QP CODE: 23123528

Reg No : ....

Name : ....

B.Sc DEGREE (CBCS) REGULAR EXAMINATIONS, MAY 2023

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)

2021 Admission Only

D37B1F6B

Time: 3 Hours   Max. Marks : 60

Part A

*Answer any **ten** questions.*

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

1. How is depletion layer formed?

2. What happens when the diode is reverse biased?

3. How a zener diode differ from pn junction diode?

4. Which is having more efficiency, half wave, full wave or center tap rectifier? Why?

5. Name the four filter circuits.

6. What is the significance of the arrow head in the emitter of NPN and PNP transistor symbols?

7. Explain what is meant by I_{CEO}?

8. Draw the block diagram of current-series feedback.

9. What are the consequences of no or faulty biasing of transistor?

10. Write any two differences between Hartley and colpitt's oscillator.

11. What is the value of open loop gain of an ideal op-amp?

12. Explain the function of diode as detector.

$(10 \times 1 = 10)$

Part B

*Answer any **six** questions.*

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

13. A silicon diode dissipates 4W for a forward dc current of 2A. Calculate the voltage drop across the diode and its bulk resistence.

14. With the help of a circuit diagram explain voltage tripler.

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. With the help of a connection diagram draw and explain the input characteristic of a common- emitter configuration of a transistor.

17. For a transistor β = 45 and voltage drop across 1KΩ load which is connected in the collector circuit is 1V. Find the base current for common emitter connection.

18. With a neat diagram explain the variations in amplifier gain with frequency.

19. For an N channel JFET I_{DSS} = 8.7mA; VP = -3V; V_{GS} = -1V. Find the values of (i) I_D (ii) gmo (iii) gm.

20. Find the voltage gain and output voltage of a non- inverting amplifier with Rf = 56K, R1 = 1K and input voltage = 1V(P-P) a.c. signal. Given supply voltage = ±12V. Comment on the result.

21. A carrier wave of 900W is subjected to 100% amplitude modulation. Calculate the power carried by the sidebands.

(6×5=30)

Part C

*Answer any **two** questions.*
*Each question carries **10** marks.*

22. Explain the positive, negative and biased clipper with appropriate circuit diagram.

23. What is negative feedback? Derive the equation for the gain of the amplifier with negative feedback. What are the advantages of negative feedback?

24. Describe a phase shift oscillator. How is positive feedback realized in it?

25. Explain amplitude modulation. Derive an expression for the instantaneous amplitude of an amplitude modulated wave. Explain the side band frequencies and band width.

(2×10=20)