

Note:

This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A

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(25 Marks)

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- 1.a) List out different segmentations presented in 8086 Microprocessor. [2]
- b) Draw the flag register of 8086 Microprocessor and explain function of each flag. [3]
- c) Explain one byte and two byte instruction frame format. [2]
- d) List the data transfer instruction set of 8086 microprocessor. [3]
- e) Draw the BSR mode frame format. [2]
- f) Explain the concept of interrupt service routine of 8086 microprocessor. [3]
- g) Explain register set of 8051 Microcontroller. [2]
- h) List out the difference between microprocessor and microcontroller. [3]
- i) Draw the T0 and T1 registers of 8051 microcontroller. [2]
- j) Explain the hardware interrupts of 8051 microcontroller with examples. [3]

PART - B

(50 Marks)

- 2.a) Draw the register organization of 8086 Microprocessor and explain it.
- b) Explain the minimum mode pins of 8086 Microprocessor in detail.
- c) Explain the concept of physical address calculation of 8086 microprocessor. [3+3+4]

OR

- 3.a) Draw the internal architecture of 8086 microprocessor and explain its operation.
- b) Draw the timing diagram of minimum mode write operation and explain it. [5+5]

- 4.a) Define addressing mode and explain different addressing modes used in 8086 Microprocessor with examples
- b) List out different assembler directives used in 8086 microprocessor with examples. [5+5]

OR

- 5.a) Write an assembly language program to find the largest number in an array of 8-bit numbers.
- b) List the string manipulation instruction set of 8086 microprocessor with examples. [5+5]

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- 6.a) Explain Clausius-Mosotti relation in dielectrics subjected to static fields.
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b) Explain electronic polarization. Derive an expression for electronic polarizability.
c) Write a short note on piezoelectricity. [3+4+3]

OR

- 7.a) What are paramagnetic materials? Explain.
b) Obtain an expression for paramagnetic susceptibility (χ). How does the paramagnetic susceptibility of a material vary with temperature?
c) A paramagnetic material has 10^{-28} atoms per m^3 . Its susceptibility at 350 K is 2.8×10^{-4} . Calculate the susceptibility at 300 K. [3+3+4]

- 8.a) Explain the phenomenon of interference of light.
b) Describe the Fraunhofer diffraction at double slit.
c) In a Newton rings experiment, the diameter of the 5th ring is 0.30cm and the diameter of the 15th ring is 0.62cm. Find the diameter of the 25th ring. [3+3+4]

OR

- 9.a) What are the characteristics of LASERS?
b) Derive expression for numerical aperture and the fractional index change of an optical fiber.
c) A fiber has the core and cladding refractive indices 1.45 and 1.44 respectively. Find the relative refractive index difference. [3+3+4]

- 10.a) Derive an expression for the carrier concentration in n-type semiconductors.
b) Derive Sabine's formula for reverberation time.
c) Write a short note on solar cell. [3+3+4]

OR

- 11.a) Write a detailed note on nanoscience.
b) Why nanomaterials exhibit different properties? Explain.
c) Write the important applications of nanomaterials. [3+3+4]

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