

Total number of printed pages-8

3 (Sem-5/CBCS) CSC HE 1/HE 2

2023

COMPUTER SCIENCE

(Honours Elective)

Answer the Questions from any one Option.

OPTION-A

Paper : CSC-HE-5016

(Microprocessor)

Full Marks : 60

Time : Three hours

OPTION-B

Paper : CSC-HE-5026

(Numerical Methods)

Full Marks : 60

Time : Three hours

**The figures in the margin indicate
full marks for the questions.**

Contd.

OPTION-A

Paper : CSC-HE-5016

(**Microprocessor**)

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Answer the following questions as directed :
 $1 \times 7 = 7$
 - (a) The Vcc pin of 8085 microprocessor should be connected to _____ V dc power supply. (Fill in the blank)
 - (b) ALE stands for _____. (Fill in the blank)
 - (c) _____ instruction is used to exchange contents of HL pair with DE pair. (Fill in the blank)
 - (d) TRAP is a non-maskable interrupt. (State true or false)
 - (e) 8255 is a programmable I/O port chip. (State true or false)
 - (f) Opcode fetch machine cycle requires four clock cycles to complete. (State true or false)

- (g) Intel 8279 can be used to interface a matrix keyboard. (State true or false)
2. Define the following terms : $2 \times 4 = 8$
 - (a) Accumulator
 - (b) Instruction word size
 - (c) Multiplexed address/data bus
 - (d) Vectored interrupt
3. Answer **any three** of the following questions : $5 \times 3 = 15$
 - (a) Write brief description of user programmable registers of 8085A microprocessor.
 - (b) What are the advantages and disadvantages of partial decoded addressing ?
 - (c) What is addressing mode ? What are the addressing modes supported by 8085 A microprocessor ? Give example.
 - (d) Describe the flags available in 8085 A microprocessor.
 - (e) Write the basic functions of 8255 A.

4. Answer **any three** of the following questions : $10 \times 3 = 30$

- (a) Draw the pinout of 8085A and explain.
- (b) Draw and explain the timing diagram for memory write machine cycle.
- (c) Write a program to copy a block of memory from one location to another location. Make necessary assumptions.
- (d) Write a delay routine to produce a time delay of 0.5 m sec in 8085 system whose clock source is 6 MHz quartz crystal.
- (e) Write a program to sort an array.
- (f) Draw the block diagram and write basic functions of 8054.

OPTION-B

Paper : CSC-HE-5026

(Numerical Methods)

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Answer the following questions as directed : $1 \times 7 = 7$

(a) If $f(x)$ is continuous on some interval $[a, b]$ and $f(a)f(b) < 0$, then the equation $f(x) = 0$ may not have any real root in the interval (a, b) .

(State true or false)

(b) The Newton-Raphson method has which of the following convergences :

(i) Linear

(ii) Quadratic

(iii) Cubic

(iv) None of the above

(Choose the correct option)

(c) Elementary row transformations change the form of a matrix, but do not change the row-rank of the matrix.

(State true or false)

(d) In Simpson's 3/8th rule, the number of subintervals is multiple of three.

(State true **or** false)

(e) In cubic spline interpolation,

(i) the first derivatives of the splines are continuous at the interior data points

(ii) the second derivatives of the splines are continuous at the interior data points

(iii) the first and the second derivatives of the splines are continuous at the interior data points

(iv) the third derivatives of the splines are continuous at the interior data points.

(Choose the correct option)

(f) Romberg Integration is an extrapolation formula of the trapezoidal rule for integration. (State true **or** false)

(g) The number of significant digits in the number 204.020050 is _____.

(Fill in the blank)

2. Define the following terms : $2 \times 4 = 8$

(a) Double precision

(b) Round off error

(c) Truncation error

(d) Normalized Floating point representation

3. Answer **any three** of the following questions : $5 \times 3 = 15$

(a) Locate the intervals which contain the positive real roots of the equation $x^3 - 3x + 1 = 0$. Obtain these roots correct to three decimal places, using the Regula Falsi method.

(b) How do we avoid computational errors in Gauss elimination ?

(c) Define consistency and inconsistency of a system of linear system of algebraic equations $Ax = b$.

(d) Use Lagrange's formula, to find the quadratic polynomial that takes the values

x	0	1	3
y	0	1	0

(e) Obtain a formula for Simpson's one-third rule for the polynomial $y = f(x)$.

4. Answer **any three** of the following questions : 10×3=30

(a) Explain Newton-Raphson method for finding roots of a non-linear equation.

(b) Solve the system of equations

$$x_1 + 10x_2 - x_3 = 3$$

$$2x_1 + 3x_2 + 20x_3 = 7$$

$$10x_1 - x_2 + 2x_3 = 4$$

using the Gauss elimination with partial pivoting.

(c) Derive the Newton's forward difference formula.

(d) Evaluate $I = \int_1^2 \frac{dx}{5+3x}$ with 4 sub intervals using the trapezoid rule.

(e) Solve the initial value problem $y' = -2xy^2$, $y(0) = 1$ with $h = 0.2$ on the interval $[0, 0.4]$.

(f) Show that mean and variance is same for poisson distribution.