(Pages : 4) **M – 1465**

Reg. No. : .....

Name : .....

Fifth Semester B.Sc. Degree Examination, December 2021

First Degree Programme Under CBCSS

Physics

Core Course VII

PY 1543 — ELECTRONICS

(2014, 2016 & 2017 Admission)

Time : 3 Hours Max. Marks : 80

SECTION – A

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

1. Define ripple factor.
2. What is a halfwave rectifier?
3. What is a_{ac} for a transistor?
4. Define transistor biasing.
5. Give the classification of amplifiers based on biasing conditions.
6. What is a feedback amplifier?
7. What is damped oscillation?
8. What is modulation?
9. Give the expression for gain of an inverting amplifier using op-amp.
10. What is DIAC?

($10 \times 1 = 10$ Marks)

P.T.O.

SECTION – B

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

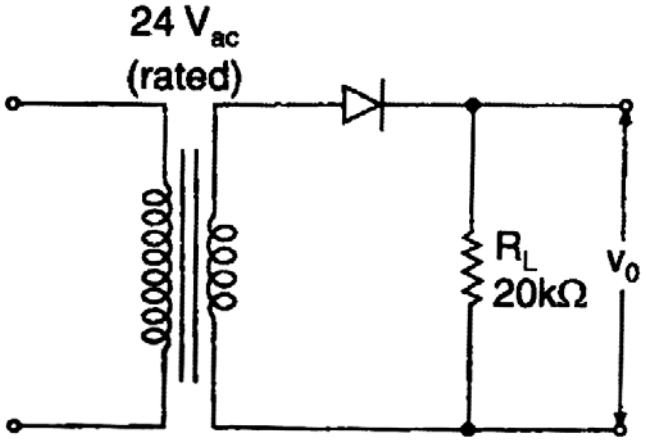
11. What is zener diode and how does it regulate the voltage?
12. What is a full wave rectifier?
13. What is DC load line?
14. Give the expression for power gain(dB) of an amplifier.
15. What is harmonic distortion?
16. What is Barkhausen criteria for oscillation?
17. What is the effect of negative feedback on the bandwidth of an amplifier?
18. What is a carrier wave?
19. What are the different op-amp parameters?
20. What is a differential amplifier?
21. What are the characteristics of a tunnel diode?
22. What are the advantages of JFET?

(8 × 2 = 16 Marks)

SECTION – C

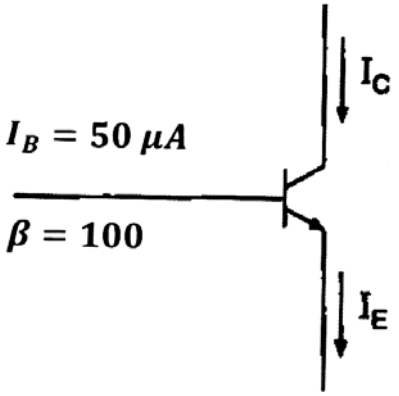
(Answer **any six**, **each** carries **4** marks)

23. For the transformer coupled half wave rectifier shown below determine the value of DC load current.



24. A full wave rectifier circuit with LC filter supplies 12V DC at 100 mA with a ripple factor of 0.01 and an inductive value of 1 H with a supply frequency of 50 Hz. Calculate the value of capacitor to be used.

25. Determine the value of I_C and I_B for the circuit shown below.



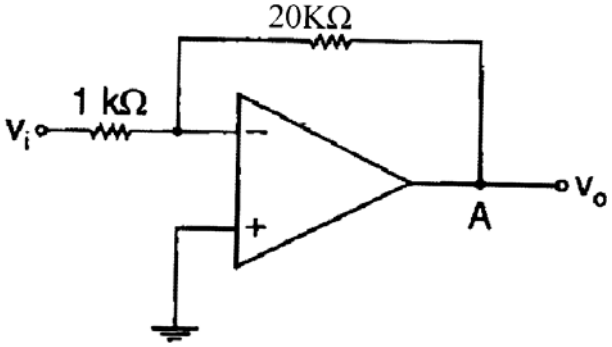
26. A given multi-stage amplifier has the following voltage gains. $A_{v1} = 10$, $A_{V2} = 20$ and $A_{V3} = 30$. What is the overall gain? Also express the overall gain in *dB*.

27. Find the operating frequency for the Hartley oscillator with following components; $L_1 = 1000\,\mu H$, $L_2 = 100\,\mu H$, $M = 20\mu H$, $C = 20pf$.

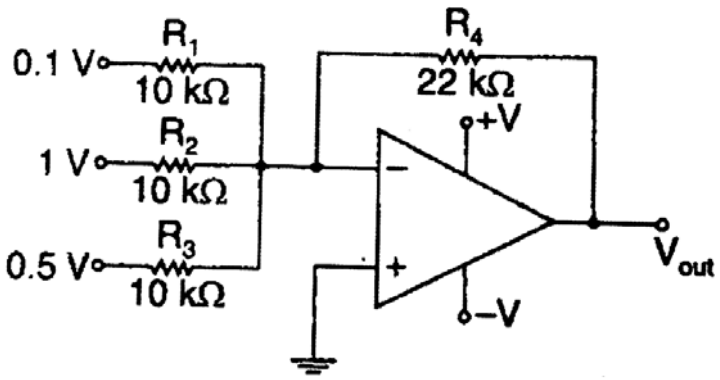
28. An RC phase shift oscillator uses three capacitors with 4.7 *pF* in the feedback circuit. Find the value of three resistors (R_1, R_2, R_3) to produce a frequency of 400 KHz.

29. An audio signal given by $20\sin 2\pi(2000t)$ amplitude modulates a sinusoidal carrier wave $90\sin 2\pi(100{,}00t)$. Find the modulation index.

30. Figure shows an inverting amplifier with an input voltage V_i. When the input voltage is increased from 0.3V to 0.5V, what will be the voltage at node *A* in each case.



31. For the summing amplifier given below find the value of output voltage.



(6 × 4 = 24 Marks)

SECTION – D

(Answer **any two, each** carries **15** marks)

32. Explain the V-I characteristics of a diode.

33. Draw and explain a voltage divider bias circuit.

34. Explain the working of an RC phase shift oscillator with circuit diagram. What is the equation for frequency of oscillation?

35. Explain the working of an SCR in detail.

(2 × 15 = 30 Marks)