

Bangladesh Open University
School of Science and Technology
B. Sc in Computer Science and Engineering Program
162 Term (2nd Year 2nd Semester) Final Examination
Course Code & Title: ECO2221 Introduction to Economics

Time: 3 hours

Total Marks (5×14): 70

[N.B.: Answer any 5 (five) questions. The figures in the right margin indicate the full marks.

All portions of each question must be answered sequentially.]

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|----------|--|-----|
| ✓1. ✓(a) | Define economics. How do you differ positive economics from normative economics? | 2+4 |
| ✓(b) | What are the common problems that every economic agent faces? Explain these problems in brief with graph. | 8 |
| 2. (a) | Define Indifference curve with its properties. | 7 |
| (b) | Analyze one indifference curve. | 7 |
| ✓3. ✓(a) | Write the differences between Micro economics and Macro economics. | 7 |
| ✓(b) | Describe the economic principles. ✓ | 7 |
| ✓4. (a) | Define demand and supply? How demand and supply curves shift due to change in income and change in price respectively. | 8 |
| (b) | Classify and describe engineering cost. ✓ | 6 |
| 5. (a) | Describe input output models of an economy. | 9 |
| (b) | Describe multiplier. | 5 |
| 6. (a) | Describe the characteristics of perfectly competitive market structure. | 8 |
| (b) | Define monopoly with perfect example. | 6 |
| 7. ✓(a) | What are the factors of production? | 5 |
| ✓(b) | Describe production possibility curve. | 5 |
| ✓(c) | Relate between average revenue and marginal revenue. | 4 |

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162 Term (2nd Year 2nd Semester) Final Examination
Course Code & Title: CSE2234 Information System Analysis and Design

Time: 3 hours

Total Marks (5×14): 70

*[N.B.: Answer any 5 (five) questions. The figures in the right margin indicate the full marks.
All portions of each question must be answered sequentially.]*

1. (a) Define information system and who are the stakeholders in the information system? 4
(b) Write Objectives of Information Systems. What are qualities of good information? 2+2
(c) Describe major sources of information and write the sequences in data collection. 4+2
2. (a) What are system analysis and design? 4
(b) How modern business and technology trends are affecting information system development? 4
(c) Where system analysts work? If someone wants to pursue a career as a system analyst what knowledge and skills need to acquire. Briefly explain. 2+4
3. (a) Differentiate between data and information. Name six groups of stakeholders in information system development. 4
(b) Describe five classes of information system applications (transaction processing, management information, decision support, expert and office automation systems) and how they interoperate. 10
4. (a) Write the rationale of systems investigation. 3
(b) What is structured analysis? Briefly discuss the tools used in structured analysis 2+3
(c) Describe eight basic principles of system development 6
5. (a) Define project. Briefly describe the eight activities in project management. 2+4
(b) Define joint project planning and mention its role in project management. 3
(c) Describe the basic competencies required of project managers and produce a project schedule with a Gantt chart. 5
6. (a) Describe the preliminary investigation, problem analysis, requirement analysis, and decision analysis phase in terms of information systems building blocks? 10
(b) Define system requirement and differentiate between functional and nonfunctional requirements. 4
7. (a) Explain disaster and recovery. 7
(b) Why system testing is essential? Briefly explain. 7

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162 Term (2nd Year 2nd Semester) Final Examination
Course Code & Title: CSE22P3 Microprocessors and Assembly Language Lab

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Time: 3 hours

Total Marks: 60

A. Choose one experiment by lottery from out of the following experiments. 1×40=40

Exp 1. Write an assembly language program to multiplication of two 8 bit on 8085 microprocessor.

Exp 2. Write an assembly language program that performs division of two 8 bit data on 8085 microprocessor.

☒ **Exp 3.** Write an assembly language program to convert lower case letter to upper case letter.

☒ **Exp 4.** Write a program to read one of the hex digits A-F and display it on the next line in decimal.

