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**5th Semester Examination**  
**COMPUTER SCIENCE (Honours)**

**Paper : DSE 1-T**

**[CBCS]**

**Full Marks : 40**

**Time : Two Hours**

*The figures in the margin indicate full marks.  
Candidates are required to give their answers  
in their own words as far as practicable.*

**[Information Security]**

**Group - A**

**Answer any *five* questions : 2×5=10**

1. What is digital signature?
2. What do you mean by Intrusion detection?
3. Define cryptanalysis.
4. Differentiate symmetric and asymmetric encryption?
5. What you meant by hash function?
6. What do you mean by passive and active attacks?

**P.T.O.**

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7. What is a Firewall?
8. What is risk management?

**Group - B**

Answer any *four* questions.

5×4=20

9. Write importance of information security.
10. Explain Playfair cipher technique in detail.
11. Write down the short notes on : 2½×2
  - (i) Threats in Networks
  - (ii) Trap doors
12. Write short notes on block cipher technique.
13. Write the functions of an Information security organization.
14. What are the necessities of Digital Certificates?

**Group - C**

Answer any *one* question.

10×1=10

15. Describe DES Encryption system.
  16. Explain the technical details of firewall and describe any three types of firewall with neat diagram.
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OR

**[Microprocessor-8085]**

**Group - A**

Answer any *five* questions :  $2 \times 5 = 10$

1. What are the differences between maskable and non-maskable interrupt in 8085 microprocessor?
2. Discuss the function of  $S_0$  and  $S_1$  signals in 8085 microprocessor.
3. Explain the function of the following instructions :
  - (a) LXI H, 2400H
  - (b) LDA 7460H
4. Add  $(AE)_H$  and  $(74)_H$  and show the status registers.
5. Specify the memory location and its contents after the following instruction are executed –

MVI B, E6 H

MOV A, B

STA XX75 H

HLT

6. Why a 16-bit address stored in memory or stack in the reverse order?

P.T.O.

7. Explain Register indirect addressing and Immediate addressing with suitable example of 8085 microprocessor.
8. What are the types of general purpose registers in 8085 microprocessor? What is the memory size of 8085 microprocessor?

**Group - B**

Answer any *four* questions.

5×4=20

9. (a) What is interrupts in 8085 microprocessor?  
(b) Short down five hardware interrupts in 8085 microprocessor according to the priority of the interrupts.  
(c) Compare hardware interrupt and software interrupt.  
1+2+2
10. (a) What is DMA data transfer scheme?  
(b) If the speed of I/O devices do not match the speed of the microprocessor, what type of data transfer techniques are used?  
(c) Discuss the function of the following signals of 8085 microprocessor :  
 $\overline{RD}$ ,  $\overline{WR}$ ,  $ALE$ ,  $INTR$   
(d) What do you mean by branching and non-branching micro-instruction?  
1+1+2+1

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11. Draw and explain the timing diagram of fetch operation. 3+2

12. (a) Explain what operation is performed when the following instructions are executed :

LHLD addr, DAA, CMP M, JNZ, RRC, INR M.

(b) Write the function of carry flag and zero flag. 3+2

13. Write an assemble language program to find the smallest number from a series of numbers. 5

14. (a) What is SIM and RIM? Explain with the help of their bit patterns.

(b) Compare JUMP and CALL instruction. 3+2

### Group - C

Answer any *one* question. 10×1=10

15. (a) Explain the need to de-multiply the bus  $AD_7-AD_0$  in 8085 microprocessor.

(b) Explain Instruction cycle and Fetch cycle of 8085 microprocessor.

(c) Write a program to add 03 H and 02 H and store the result in 2400 H. Calculate the total time for execution your program if clock frequency is 2 MHz. 3+3+4

P.T.O.

16. (a) What is T-state in 8085 microprocessor?
- (b) Show the bit position of various flag in 8085 flag register.
- (c) With the help of a diagram, explain the architecture of 8085 microprocessor. 1+3+6
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OR

**[Operational Research]**

**Group - A**

Answer any *five* questions :  $2 \times 5 = 10$

1. Write down a general form of a L.P.P.
2. What is redundant constraint?
3. Define feasible region with example.
4. What is the difference between feasible solution and basic feasible solution?
5. What are the advantages of Duality?
6. What do you mean by degenerate solution?
7. Define convex set with an example.
8. What do you mean by the extreme point?

**Group - B**

Answer any *four* questions.  $5 \times 4 = 20$

9. What do you mean by artificial variable, slack and surplus variable? What are the methods used to solve a LPP involving artificial variables?  $3+2$
10. Write down the applications of Operations Research.

P.T.O.

11. Solve the LPP by graphical method :

$$\text{Maximize } Z = 4x_1 + 3x_2$$

$$\text{sub. to, } x_1 + x_2 \leq 50$$

$$x_1 + 2x_2 \leq 80$$

$$2x_1 + x_2 \geq 20$$

$$x_1, x_2 \geq 0$$

12. Prove that Dual of the dual is primal.

13. Solve the LPP by simplex method :

$$\text{Maximize } Z = x_1 + x_2 + 3x_3$$

$$\text{sub. to, } 3x_1 + 2x_2 + x_3 \leq 3$$

$$2x_1 + x_2 + 2x_3 \leq 2$$

$$x_1, x_2, x_3 \geq 0$$

14. How to resolve degeneracy in a LPP?

### Group - C

Answer any *one* question.

10×1=10

15. Solve the following LPP by Big-M method :

$$\text{Minimize } Z = 2x_1 + 9x_2 + x_3$$

$$\text{sub. to, } x_1 + 4x_2 + 2x_3 \geq 5$$

$$3x_1 + x_2 + 2x_3 \geq 4$$

$$x_1, x_2, x_3 \geq 0$$

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16. Use two-phase method to solve the following LPP :

Maximize  $Z = 2x_1 + x_2 + x_3$

sub. to,  $4x_1 + 6x_2 + x_3 \leq 8$

$$3x_1 - 6x_2 - 4x_3 \leq 1$$

$$2x_1 + 3x_2 - 5x_3 \geq 4$$

$$x_1, x_2, x_3 \geq 0$$

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P.T.O.

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OR

**[Cloud Computing]**

**Group - A**

Answer any *five* questions :  $2 \times 5 = 10$

1. What is Cloud Computing?
2. What do you mean by the term “pay as you go” in Cloud?
3. What is on-demand functionality in Cloud?
4. Why API's is used in Cloud services?
5. What do you mean by CaaS?
6. Differentiate Cluster Computing from Distributed Computing.
7. Name two popular Cloud service providers.
8. Briefly describe the Economics of scaling in Cloud Computing.

**Group - B**

Answer any *four* questions.  $5 \times 4 = 20$

9. Explain the benefits and limitations of Cloud Computing?
10. What is Infrastructure as a Service? Explain its reference model.  $2\frac{1}{2} + 2\frac{1}{2}$

11. What are SLAs? Discuss how traditional scaling hardware differs from that of Cloud with respect to service management.
12. Describe the different types of Cloud.
13. Compare and contrast Utility Computing and Cloud Computing, highlighting their distinguishing features.
14. Explore the security aspects of Cloud Computing, focusing on infrastructure, data, and application-level security. Discuss the challenges and solutions. 3+2

**Group - C**

Answer any *one* question. 10×1=10

15. What is Virtualization? Discuss machine reference model of execution virtualization.
  16. Conduct a detailed analysis of the NIST architecture for Cloud Computing. Discuss its components, advantages and how it addresses key challenges.
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