(Pages : 4)

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Fifth Semester B.Sc. Degree Examination, February 2021.

First Degree Programme under CBCSS

Physics

Core Course VII

PY 1543 – ELECTRONICS

(2013, 2015 to 2017 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

(Answer **all** questions, each carries **1** mark)

1. What is a PN junction?
2. What is the value of ripple factor for a half wave rectifier?
3. What is β for a transistor?
4. What is the use of an emitter follower circuit?
5. Name the different methods of coupling used in multistage amplifiers.
6. What is crossover distortion?
7. What is positive feedback?
8. What is frequency modulation?
9. What is differential mode signal?
10. What is a photodiode?

(10 × 1 = 10 Marks)

P.T.O.

SECTION – B

Answer **any eight**, each carries **2** marks

11. What are the two breakdown mechanisms in a diode?
12. What is the use of a voltage regulator circuit?
13. How can we make the transistor to operate in the active region?
14. What do you mean by operating point of an amplifier?
15. What is a class A amplifier?
16. What are the advantages of class B push pull amplifier?
17. What are the different forms of negative feedback?
18. What is a tank circuit?
19. What is modulation index?
20. Explain a non inverting amplifier using op-amp.
21. What are the applications of a summing amplifier?
22. What is the theory of operation of an LED?

(8 × 2 = 16 Marks)

SECTION – C

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

23. Calculate the DC value of load power (P_{dc}) for a half wave rectifier from the following data. $V_{dc} = 50V$, Load resistance = 200Ω.
24. Calculate the ripple factor for a full wave rectifier with CLC filter. Given C1=C2=$100\,\mu f$, $f = 50Hz$, $L = 5H$ and $R_L = 150\Omega$.

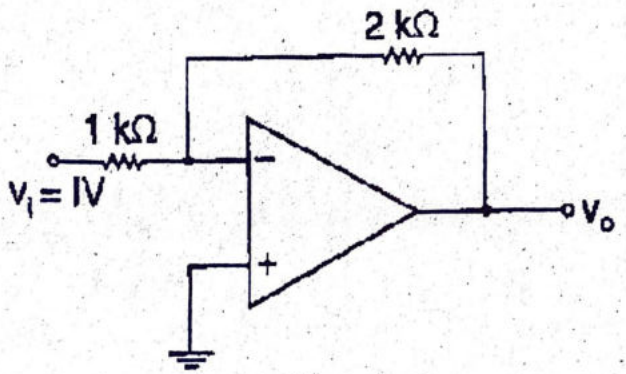
25. Derive the relation between α and β for a transistor.

26. A single stage, class A amplifier has V_{CC} = 20 volt, V_{CEQ} = 10 volts, I_{CQ} = 600 mA and collector load resistor, $R_L = 16\Omega$. Determine the power supplied by the d.c. source to the amplifier circuit.

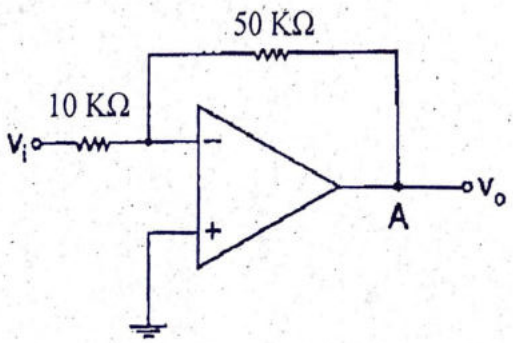
27. A transistorized RC phase shift oscillator has the following values R1=R2=R3 =1MΩ and C1=C2=C3 = 68pF. At what frequency will the circuit oscillate?

28. A amplitude modulated carrier wave has maximum and minimum amplitudes of 750 mV and 250mV. Calculate the value of percentage modulation.

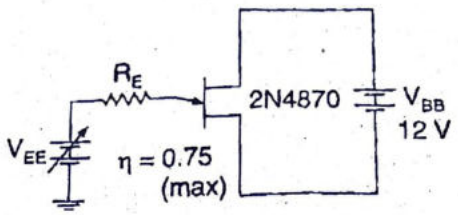
29. Figure shows an inverting amplifier with an input voltage of 1 V. Find the value of output voltage.



30. Figure shows an inverting amplifier with an input voltage 1V. When the input voltage is increased from 0.2V to 0.6V, what will be the voltage at node A in each case.



31. Determine the peak point voltage value (V_p) for the UJT shown below. Take $V_D = 0.7V$



(6 × 4 = 24 Marks)

SECTION – D

Write essays not exceeding four pages. Answer **any two** questions. (Each answer carries **15** marks)

32. What are filters? Explain the working of a shunt capacitor filter with necessary sketches.

33. With a neat sketch explain a class B push pull amplifier.

34. Sketch and explain the frequency spectrum of an AM modulated wave showing the position of the carrier wave and the two side bands.

35. Explain how an op-amp can be used as a summing amplifier.

(2 × 15 = 30 Marks)