Exp 5. Write a program to display a 10x10 solid box of asterisks.

☒ **Exp 6.** Write a program to display "?", read two capital letters and display them on the next line in alphabetical order.

Exp 7. Write a program to display a "?" read two decimal digits whose sum is less than 10. Display them and their sum on the next line with an appropriate message.

Exp 8. Write a program that will read a character from keyboard and display it at the beginning of the next line on 8086 microprocessors.

Exp 9. Implement 7-segment display using MDA-806.

☒ **Exp 10.** Write a program that performs addition and subtraction operation on 8085MP.

B. Notebook on experiments. 10

C. Viva-voce. 10

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162 Term (2nd Year 2nd Semester) Final Examination
Course Code & Title: CSE22P7 Computer Algorithms Lab

Time: 3 hours

Total Marks: 60

A. Choose one experiment by lottery from out of the following experiments. 1×40=40

Exp 1. Write a program to implement Tower of Hanoi and Selection sort algorithm.

Sample input for selection sort: 22, 13, -5, -8, 15, 60, 17, 31, 47

Exp 2. Write a program to implement Dijkstra's algorithm to find the shortest path of a graph.

Exp 3. Write a program to implement Graph Coloring/Hamiltonian Cycle algorithm a graph.

Exp 4. Write a program to implement Prim's/Kruskal's algorithm to find minimum cost spanning tree of a graph.

Exp 5. Write a program to implement NQueen's problem or Sum of Subsets algorithm using backtracking method.

Sample Input for Sum of Subsets problem: $n = 4$, $w = \{11, 13, 24, 7\}$ and $m = 31$.

Exp 6. Write a program to implement Knapsack algorithm to find optimal solution from any weight and profit values.

Sample Input: $n = 3$, $m = 20$, $(p_1, p_2, p_3) = (25, 24, 15)$ and $(w_1, w_2, w_3) = (18, 15, 10)$

Exp 7. Write a program to implement Largest Common Subsequence.

Exp 8. Write a program to implement Warshall's Algorithm.

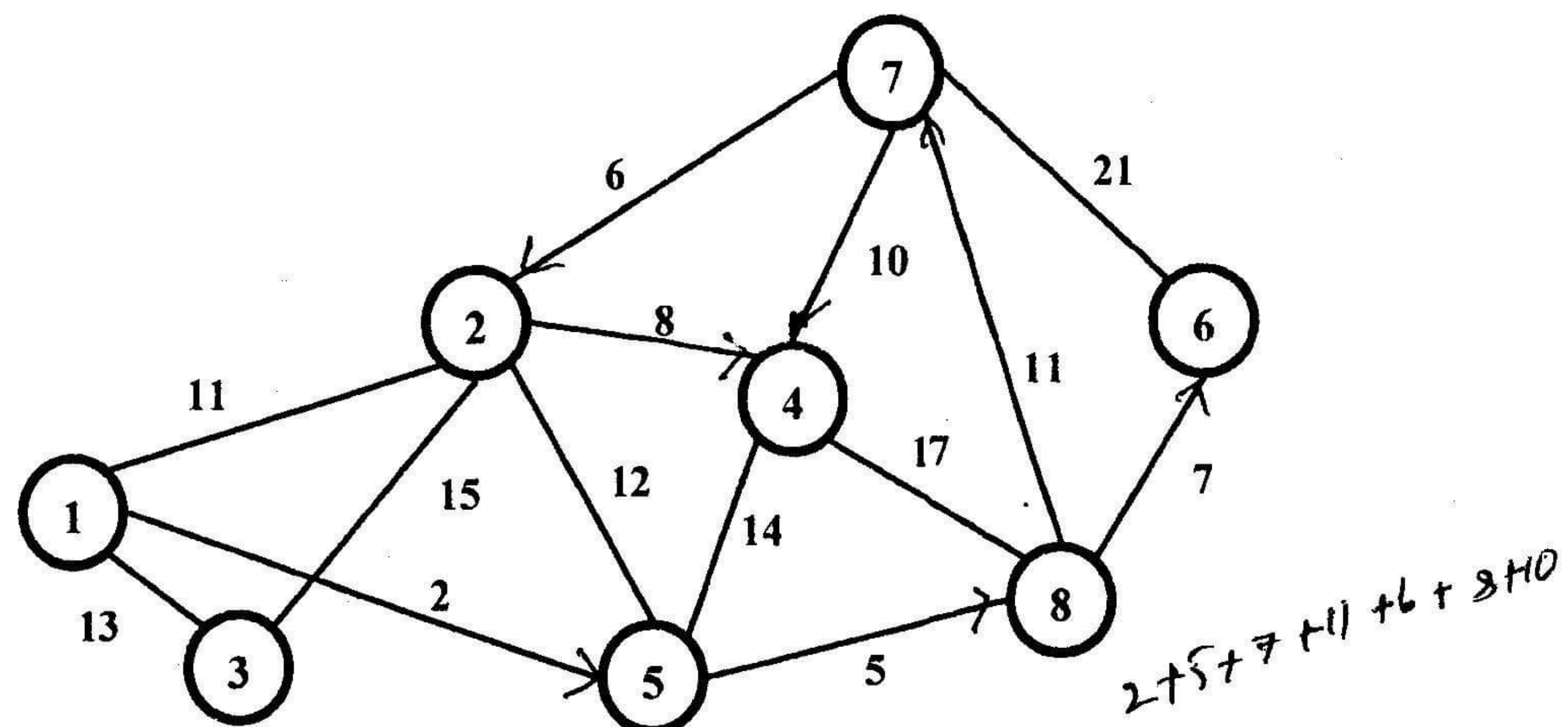
Exp 9. Write a program to implement Depth First Search Algorithm.

