

MBA-02

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B. Tech.

(SEM-V) ODD SEMESTER

MAJOR EXAMINATION: 2021-2022

Subject Name: ENGINEERING AND MANAGERIAL ECONOMICS

Time: 3 Hrs.

Max. Marks: 50

Note: Attempt all questions. Each question carries equal marks.

1. Attempt any Five parts of the following. $(5 \times 2 = 10)$
- (a) Define nature of macro-economics.
 - (b) Define managerial economics
 - (c) Enumerate tools and techniques of Decision-making.
 - (d) What is Demand?
 - (e) List out any six determinants of Demand.
 - (f) How law of supply is different from law of demand?
 - (g) Explain cross-elasticity of demand.
2. Attempt any Two parts of the following. $(2 \times 5 = 10)$
- (a) Describe law of diminishing returns to scale with suitable example?
 - (b) Explain fixed cost, variable cost and average cost with suitable diagram?
 - (c) Establish relationship between Short-run average cost curve and Marginal cost curve.
3. Attempt any Two parts of the following. $(2 \times 5 = 10)$
- (a) Explain external Economies of Scales with example.
 - (b) Differentiate between Accounting profit and economic profit. Also discuss theories of profit.
 - (c) Comment on any three of the following:-

I. Implicit cost

II. Opportunity cost

III. Sunk cost

IV. Incremental cost

A. Attempt any Two parts of the following. (2×5=10)

(a) Differentiate between Monopoly, Monopolistic, Oligopoly and Perfect Competition market.

(b) Define National Income. Also discuss concepts of national Income.

(c) Explain different phases of business cycle.

B. Attempt any Two parts of the following. (2×5=10)

(a) What are causes of inflation? Also discuss preventive measures for Inflation.

(b) Explain Price determination under the condition of Oligopoly and Perfect competition.

(c) What are the possible techniques to measure National Income?

B. TECH
ODD SEMESTER
MAJOR EXAMINATION 2021–2022
OPERATING SYSTEM

Time: 3 Hours]**[Maximum marks: 50****Note: Attempt all questions. All questions carry equal marks.**

1. Attempt any Five parts of the following: $5 \times 2 = 10$
 - (a) What are the different functions of an Operating System? Explain any one in brief.
 - (b) Why might a global replacement policy be more susceptible to thrashing than a local replacement policy?
 - (c) Explain in brief the layered architecture of operating system design.
 - (d) Discuss the issues of how programming style affects the performance in a paging system. Consider each of the following:
 - (i) Top-down approach
 - (ii) Minimal use of GOTOS
 - (e) Explain Spooling with suitable diagram. You are also required to give its advantages.
 - (f) The correct producer-consumer algorithm allows only $n-1$ buffers to be full at any time. Modify the algorithm to allow all the buffers to be utilized fully.
 - (g) Consider a logical-address space of eight pages of 1024 words, each mapped onto a physical memory of 32 frames then
 - (i) How many bits are in the logical address?
 - (ii) How many bits are in the physical address?

2. Attempt any Two parts of the following: $2 \times 5 = 10$

- (a) Suppose that we replace the *wait* and *signal* operations of monitors with a single construct *await(B)*, where *B* is a general Boolean expression that causes the process executing it to wait until *B* becomes true.
- Write a monitor using this scheme to implement the readers-writers problem.
 - Explain why, in general, this construct cannot be implemented efficiently.
 - What restrictions need to be put on the *await* statement so that it can be implemented efficiently?

b Suppose there are four processes and four resource types in a system that avoids deadlock using Banker's algorithm. The maximum resource requirement matrix is

	R1	R2	R3	R4
P1	4	4	2	1
Claim = P2	4	3	1	1
P3	13	5	2	7
P4	6	1	1	1

Where Claim_{ij} ($1 \leq i \leq 4$) and ($1 \leq j \leq 4$) denotes the maximum requirement of process *i* for resource *j*. The total amount of each resource type in the system is given by the vector [16, 5, 2, and 8].

The current allocation of resource is given by the matrix.

	R1	R2	R3	R4
P1	4	0	0	1
Allocation = P2	1	2	1	0
P3	1	1	0	2
P4	3	1	1	0

Where Allocation_{ij} denotes the number of units of resource *j* that are currently allocated to process *i*.

- (i) Illustrate this is safe.
- (ii) Illustrate whether the granting of a request by process 1 for 1 unit of resource 2 would be granted.
- (iii) Illustrate whether the granting of a request by process 3 for 6 units of resource 1 would be granted. (This is independent of ii)
- (c) What are the different necessary conditions for the occurrence of deadlock? Explain each one with suitable example. You are also required to give a protocol to break each of the necessary conditions of the deadlock.

