

22371

23242

3 Hours / 70 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
 - (2) Illustrate your answers with neat sketches wherever necessary.
 - (3) Figures to the right indicate full marks.
 - (4) Assume suitable data, if necessary.
 - (5) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.
 - (6) Preferably, write the answers in sequential order.

Marks

1. Attempt any FIVE of the following :

10

- (a) Draw symbol of LED and PN junction diode.
- (b) Draw symbol of NPN transistor.
- (c) State needs of Filter in rectifier.
- (d) Define α and β of a transistor.
- (e) Write Radix of the following number systems : Decimal, Binary, Octal and Hexadecimal.
- (f) Convert following :
 $(D8D)_{16} = (?)_2$
- (g) Compare between synchronous and asynchronous counter (any two points).



2. Attempt any THREE of the following : 12

- (a) Explain V-I characteristics of zener diode with the help of circuit diagram.
- (b) Sketch block diagram of a regulated power supply. State function of each block. State two applications of regulated D.C. power supply.
- (c) Draw logic diagram of full adder and write its truth table.
- (d)
 - (i) Draw logical symbol of Ex-OR and Ex-NOR gate.
 - (ii) State rules for BCD addition.

3. Attempt any THREE of the following : 12

- (a) Draw the circuit diagram of 4 bit R-2R ladder DAC and obtain its output voltage expression.
- (b) Draw circuit diagram of zener diode as a voltage regulator. Describe its operation.
- (c) With circuit diagram, explain how transistor works as a switch.
- (d) Solve the following :
Perform the subtraction using 2's complement method $(52)_{10} - (65)_{10}$.
- (e) Explain operation of 3 bit asynchronous counter draw output waveform.

4. Attempt any THREE of the following : 12

- (a) Explain operation of 3 bit synchronous counter and draw output waveform.
- (b) Draw circuit diagram of full wave (centre tapped) rectifier. Describe its operation with input and output waveform.
- (c) Draw circuit diagram of single stage RC coupled CE amplifier. State the function of each component.
- (d) State and prove Demorgan's theorem.
- (e) Define following specification for DAC :
 - (i) Accuracy
 - (ii) Resolution

5. Answer any TWO of the following :**12**

- (a) Describe the working of JK flip flop with truth table and logic diagram.
- (b) Suggest proper diode for following application :
 - (i) for optical communication as a receiver.
 - (ii) for rectifier circuit
 - (iii) for voltage regulation
 - (iv) for clipper circuit
 - (v) for light intensity meter
 - (vi) for meter protection circuit
- (c) Draw construction of Bipolar Junction transistor (NPN) and explain its working principle. State and explain different operating regions.

6. Attempt any TWO of the following :**12**

- (a) Compare half wave rectifier and bridge type full wave rectifier on the basis of following parameters :
 - (i) No. of diodes used
 - (ii) Ripple factor
 - (iii) Rectification efficiency
 - (iv) PIV
 - (v) Ripple frequency
 - (vi) Output waveform
 - (b) Realize following logic expressions using only NAND and NOR gates :
 - (i) OR
 - (ii) AND
 - (iii) NOT
 - (c) Describe working principle of successive approximation ADC.
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