22102721

QP CODE: 22102721

Reg No : .....

Name : .....

B.Sc DEGREE (CBCS) REGULAR EXAMINATIONS, AUGUST 2022

Fourth Semester

Core Course - PH4CRT04 - SEMICONDUCTOR PHYSICS

(Common for B.Sc Physics Model I, B.Sc Physics Model II Applied Electronics,B.Sc Physics Model II Computer Applications, B.Sc Physics Model III Electronic Equipment Maintenance)

2020 Admission Only

C3648EED

Time: 3 Hours Max. Marks : 60

Part A

*Answer any **ten** questions.*

*Each question carries **1** mark.*

1. What is an intrinsic semiconductor?
2. What is reverse breakdown phenomenon in pn junction diode?
3. Name the diode parameters.
4. How we can calculate the efficiency of a half wave rectifier?
5. What is the use of voltage regulator?
6. What is the significance of the arrow head in the emitter of NPN and PNP transistor symbols?
7. Why CE configuration is most popular in amplifier circuits?
8. What is thermal runaway?
9. What do you mean by single stage transistor amplifier?
10. What do you meant by decibel system?
11. Explain how to obtain an voltage follower from non-inverting amplifier.
12. What is phase modulation?

(10×1=10)

Part B

*Answer any **six** questions.*

*Each question carries **5** marks.*

13. Write a short note on shunt capacitor filter.

14. A 10V peak sine wave is applied to the input of a positive clipper. Draw the positive clipper circuit and the output wave form.

15. Design and draw a clamper circuit to clamp the output 5V above the zero referance level for an input signal of 4V(p).

16. Define the current gain α. For a transistor α = 0.95 and IE = 1mA, find the values of IC and IB.

17. What are the four different forms of negative feedback? Explain.

18. A silicon transistor is biased in the voltage divider method using resistors R1=39KΩ,R2=10KΩ.the other resistors used are RE=1KΩ, RC=5.6KΩ, VCC=10V, VBE =0.7V calculate IC and IC(sat).

19. A FET has a drain current of 4mA. If I_{DSS} = 6mA and V_{GS} (off) = -6V. Find the value of V_{GS} and VP.

20. Define CMRR. A differential dc amplifier has a differential mode gain of 100 and a common mode gain of 0.01. What is its CMRR in dB?

21. The maximum and minimum amplitudes of an amplitude modulated wave is 5V and 2.25 V respectively. Find its modulation index and percentage of modulation.

(6×5=30)

Part C

*Answer any **two** questions.*

*Each question carries **10** marks.*

22. What is the difference between zener diode and ordinary diode? Draw and explain the V-I characteristics of zener diode.

23. Why negative feedback is employed in amplifiers? Explain this with the help of different advantages of negative feedback.

24. Explain Colpitt's oscillator with suitable diagram. Compare it with Hartley oscillator.

25. Draw and derive the output voltage of a three input non-inverting summing amplifier. With Rf= 10K Ohm design an op-amp non-inverting summing amplifier with output voltage Vo = Va+Vb+Vc.

(2×10=20)