3. Attempt any **Two parts** of the following: $2 \times 5 = 10$

- (a) Suppose the head of a moving head disk with 200 tracks is currently serving a request for track number 143 and just finished a request for track number 85. If the queue of the requests is kept in FIFO order: 86, 147, 91, 177, 94, 150; What is the total head movement to satisfy these requests for the following scheduling schemes?
- (i) SCAN
(ii) SSTF
- (b) Discuss elevator algorithm for disk scheduling. You are also required to compare this with SCAN algorithm of disk scheduling.
- (c) None of the disk scheduling algorithm, except FCFS, is truly fair (starvation may occur).
- (i) Explain why this assertion is true?
(ii) Explain why fairness, is an important goal in algorithm designs?
(iii) Describe a way to modify algorithm such as SCAN to ensure fairness.

4. Attempt any **Two parts** of the following: $2 \times 5 = 10$

- (a) Explain UNIX file system in detail with suitable diagram.
- (b) Explain linked allocation method of files with suitable example. You are also required to give its advantages of over other methods.

(g) What are different access methods of files? Explain. You are also required to enlist and explain the different attributes of the file with example

5. Attempt any Two parts of the following: $2 \times 5 = 10$

(a) Some systems provide file sharing by maintaining a single copy of a file; other systems maintain several copies, one for each of the users sharing the file. Discuss the relative merits of each approach.

(b) In some systems, a subdirectory can be read and written by an authorized user, just as ordinary files can be.

✓ Describe the protection problems that could arise.

✓ Suggest a scheme for dealing with each of the protection problems you named in above part.

(b) (i) Make a list of security concerns for a computer system for a bank. For each item on your list, state whether this concern relates to physical security, human security, or operating system security.

(ii) Explain UNIX directory structure as well as I-node structure. You are also required to explain how the path /usr/ast/mbox in UNIX is looked up.

(c) What is encryption and decryption of messages? What are the different types of encryptions? Explain. You are also required to explain in brief RSA algorithm for encryption with example.

BCS-73

Roll No.

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ODD SEMESTER MAJOR EXAMINATION (2021-22)
NEURAL NETWORK & FUZZY SYSTEM

Time: 3 Hrs.

PAPER CODE: BCS-73

Maximum Marks: 50

Note: Attempt all questions. Each question carries equal Marks

Q.1 Attempt any FIVE of the following. Q.1 (a) is compulsory. $(5 \times 2 = 10)$

- (a)** What do mean by Artificial Neural Network? "Neural Networks can be considered as the foundation of Computational Intelligence". Justify this statement?
- (b)** Compare and contrast Single Layer Feed Forward Network, Multi-Layer Feed Forward Network and Recurrent Network Models.
- (c)** Draw diagram of artificial neuron and explain similarity with the biological neurons.
- (d)** Give the classification of various learning mechanisms in neural networks. Describe any three methods of learning in neural networks.
- (e)** Explain the perceptron learning process.
- (f)** Differentiate crisp and fuzzy set.
- (g)** What do you mean by activation function? Define different types of activation function.

Q.2 Attempt any two of the following. $(5 \times 2 = 10)$

- (a)** Explain Back propagation Learning Algorithm, how can we fasten the learning rate of Back propagation.
- (b)** Explain how to solve the XOR gate classification problem using OR, NAND and AND gate.

(e) Explain the working of Auto-associative and Hetero-associative memory?

Q.3 Attempt any two of the following. (5×2=10)

(a) Explain the process of learning in Perceptron's training algorithm (write the steps of the algorithm).

(b) What do you understand by Fuzzy Logic? Describe its significance and how is it different from Crisp Logic.

(c) Explain the working of Auto-associative and Hetero-associative memory?

Q.4 Attempt any two of the following. (5×2=10)

(a) Explain the creation of offspring in detail with example. Also write down the working principle of Genetic algorithm and application of Genetic algorithm.

(b) Describe the principal of Fuzzy Neural Network? Describe the architecture of Fuzzy Neural Network.

(c) Name and describe the main features of Genetic Algorithm (GA).

Q.5 Attempt any two of the following. (5×2=10)

(a) What is Inheritance in Genetic algorithm? Explain Binary encoding in Genetic algorithm.

(b) A genetic algorithm is to be used to evolve a binary string of length n containing only 1s. The initial population is a randomly generated set of binary strings of length n. Give a suitable fitness function for this problem.