Exp 10. Write a program to implement Matrix Chain Multiplication.

B. Notebook on experiments. 10

C. Viva-voce. 10

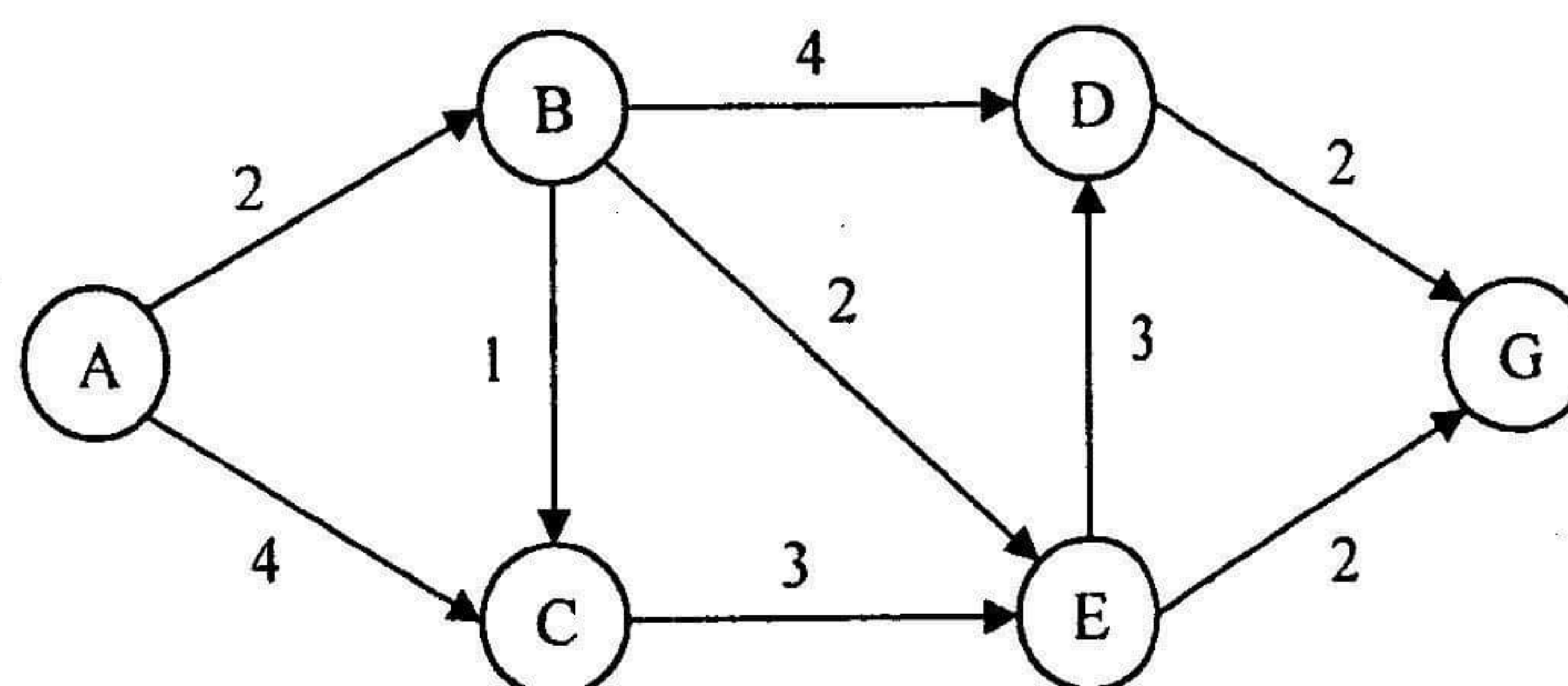
5. a) Define minimum cost spanning tree. Compute a minimum cost spanning tree for the following graph using Khuskal's algorithm. 1+6



