Total No. of Questions: 22 Total No. of Pages: 2

Roll No.

B.Tech IV sem (Main/Back) Exam April-May 2026
Automobile Engg.
4AE3-04 Digital Electronics
Paper Code : 4E1309
AE, ME, PI

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

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 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. _____ 2. _____

Part A (Answer should be given up to 25 words only)
All questions are compulsory [1-410]

Q.1 Draw ideal Vi Characteristic of an ideal diode.

Q.2 Find the unknown numbers :

(i) $(1A)_{16} + (342)_8 = (?)_4$

(ii) $(?)_2 + (102)_8 = (420)_4$

Q.3 Simplify the following Boolean function :-

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

Q.4 Design on AX - OR gate using NAND gate.

Q.5 Draw the output characteristic of an BJT in CE mode.

Q.6 State the ideal characteristic of an operational amplifiers.

Q.7 What is the difference between as table and monostable multivibrator?

Q.8 Explain half wave rectifier.

Q.9 Draw a circuit diagram of unity gain buffer using Op-amp IC741.

Q.10 Define the basic elements of communication system. **10x2=20**

Part B (Analytical/Problem solving questions)
Attempt any Five questions [1-410]

Q.1 Design following gates using 2:1 mux :

(i) NAND gate (ii) OR gate

Q.2 Find the output voltage of an circuit as shown in figure 1 :

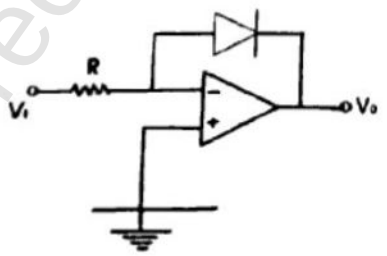


Figure-1

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Q.3 Implement the full adder using 4:1 multiplexers

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

Q.5 Find the voltage gain of circuit as shown in figure -2

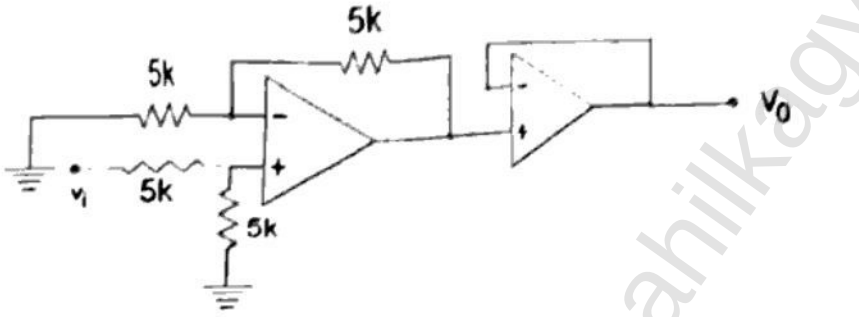


Figure -2

Q.6 Explain the working and hence derive the expression for Wein Bridge Oscillators.

Q.7 State the difference between microprocessor and micro controller in detail with block diagram.

5x4=20

Part C (Descriptive/Analytical/Problem Solving/Design question)

Attempt any three questions

Q.1 Design a full subtractor circuit using NAND gate.

Q.2 Design a ±12 V regulated power supply and explain its working also. Find the value of filtering capacitance also.

Q.3 Design a synchronous counter that counts from 0 to 12.

Q.4 Find the transistor currents in the circuit of figure 3. A silicon transistor with $\beta = 100$ and $I_{co} = 20 \times 10^{-3}$ mA is under consideration.

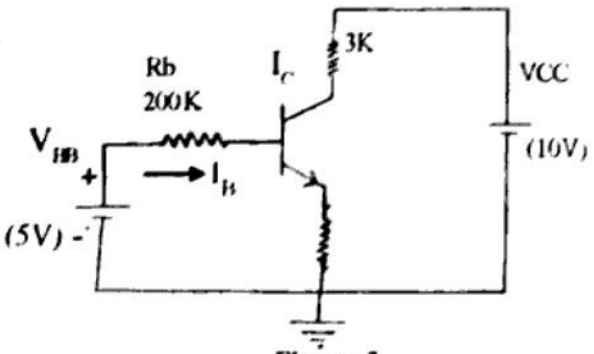


Figure -3

Q.5 Write short note on following :

i. Mobile communication system.

ii. IEEE frequency spectrum

3x10=30

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