(c) Explain the following.

(i) Fitness Evaluation

(ii) Mutation.

B. Tech.
 (Vth Semester) ODD SEMESTER
 Major Examination 2021–2022

Time: 03 Hrs. AUTOMATA THEORY

Max. Marks: 50

Note: Attempt ALL questions. Each question carries equal Marks.

Q.1 Attempt any five of the following.

(5×2=10)

- a. Define DFA. Differentiate between DFA and NFA.
- b. Briefly discuss about Finite Automata with Epsilon- Transitions.
- c. Explain the procedure for converting DFA to NFA.
- d. Construct a DFA for the Regular expression $(0+1)^* (00+11) (0+1)^*$.
- e. Define Regular Expression? Explain about the properties of Regular Expressions.
- f. Find the simplified regular expression for the following regular expression $r(r^*r + r^*) + r^*$?
- g. Is the $L = \{a^{2n} \mid n \geq 1\}$ is regular?

Q.2 Attempt any two of the following.

(2×5=10)

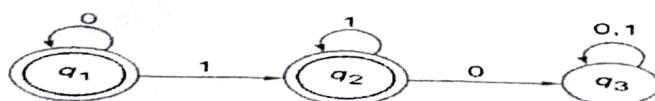
- a. What is Chomsky Normal Form(CNF)? Convert the following context-free grammar(CFG) to

Chomsky Normal Form(CNF):

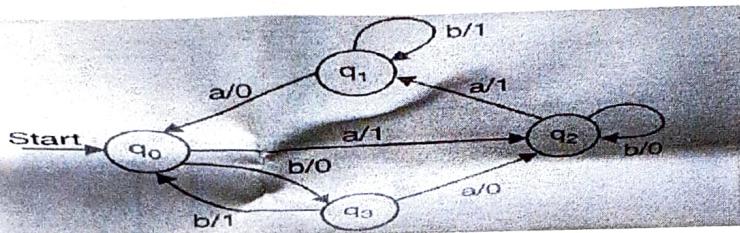
$$S \rightarrow abSb \mid a \mid aAb$$

$$A \rightarrow bS \mid aAb$$

- b. State Arden's Theorem and its application. Construct a regular expression corresponding to the given finite automata:



- Q. Differentiate between Mealy and Moore Machine. Convert the following mealy machine to moore machine:



- Q.3 Attempt any two of the following. (2×5=10)

- a. i. Prove that the Grammar

$$S \rightarrow aB \mid ab$$

$$A \rightarrow aAB \mid a$$

$$B \rightarrow Abb \mid b$$

Is ambiguous.

- ii. Reduce the Grammar $G = (\{S, A, B\}, \{a, b\}, P, S)$ to the Chomsky Normal Form where production P is defined as:

$$S \rightarrow bA \mid aB$$

$$A \rightarrow bAA \mid aS \mid a$$

$$B \rightarrow abb \mid bS \mid b$$

- b. What is Push down Automata (PDA)? What is the difference between acceptance of PDA by empty store and acceptance by Final state? Is the language accepted by Deterministic PDA and non-deterministic PDA same? Describe it.

- c. Show that the language $\{0^n 1^n 2^n \mid n \geq 1\}$ is not context free.

- Q.4 Attempt any two of the following. (2×5=10)

- a. What is Turing Machine? Design a Turing Machine that accept the language containing even number of a's and b's both. Also draw transition table.

- b. Design a TM that accept the language

$$L = \{a^n b^n \mid n \geq 1\}$$

Also draw transition table.

- c. i. Halting problem of turing machine.
ii. Church's Thesis

Q.5 Attempt any two of the following.

(2×5=10)

a. Define various variants of turing machine.

b. Show that the language $\{0^n 1^n 2^n \mid n \geq 1\}$ is not context free.

c. Write short notes on the following: (I) Universal Turing Machine (II) Halting

Multitape Problem of Turing Machine

b. i) construct PDA from following CFG - *****

$$S \rightarrow aAA$$

$$A \rightarrow aS / bS/a$$

ii) Explain closure properties of CF languages

B. TECH**ODD SEMESTER (V)****MAJOR EXAMINATION 2021-22****SUBJECT: SOFTWARE ENGINEERING (BIT-28)****Time: 3Hrs.****Max. Marks: 50****Note: Attempt all questions. Each question carries equal marks.****Q 1. Attempt any five parts of the following.** $5 \times 2 = 10$

- (a) What is the significance of requirements in software development? Describe the various types of requirements with a suitable example.
- (b) Write down the major characteristics of software? Illustrate with a diagram that the software does not wear out.
- (c) Discuss the prototype model with a suitable block diagram. What is the effect of designing a prototype on the overall cost of the software?
- (d) Compare iterative enhancement model and evolutionary process model in detail.
- (e) What is the significance of module cohesion in software development? Illustrate the various types of cohesion in brief.
- (f) What is Software Requirement Specification (SRS)? List the various steps of IEEE standards for SRS.
- (g) What is SEI-CMM Model? Describe the various steps of SEI-CMM Model in brief.

