohm, find the dc load current and the efficiency of the rectifier.
24. In an amplifier the input resistance is 1500Ω and drives a 100Ω load. If the input current is 0.632 mA rms and the load voltage is 30 V rms, find : power gain in dB and the voltage gain in dB.
25. In a Colpitts oscillator choose the capacitor values if it is designed for a frequency 600K Hz and feedback fraction 0.2. A 2mH inductance is available.

26. Determine the maximum and minimum peak point voltage for a UJT with $V_{BB} = 25V$. Given that UJT has intrinsic standoff ratio range. 0.74 to 0.86 and the forward voltage drop in the PN junction is 0.7V.
27. Calculate the inductor values in a Hartley oscillator so that $f = 1MHz$ and feedback fraction $m_v = 0.2$. A 1 pF capacitor is provided.
28. In an FM system, when audio frequency is 500Hz and audio frequency voltage is 5V, the frequency deviation is 5 KHz. If audio frequency voltage is raised to 10V and audio frequency is reduced to 200Hz, what is the frequency deviation? Find the modulation index in each case.
29. Three voltages of 0.6V, -1.5V and 2V are applied to the three input resistors of a summing amplifier. The input resistors are 100 k Ω , 200 k Ω and 300 k Ω respectively. If the feedback resistor is 400 Ω . Find the output voltage.
30. A certain amplifier has voltage gain of 15dB. If the input signal voltage is 0.8V, what is the output voltage?
31. The ac equivalent circuit of crystal has values : $L = 200mH$, $C = 2pF$, $R = 1k\Omega$ and $C_m = 40 pF$, Calculate series resonant and parallel resonant frequency.

(6 $\times$ 4 = 24 Marks)

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

32. Explain a voltage divider bias circuit in detail.
33. Explain negative feedback Derive an expression for gain in feedback amplifier. What are the advantages of negative feedback.
34. Explain the construction and working of JFET.
35. Explain the working of a full wave rectifier and derive its efficiency.

(2 $\times$ 15 = 30 Marks)