- b) Define with example: 4
- i) decision problem
 - ii) tractability
 - iii) membership problem
 - iv) satisfiability
- c) What is nondeterministic algorithm? Explain nondeterministic search algorithm. 1+2
6. a) What do you understand by Huffman code? Find Huffman code for the following: 8

Character	A	E	I	O	U	Space	T	New Line
Frequency	15	10	21	5	7	12	3	7

- b) Find the shortest path from A to G for the following graph using Dijkstra's algorithm: 6



7. a) What is backtracking technique? Draw the solution space of the 4-queens problem. 1+5
- b) Discuss about Prim's minimum spanning tree algorithm. 4
- c) How can a graph represent in an adjacency table. 2
- d) What is travelling salesman problem? 2

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Course Code & Title: CSE2236 Computer Algorithms

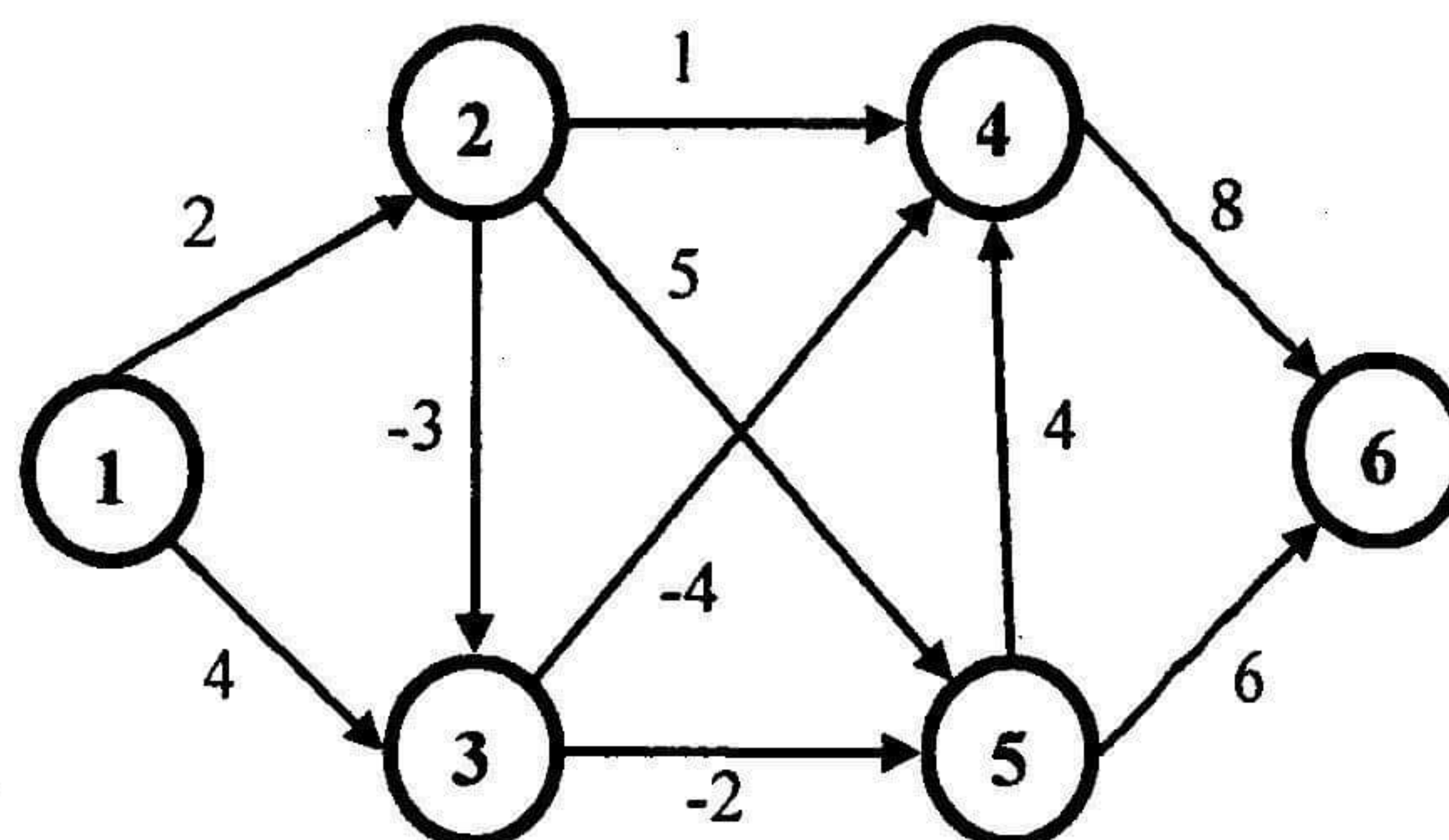
Time: 3 hours

Total Marks (5×14): 70

*[N.B.: Answer any 5 (five) questions. The figures in the right margin indicate the full marks.
 All portions of each question must be answered sequentially.]*

1. a) What is algorithm? What kinds of problems are solved by algorithms? 3
