

313318

24225

3 Hours / 70 Marks

Seat No.

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- Instructions* – (1) All Questions are *Compulsory*.  
(2) Answer each next main Question on a new page.  
(3) Illustrate your answers with neat sketches wherever necessary.  
(4) Figures to the right indicate full marks.  
(5) Use of Non-programmable Electronic Pocket Calculator is permissible.  
(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

1. Attempt any FIVE of the following : 10
- a) Draw symbol of P-N junction diode and photo diode.
  - b) The applied input A.C. power to a half wave rectifier is 150 watts. The D.C. output power obtained is 60 watts. What is the rectification efficiency ?
  - c) Draw output characteristics of CE configuration. Show different regions.
  - d) List different types of number system with their base or radix.
  - e) Perform  $(8)_{10} - (5)_{10}$  using 1's complement method.
  - f) Draw logical circuit diagram of half adder circuit.
  - g) Draw symbol and truth Table of T flip-flop.

P.T.O.

- 2. Attempt any THREE of the following :** **12**
- a) Explain working of zener diode as a voltage regulator with diagram.
  - b) Compare half wave and full wave rectifier on following parameters:
    - i) Maximum efficiency
    - ii) Ripple factor
    - iii) PIV
    - iv) Number of diodes used
  - c) Draw circuit diagram of single stage RC coupled CE amplifier and state the function of each component.
  - d) State and prove De-Morgan's theorems.
- 3. Attempt any THREE of the following :** **12**
- a) Describe the working principle of photodiode with diagram.
  - b) Define  $\alpha$  and  $\beta$  of transistor and derive the relation between  $\alpha$  and  $\beta$ .
  - c) Draw symbol, logic expression and truth table of AND, EX-OR Gate.
  - d) Draw and explain 8:1 multiplexer with truth table.
- 4. Attempt any THREE of the following :** **12**
- a) Describe the construction and working principle of NPN transistor with diagram.
  - b) With circuit diagram, explain transistor works as a switch.
  - c) Draw logic diagram of full Adder and write its truth table.
  - d) Draw and explain R-2R ladder type data converter.
  - e) List any 4 specifications of ADC IC 0809, and DAC 0808.

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

- a) Draw block diagram of DC regulated power supply and explain function of each block with waveforms.
- b) Perform the following:
  - i)  $(8CF)_{16} = (?)_2 = (?)_8$
  - ii) Binary Addition:  $(101001)_2 + (100110)_2$
  - iii)  $(19)_{10} = (?)_2 = (?)_{16}$
- c) Draw circuit diagram and output waveforms of 3-bit asynchronous counter.

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

- a) Compare CB, CE and CC configurations of transistors. (Any six points)
  - b) Describe the working of 4 bit SISO shift register.
  - c) Draw block diagram of Successive Approximation ADC and explain its working.
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