QP CODE: 24801181

24801181

Reg No : .....

Name : .....

INTEGRATED MSC DEGREE EXAMINATION, FEBRUARY 2024

First Semester

INTEGRATED MSC BASIC SCIENCE-PHYSICS

CORE - IPH1CR03 - SEMICONDUCTOR PHYSICS

2021 Admission Onwards

5B2D2C28

Time: 3 Hours Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

*Weight **1** each.*

1. What are the two combinations of resistors in various circuits? Give the formula for each combination.
2. What do you mean by eddy current loss in a transformer?
3. Write a note on current components in a p-n junction.
4. Distinguish between the output waveforms of rectifiers made using capacitor filter and series inductor filter.
5. Distinguish between positive and negative clippers.
6. Draw the symbols of NPN and PNP transistors.
7. What type of feedback is employed in oscillators? Explain.
8. Write down the general applications of oscillators.
9. Explain the formation of depletion region in a JFET.
10. Name the two characteristic of JFET.

(8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

*Weight **2** each.*

11. Four capacitors of 4 micro Farad each are connected in a) series and b) parallel. Calculate the effective capacitance in each case.
12. Derive expressions for ripple factor (r), rectification efficiency (η) of a Full Wave Rectifier (FWR) and the PIV of the diodes to be used.

13. A power supply has a voltage regulation of 2 %. If the no load voltage is 30 V find its full load voltage.

14. Define the current gain α. For a transistor I_E=2mA and I_C = 1.9mA. Compute the values of α and I_B.

15. Explain what is I_{CO}. A transistor has α = 0.98, I_B =100μA and I_{CO} = 6μA. Calculate I_C and I_E.

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

17. Differentiate between BJT and FET.

18. What is IGFET? With a neat sketch explain the structure of an N channel depletion type MOSFET.

(6×2=12 weightage)

Part C (Essay Type Questions)

*Answer any **two** questions.*

*Weight **5** each.*

19. Give a detailed description about various types of inductors.

20. Explain the working of a zener diode. Give its applications.

21. Explain the voltage divider method of biasing a transistor. Obtain expressions for collector current and saturated collector current of a transistor biased in this way.

22. With necessary circuit diagram explain the biasing circuits of the Enhancement type MOSFETs and Depletion type MOSFETs.

(2×5=10 weightage)