

(2 1/2 Hours)

[Total Marks : 60

N.B. : (1) All questions are **compulsory**.

(2) **Figures** to the **right** indicate **full** marks.

(3) **Symbols** have their usual **meanings** unless otherwise **stated**.

(4) Use of **log tables / non-programmable** calculator is **allowed**.

1. (a) Attempt any **one** : - **08**
- (i) Draw the block diagram of generic microprocessor and explain the function of each block.
- (ii) Explain the PORT structure in case of 8051. List the features of Atmel 89C2051 microcontrollers.
- (b) Attempt any **one** : - **04**
- (i) What are CISC and RISC processors? List the advantages /disadvantages in each case.
- (ii) Explain with example any two addressing modes used in 8085 Microprocessor.
2. (a) Attempt any **one** : - **08**
- (i) Explain the boost regulator and derive an expression for its average output voltage in terms of the duty cycle.
- (ii) Describe the working of differential voltage to current converter
- (b) Attempt any **one** : - **04**
- (i) With the help of neat block diagram, explain the working of SMPS.
- (ii) Explain the working of sample and hold circuit using MOSFET and OPAMP.
3. (a) Attempt any **one** : - **08**
- (i) State the different types of modulation? Describe Pulse Code Modulation. Discuss its advantages over other techniques.
- (ii) Illustrate various types of optical fibers? With the help of necessary diagrams explain single mode and multimode operations in each type. Discuss effect of these operations on dispersion in optical fibers.

Turn Over

- (b) Attempt any **one** : - 04
- (i) What do you mean by fiber sensors? Explain any two transducers in which optical fiber is used as a sensor.
- (ii) Describe Time Division Multiplexing (TDM) technique used in data transmission
4. (a) Attempt any **one** : - 08
- (i) Draw a circuit diagram for a microcontroller based temperature controller and explain the circuit working.
- (ii) Explain how the load cell interfaced to a microcontroller can be used to construct an electronic single pan balance.
- (b) Attempt any **one** : - 04
- (i) Draw a circuit diagram for IR remote control On/Off switch.
- (ii) Explain how optical sensor along with microcontroller can be used to measure light intensity.
5. Attempt any **four**: - 12
- (a) Write an assembly language program to output a square wave of arbitrary frequency on PORT A configured as output port.
- (b) Give the account of Program memory and data memory organization in case of 8051 microcontroller.
- (c) With the help of neat block diagram, explain the working of linear power supply.
- (d) An 8 bit unipolar DAC has a resolution of 25 mV/bit. What is the analog output voltage for the following digital inputs : 24, 56, 83.
- (e) What is quantizing noise in modulation? Explain the technique used for its reduction.
- (f) Calculate numerical aperture of an optical fiber whose maximum acceptance angle is 35° . If refractive index of core of the fiber is 1.48, then, find refractive index of its cladding.
- (g) What is PWM? How it can be used to control the intensity of LED?
- (h) Draw a circuit diagram to show how the LCD module can be interfaced with the microcontroller to display information.
