



QP CODE: 21100831



21100831

Reg No :

Name :

B.Sc DEGREE (CBCS) EXAMINATION, MARCH 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)

2017 Admission onwards

8EF5526A

Time: 3 Hours

Max. Marks : 60

Part A

*Answer any **ten** questions.*

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

1. Calculate the barrier potential for Si junction at 75° C if its value at 25°C is 0.8.
2. What happens when the diode is reverse biased?
3. Give the relation between dynamic resistance and junction resistance.
4. Compare the output of half wave, full wave and center tapped rectifier.
5. Name the four filter circuits.
6. What is Q point of a transistor?
7. What are the advantages of negative feedback?
8. Why is it necessary to bias a transistor for its normal operation?
9. What is CE amplifier?
10. What do you mean by LC oscillators?
11. Discuss classification of Field-Effect Transistor.
12. An IC has the designation UA741C, what does it mean?

(10×1=10)

Part B

*Answer any **six** questions.*

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

13. What is the difference between NTC and PTC thermistor ? Draw the temperature -





resistance curve of a thermistor? Explain its applications.

14. A 10V zener diode is used to regulate the voltage across a variable load resistor. The input voltage varies between 12 to 18 V. The load current (I_L) varies between 5 to 100 mA. The minimum zener current is 20 mA. Find (i) the maximum value of series resistance (R) and (ii) the maximum power dissipated by the zener diode using this value of series resistance.
15. Design and draw a clipper circuit to clip the output at +2V and -2V.
16. Compare the input resistance, output resistance, voltage gain and applications of CB, CE and CC configurations of a transistor.
17. Define α and β . Find the values of β if (i) $\alpha = 0.9$ (ii) $\alpha = 0.98$ and (iii) $\alpha = 0.99$.
18. A germanium transistor has $I_{CBO} = 10\mu A$, $\alpha = 0.98$ and $I_C = 1mA$. Determine the emitter current and β of the transistor.
19. Find the voltage gain and output voltage of an inverting amplifier with $R_f = 82K$, $R_1 = 2K$ and input voltage = 2V(P-P) a.c. signal. Given supply voltage = $\pm 12V$. Comment on the result.
20. A modulating signal $m(t) = 10 \cos 2\pi(1000t)$ is amplitude modulated with a carrier signal $c(t) = 70 \cos 2\pi(100000t)$. Find the modulation index, the carrier power, and the power required for transmitting AM wave.
21. An AM transmitter with a carrier frequency of 2.5 KHZ is being modulated by audio signals in the frequency range 200-2000 Hz. Obtain its channel width.

(6×5=30)

Part C

Answer any **two** questions.

Each question carries **10** marks.

22. Explain the positive, negative and biased clamper with appropriate circuit diagram.
23. What do you mean by decibel system? Explain how voltage gain, power gain and current gain expressed in dB. State its merits. What is the significance of -3dB gain.
24. Draw and explain RC phase shift oscillator.
25. Explain modulation. Write notes on i) amplitude modulation ii) frequency modulation iii) phase modulation.

(2×10=20)