Q 2. Attempt any two parts of the following. $2 \times 5 = 10$

- (a) What is software testing? Describe the various levels of software testing in detail.
- (b) Describe the top-down, bottom-up and sandwich testing strategies along with its advantages and disadvantages.
- (c) What is static testing strategy? Illustrate the Formal Technical Reviews and Walk Through in brief.

Q3. Attempt any two parts of the following.

$2 \times 5 = 10$

- (a) Describe the white box and black box testing in detail with a suitable example.
- (b) Define and differentiate the Verification and Validation. Describe the Alpha testing and Beta testing with a suitable example.
- (c) Write short notes on Software Reliability Metrics.

Q4. Attempt any two parts of the following.

$2 \times 5 = 10$

- (a) Explain the importance of software maintenance. Describe the various categories of software maintenance. Which category of software maintenance consumes maximum effort and why?
- (b) Illustrate the Reverse Engineering and Re-Engineering with a suitable diagram.
- (c) A project size of 200 KLOC is to be developed. Software development team has average experience on similar type of projects. The project schedule is not very tight. Calculate the effort, development time, average staff size and productivity of the project.

Q5. Attempt any two parts of the following.

$2 \times 5 = 10$

- (a) Describe the Software Version Control and Change Control process in detail.
- (b) Explain all the levels of COCOMO model. Assume that the size of an organic software product has been estimated to be 32,000 lines of code. Determine the effort required to develop the software product and the nominal development time.
- (c) What is Software Risk? Describe the various risk management activities in detail.

BIT-27

ROLL NO.

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B. Tech. 3rd Year

(SEM V) ODD SEMESTER

MAJOR EXAMINATION 2021-2022

Subject Name: Computer Networks

Time: 3 Hrs.

Max Marks: 50

Note: Answer all questions. Each question carries equal marks.

1. Attempts any five parts of the following: (5×2=10)

- (a) Define communication network and computer network. Explain components of data communication system.
- (b) Give the difference between OSI & TCP/IP model. Which model is more popular & why?
- (c) What is sliding window protocol? Explain this protocols with help suitable diagrams of send window and receive window before and after sliding for m=4.
- (d) Explain the two modes of operation with fiber optic cables with suitable illustrations.
- (e) In what way, would you **summarize** circuit switched and packet switched networks? What is the principal difference between connectionless communication and connection-oriented communication?
- (f) Compare between slotted and pure aloha.
- (g) Compare among LAN, MAN and WAN.

2. Attempts any two parts of the following. (2×5=10)

- (a) Explain the network design issues involved in designing a typical network. Which services are being provided to the transport layer and what are the duties of the network layer to make this design a good design?

- (b)** Explain how the Distance Vector Routing Algorithm works and what practical serious flaws it has.
- (c)** Explain about IP addressing. Mention the advantages that IPv6 provides. Also, discuss the addressing and packet format of IPv6.

3. Attempts any two parts of the following. $(2 \times 5 = 10)$

- (a)** Explain the principle of congestion control algorithms. Explain the four causes of congestion and why there is a need for congestion control.
- (b)** State which deficiencies in IP have led to ICMP. Explain the two broad categories of ICMP messages with their possible formats.
- (c)** Explain drawbacks of classful addressing and how classless addressing is beneficial in the current growing network. Also, explain NAT.

4. Attempts any two parts of the following. $(2 \times 5 = 10)$

- (a)** Explain the duties of the transport layer with transport service primitives.
- (b)** What is the data compression technique write its type. What are the various functions which are carried out by presentation layer? Explain one of them with suitable example.
- (c)** Explain purposes of UDP with its header and pseudo header.

5. Attempts any two parts of the following. $(2 \times 5 = 10)$

- (a)** Explain DNS addressing scheme. How does the DNS work? Which are the generic domains?
- (b)** Explain how the connection establishment and connection termination work in TCP.
- (c)** Write technical notes on the following:
- (i) World wide web
 - (ii) Multimedia
 - (iii) Network security