 b) What do you understand by asymptotic notation? Define Ω notation, Θ notation and O notation with proper example. 7
 c) What are the types of cost models used in algorithm? 2
 d) If $n^2/4 - 4n = \Theta(n^2)$, find the value of c_1, c_2 . 2
2. a) Solve the recurrence relation for the following choices of a, b and $f(n)$ (c being a constant): 6

$$T(n) = \begin{cases} T(1) & n = 1 \\ aT(n/b) + f(n) & n > 1 \end{cases}$$
 - i) $a = 1, b = 2$ and $f(n) = cn$
 - ii) $a = 28, b = 3$ and $f(n) = cn^3$
 b) Prove by induction the relationship $E = I + 2n$ for a binary tree with n internal nodes. The variables E and I are the external and internal path length respectively. 5
 c) Draw the tree of calls of Merge sort (1, 9) for the following data: 22, 13, -5, -8, 15, 60, 17, 31, 47. 3
3. a) Write greedy method control abstraction for the subset paradigm. 3
 b) Solve the following Knapsack problem when $n = 3, m = 20, (p_1, p_2, p_3) = (25, 24, 15)$ and $(w_1, w_2, w_3) = (18, 15, 10)$ 5
 c) Consider two strings: "HEAGAWGHEE" and "PAWHEAE". Find the longest common substring using dynamic programming technique. 6
4. a) Find the shortest paths from node 1 to every other node in the following graph using the Bellman and Ford algorithm. 7



