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End Semester Examination, December 2024
Open Elective – 3rd Semester
Fundamental of Electronics (OEC038)

Time: 2.5 hrs.

Max Marks: **50**

Note: *All Questions are compulsory. Marks are indicated against each question.*

PART-A

Q.1 **Attempt any five questions:**

- | | |
|---|-----------------------|
| (a) What is Consensus Theorem and Redundant literal Rule | [CO-1] [L-2] 2 |
| (b) What is the role of filter and regulator in rectifier with waveform | [CO-1] [L-2] 2 |
| (c) Difference between Avalanche and Zener Breakdown | [CO-1] [L-3] 2 |
| (d) What is DeMorgan's law in Boolean algebra? | [CO-3] [L-2] 2 |
| (e) Draw the truth table for a 2-input XOR gate | [CO-3] [L-3] 2 |
| (f) Compare the characteristics of a PNP and an NPN transistor. | [CO-1] [L-2] 2 |
| (g) Define and explain the operation of a photodiode | [CO-1] [L-1] 2 |

2x5

PART-B

- Q.2 (a) Derive the input-output characteristic curves for a common-emitter configuration of a BJT.
(b) Explain the concept of Punch Through Effect in BJT [CO-2] [L-4] **10**

OR

- (a) Describe the construction and operation of a Metal-Oxide-Semiconductor Field-Effect Transistor (MOSFET) in Depletion mode.
(b) Compare the characteristics of FETs and BJTs. [CO-2][L-3] **10**

- Q.3 What do you mean by Junction and Diffusion capacitance in Diode? Explain the different working modes of diode with help of I-V curve. [CO-3] [L-4] **10**

OR

What do you mean by Drift and Diffusion current in Diode? Write and explain the expression of Diode current Equation? [CO-3] [L-4] **10**

- Q.4 (a) Explain the need for modulation in communication systems.
(b) Describe the different types of modulation techniques used in analog communication (AM, FM, PM). [CO-4] [L-2] **10**

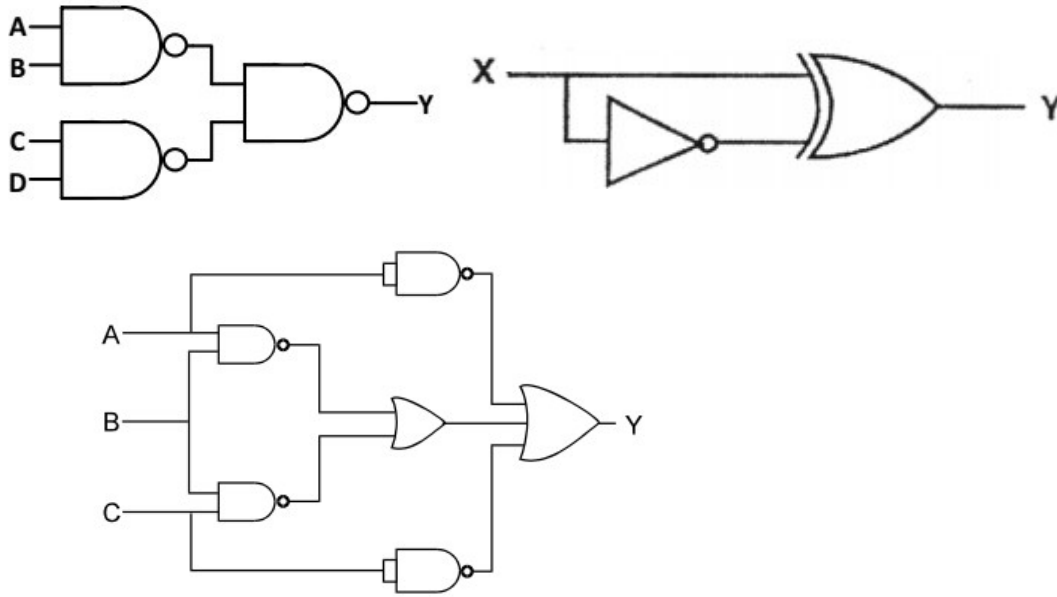
OR

(a) Discuss the elements of a communication system and their functions (source, transmitter, channel, receiver).

(b) What is noise in a communication system? Discuss its impact on signal transmission.

[CO- 4] [L-3] **10**

Q.5 In the logic circuits shown in the figure below, Y is given by



[CO-3] [L-4] **10**

OR

Which are the Logic Gates designated as Universal Gates? Explain why they are called universal. Using logic gates, show detailed steps and circuit diagrams for each Boolean function using logic gates only.

[CO- 3] [L-4] **10**