Reg. No. : ....

Name : ....

IV Semester B.Sc. Degree CBCSS (OBE) Regular Examination, April 2021
(2019 Admission Only)
CORE COURSE IN PHYSICS
4B04PHY : Electronics I

Time : 3 Hours

Max. Marks : 40

PART – A

(Short answer questions. Answer **all** questions. **Each** question carries **1** mark.)

1. What do you mean by biasing a PN junction diode ? Compare the effect of forward and reverse bias on a PN junction.

2. What do you mean by the quiescent point of a transistor ?

3. What is the basic difference between a BJT and an FET ?

4. What is the basic advantage of MOSFET over FET ?

5. How will you obtain the 1's complement of a binary number ? What is the 1's complement of 10101 ?

6. Give truth table for a 2 input OR gate.

(6×1=6)

PART – B

(Short essay questions. Answer **any 6** questions. **Each** question carries **2** marks.)

7. Draw typical forward current-voltage characteristics to illustrate the differences of Si and Ge diodes.

8. Using a suitable figure, illustrate the currents and their directions in a biased pnp transistor.

9. Write short note on the temperature effects on the performance of transistor circuits.

10. Draw the drain characteristics of an n-channel JFET under zero external bias indicating the different regions.

11. Discuss the basic working principle of a MOSFET.

12. Convert the binary numbers 1101101 and 0.1011 to decimal.

13. Determine the values of A, B, C and D that make the sum term $A + \overline{B} + C + \overline{D}$ equal to 0. Similarly determine the values of A, B, C and D that make the product term $A \overline{B} C \overline{D}$ equal to 1.

14. Using Boolean algebra techniques show that AB + A(B + C) +B(B + C) = B + AC.

(6×2=12)

PART – C

(Problems. Answer **any 4** questions. **Each** question carries **3** marks.)

15. A 6.2V Zener diode is used to regulate an input voltage which fluctuates between 9V and 12V. It is connected across a load of 1kΩ and a series resistance of 330Ω. Calculate the maximum and minimum values of the Zener current.

16. A transistor in CB configuration with current amplification factor a = 0.92 has an emitter current of 1 milli ampere. When the emitter circuit is open, the collector current is 50 micro amperes. Determine the total collector current.

17. In a transistor circuit, collector load is 4 kΩ and the zero-signal collector current is 1 milli ampere. Determine the operating point if V_{cc} = 10 V. What will be the operating point if R_c = 5 k Ω ?

18. Define the basic FET parameters

   i) ac drain resistance,

   ii) transconductance and

   iii) amplification factor.

19. Convert the octal numbers 13, 25, 140, 7526 and 6352.745 to binary.

20. State de Morgan's theorems and verify them using a truth table.

(4×3=12)

PART – D

(Long essay questions. Answer **any 2** questions. **Each** question carries **5** marks.)

21. Using a suitable circuit diagram, explain the working principle of a half wave rectifier with capacitor smoothing. Comment on the rectification efficiency of the circuit. Draw the output waveforms in the presence and absence of a capacitor filter.

22. Explain the voltage divider method of biasing a bipolar junction transistor circuit.

23. Compare the working principle of n-channel and p-channel JFETs.

24. Illustrate how a NAND gate be used to produce NOT, OR, AND and NOR gates.

(2×5=10)

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