- b) Write the All Pairs Shortest Path algorithm using dynamic programming. Demonstrate the algorithm with suitable example. 5
 c) Define Brute force strategy. Explain with example. 2

- ✓ 6. (a) What do you mean by I/O interface? Distinguish between isolated I/O and memory mapped I/O interface. 1+2
- ✓ (b) Explain 8-bit and 16-bit I/O port address decoding technique with necessary diagram. 5
- (c) How a stepper motor is interfaced to the 82C55? Sketch the interfacing diagram and explain its operation. 6
- ✓ 7. a) What is the main function of a DMA controller? Write the key features of DMA controller. 1+2
- b) Design a block diagram of DMA controller. Explain the operation of three special function register (SFRs) of a DMA controller. 5
- ✓ c) Why is microcontroller used? Explain direct addressing mode in 8051 microcontroller with suitable example. 2+4



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162 Term (2nd Year 2nd Semester) Final Examination
Course Code & Title: CSE2232 Microprocessors and Microcontrollers

1427

Program :-
8086
8086

Time: 3 hours

Total Marks (5×14): 70

*[N.B.: Answer any 5 (five) questions. The figures in the right margin indicate the full marks.
 All portions of each question must be answered sequentially.]*

1. (a) Mention the main features of 8086 microprocessor. 3
- (b) Sketch the block diagram of 8086 microprocessor and explain its operation. 5
- (c) What do you mean by flag register? Explain all flag registers of 8086 microprocessor with necessary diagram. 6
2. (a) Distinguish between logical address and physical address with necessary example. 3
- (b) Calculate the memory address of 8086 microprocessor for following instructions. Assume 6
 DS = 10000H, BX = 0300H, SI = 0200H, EBX = 00000300H, ESI = 00000200H.
 i) MOV [BX], CL
 ii) MOV CL, [BX + 4]
 iii) MOV [EBX + 2xESI], AX
- (c) Write the functions of the following pin connections of 8086 microprocessor: 5
 i) $\overline{\text{TEST}}$ ii) $\text{MN}/\overline{\text{MX}}$ iii) ALE iv) $\overline{\text{INTA}}$ v) $\text{DT}/\overline{\text{R}}$
3. (a) Define memory segment and offset address. A memory location has physical address 1+2
 80FD2H. In what segment does it have offset BFD2H?
- (b) Write an assembly language program that converts the message "bangladesh open university" 5
 into uppercase letter.
- (c) Consider the following two instructions: 6
 i) ADD AL, BL, where AL contains 80H and BL contains 80H
 ii) SUB AX, BX, Where AX contains 8000H and BX contains 0001H
 Now, what will be the value of status Flag (SF), Parity Flag (PF), Zero Flag (ZF), Carry Flag (CF) and Overflow Flag (OF) after the execution of above two instructions?
4. (a) Write the function of JMP instruction. Write an assembly language program according to the 5
 following instruction:
 "If AL contains 1 or 3, display "o"; If AL contains 2 or 4, display "e"."
- (b) Write the syntax for loop in assembly language. Write a count controlled loop to display a row 1+2
 of 80 stars.
- (c) Write short note on the following instructions with example: 6
 i) SHL ii) SAL iii) SAR iv) ROL
5. (a) Write short note on the followings (any three): 9
 i) Mixed language programming in 8086 ii) Timer mode register
 iii) DS12887RTC interfacing iv) Debugger
- (b) Explain software and hardware interrupts in 8086. 5