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I Semester M.Sc. Degree Examination, March/April - 2025

PHYSICS

Electronic Circuit and Devices

(CBCS Scheme 2020-21)

Paper : Phy 104

Time : 3 Hours

Maximum Marks : 70

Instructions to Candidates:

Answer ALL the questions.

1. a) Define depletion capacitance. Derive an expression for depletion capacitance in a pn junction.
b) Explain the working principle of SCR.
c) Mention the factors affecting the efficiency of LED. (7+4+4)

(OR)

2. a) Write a note on Ohmic contacts.
b) Explain the construction, working principle and characteristics of MESFET. (5+10)
3. a) Explain the V-I characteristics of transistor in common emitter configuration.
b) Discuss the working of darlington pair configuration. (8+7)

(OR)

4. a) Discuss the significance of DC load line and optimum point in a transistor circuit.
b) Explain the dc analysis of dual input and dual output configuration of transistor difference amplifier. (5+10)
5. a) Draw the circuit diagram of first order low pass filter using op amp and discuss the phase and frequency response of the circuit.
b) Explain the working of Op-Amp as differentiator. (10+5)

(OR)

6. With neat circuit diagram explain the working of an op-amp in the inverting configuration and hence derive an expression for closed loop gain, input impedance and output impedance.

[P.T.O.]





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(5×5=25)

Answer any FIVE of the following.

7. a) Explain in brief the band structure of pn junction at thermal equilibrium.
- b) Discuss the working principle of photo diode.
- c) Explain the working of transistor as voltage regulator.
- d) Explain CMRR and difference mode gain.
- e) Discuss the working of an Op-Amp as Summing amplifier.
- f) Simplify using Karnaugh map $F(A,B,C,D) = \sum m(1,2,3,6,8,9,10,12,13,14)$

