15/01/2025 AW

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Reg. No. : .....

Name : .....

Fifth Semester B.Sc. Degree Examination, December 2024

First Degree Programme under CBCSS

Physics

Core Course VII

PY 1543 : ELECTRONICS

(2018 Admission Onwards)

Time : 3 Hours

Max. Marks : 80

SECTION – A

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

1. State Norton's theorem.
2. What is a pn junction?
3. What is meant by peak inverse voltage?
4. What do you understand by single stage transistor amplifier?
5. What are the advantages of transformer coupling?
6. What is a feedback circuit?
7. What are the advantages of negative feedback amplifier?
8. Define the term modulation.
9. What is an operational amplifier?
10. Explain Barkhausen criterion for oscillations.

(10 × 1 = 10 Marks)

P.T.O.

SECTION – B

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

11. Explain maximum power transfer theorem.

12. Describe the action of a capacitor filter.

13. Explain phase reversal in amplifier.

14. What do understand d.c and ac load lines?

15. Explain how transistor works as an amplifier?

16. What is the difference between JFET and a bipolar transistor?

17. What are the advantages and disadvantages of frequency modulation?

18. Describe the working principle of a MOSFET.

19. What is the principle of phase shift oscillator? List out its advantages.

20. What is the difference between open loop gain and (Av) and closed loop gain (Avf)?

21. Discuss the operation of a summing amplifiers.

22. Why dual power supply is used in Op-Amp?

(8 × 2 = 16 Marks)

SECTION – C

Answer any **six**, each question carries **4** marks.

23. A zener diode (Vz=9V) along with a series resistance is connected across a 18 V supply. Calculate the minimum value of the resistance required, if the maximum zener current is 100*mA*.

24. A crystal diode having internal resistance $r_f = 20\Omega$ is used for half wave rectification. If the input voltage v=sin ω t and load resistance RL = 800Ω. Find
    (a) Im, Idc, Irms
    (b) ac power input and dc power output
    (c) dc output voltage.

25. A Germanium transistor is to be operated at zero signal I_C = 1mA. If the collector supply Vcc=12V, what is the value of R_B in the base resistor method. Given β=100.

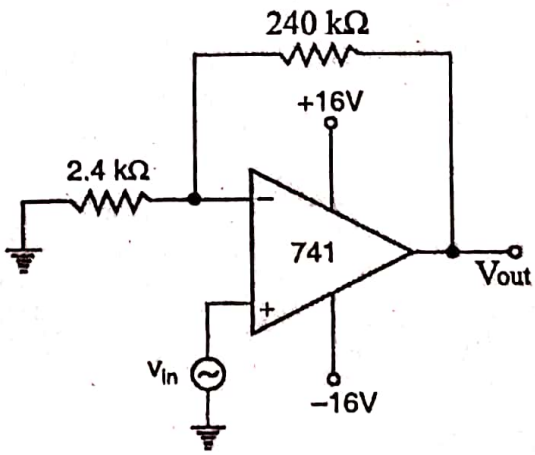
26. The overall gain of a multistage amplifier is 140. When negative voltage feedback is applied, the gain is reduced to 17.5. Find the fraction of the output that is fed back to the input.

27. An amplifier has a voltage gain of 50. To reduce the distortion present in it, 10% negative feedback is employed. Calculate voltage gain with feedback.

28. The maximum peak to peak voltage of an AM wave is 28mV and the minimum peak to peak voltage is 8mV. Calculate the modulation factor.

29. A JFET has a drain current of 5mA. If I_{DSS} = 10mA and $V_{GS(off)}$ =-6V. Find the value of V_{GS} and V_P.

30. Calculate the output voltage from the non inverting amplifier circuit shown in the following figure for an input of 12 μV:



31. The Q value of a tuned amplifier is 60. If the resonant frequency for the amplifier is 200 kHz, find the band width and cut off frequencies.

(6 × 4 = 24 Marks)

SECTION – D

Answer any **two** questions; each question carries **15** marks.

32. Explain with circuit diagram, the action of a full wave rectifier using centre tap transformer. Derive an expression for rectification efficiency and ripple factor.

33. Explain the principle and working of unijunction transistor with the help of diagram.

34. With circuit diagram, explain the working of a push pull amplifier.

35. What is amplitude modulation? Explain the modulation factor and its importance. Show how sideband frequencies are generated by amplitude modulation.

(2 × 15 = 30 Marks)