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4E1309

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B. Tech. IV - Sem. (Main / Back) Exam., - 2025

Automobile Engineering

4AE3-04 Digital Electronics

AE., ME.

Time: 3 Hours **Maximum Marks: 70**

Instructions to Candidates

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination (Mentioned in form No. 205)

1 NIL 2 NIL

PART – A [10×2=20]

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1 Draw the ideal VI characteristic of a diode.

Q.2 State the difference between half and full wave rectifier

Q.3 Mention various advantages of negative feedback

Q.4 Define CMRR and Slew Rate.

Q.5 Write the application of unity gain buffers

Q.6 State the difference between Analog and Digital signals

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Q.7 Simplify the following Boolean expression -

$(A + \overline{B} + AB)(A + \overline{B})(\overline{A}B)$

Q.8 Design AND gate using 2:1 MUX.

Q.9 What is the difference between microprocessor and microcontroller?

Q.10 Define the basic elements of communication system.

PART – B

[5×4=20]

(Analytical/Problem solving questions)

Attempt any five questions

Q.1 What is Zener breakdown? Explain the use of Zener diode as voltage regulator.

Q.2 Draw the diagram of ± 5V regulated power supply and explain its working also.

Q.3 Draw the circuit diagram for an differentiator and also explain its working.

Q.4 Find the output voltage for circuit as shown in Figure below -

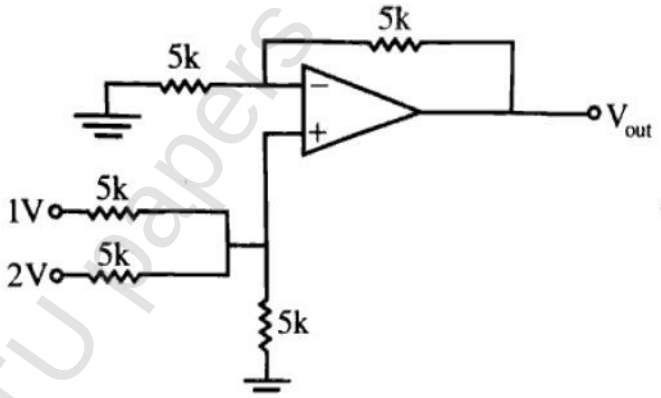


Figure 1

Q.5 Implement the full adder using 3:8 decoder.

Q.6 Design the EX-OR gate using following -

(i) NAND Gate

(ii) NOR Gate

Q.7 Explain the working of monostable multivibrator and mention its application also.

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PART – C

[3×10=30]

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any three questions

Q.1 (a) What are the various operating modes of 555IC? Explain in detail.

(b) State the Barkhausen's criteria for oscillation.

Q.2 Design the full subtractor circuit using NAND gate.

Q.3 Minimize F (w, x, y, z) = $\sum$ (0, 2, 3, 4, 6, 8, 10) + d (1, 5, 7) using K-map.

Q.4 Design a Wien bridge oscillator for frequency of 10 kHz. Explain its working also.

Q.5 Write short note on the following -

(i) FM modulation scheme

(ii) 1EEE frequency spectrum

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