B.Sc DEGREE (CBCS) EXAMINATIONS, OCTOBER 2021

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)

2019 Admission only

408ACBFC

Time: 3 Hours   Max. Marks : 60

Part A

*Answer any **ten** questions.*

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

1. What is the difference between intrinsic and extrinsic semiconductors?

2.   What is avalanche breakdown?

3. Explain the term 'PIV'.

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

5. What are the different types of clipper?

6. Why emitter is heavily doped than collector and base?

7. What do you mean by d.c. and a.c. load line?

8. What do you mean by positive feedback?

9. State the important conditions to be satisfied for the normal transistor operation.

10. Write down the expression for power gain in bel and decibel.

11. Give the classification of pulse modulation.

12. What will be the percentage of modulation if the signal amplitude is half the carrier amplitude?
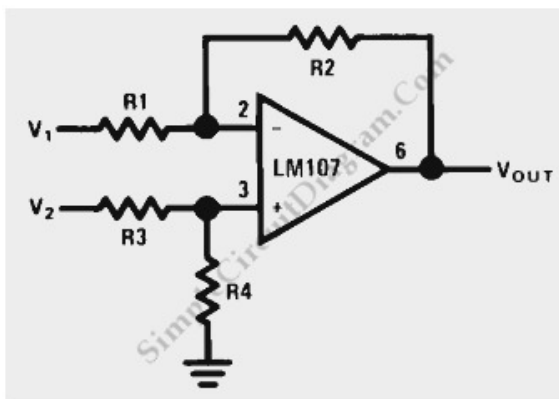
(10×1=10)

Part B

*Answer any **six** questions.*

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

13. Write a short note on Pi filter.

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

15. Design and draw a clamper circuit to clamp the output 2V above the zero referance level.

16. With the help of a connection diagram draw and explain the output characteristic of a common- base configuration of a transistor.

17. In a CB connection α = 0.95. The voltage drop across 2KΩ load resistance which is connected in the collector is 2V. Find the base current.

18. Explain what is leakage current? The following measurements are made in a transistor IC = 5.202mA, IB = 50µA, I_{CO} = 2µA. Compute the values of α, β and IE.

19. When a reverse voltage of 10V is applied between gate and source of JFET the gate current is 10µA. Determine resistance between gate and source.

20. Find the voltage gain and output voltage of an inverting amplifier with Rf = 10K, R1 = 1K and input voltage = 1V. Given supply voltage = ±12V.

21.
    Find the output voltage of the summing amplifier. Given R1 = 2K, R2 = 1K,R3 = 4K, R4 = 4K, V1 = 0.4V and V2 = 0.6V.

<div align="right">(6×5=30)</div>

Part C

*Answer any **two** questions.*

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

22. Explain the half wave rectifier with a neat circuit diagram. Derive an expression for the efficiency, ripple factor and PIV rating and compare it with full wave rectifier. What are the disadvantages?

23. What do you meant by single stage transistor amplifier? Discuss the working of a CE

amplifier with neat diagram and explain the various amplification factors.

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

25. Obtain the expression for varying voltage of an amplitude modulated wave and the total power of the AM wave. Discuss the waveform and side bands in it.

$$(2 \times 10 = 20)$$