



SASTRA
DEEMED TO BE UNIVERSITY
KOLKATA, WEST BENGAL, INDIA



School of Computing
First CIA Exam – Feb 2024

Course Code: **MGT 207**
Course Name: **Introduction to Innovation, Entrepreneurship and IP Management.**

Duration: 90 minutes Max Marks: 50

PART A

Answer all the questions $10 \times 2 = 20$ marks

1. Explain the concept of innovation space with a diagram
2. Discuss the tangible and intangible outcomes as the impact of innovation on the organization.
3. Explain the structured process of creativity.
4. Differentiate divergent and convergent thinking styles.
5. Discuss the characteristics of innovation.
6. How can data be converted to information?
7. How can organizations foster creativity.
8. Mention the types of innovation under marketing and distribution strategies
9. Define knowledge markets.
10. Compare and contrast radical and incremental innovation with suitable examples.

PART B

Answer all the questions $10 \times 3 = 30$ marks

11. How do you recognize innovation in products and services.
12. Explain the concept of knowledge management, starting from data to knowledge, knowledge generation and knowledge acquisition.
13. Enumerate the components of the innovative organization



Duration: 90 minutes Max Marks: 50

PART A

5x2=10 Marks

I. Answer the following questions

1. Expand VUCA and VUCA 2.0
2. Name two strategies to strengthen customer relationship in business ambience
3. Differentiate Global and Glocal value systems.
4. Give two examples for translocational impact in the business world
5. Define Culture Shock with examples.

PART -B

2x5=10 Marks

II. Answer the following questions

6. Differentiate Multiculturalism and Pluralism with adequate example
7. Give 5 tips to enhance Effective Cross Cultural Communication.

PART -C

3x10=30 Marks

I. Answer the following questions

8. Analyse a SWOT to achieve your goals. Identify your strengths and weaknesses, leverage opportunities and counteract the threats/Challenges in the Business Era.
9. Elevate the thoughts of VUCA to VUCA 2.0 in the perspective of Higher Studies.
10. Discuss on an application of artificial intelligence in everyday life -their advantages and limitations.



PART A

[5×2 = 10 Marks]

Answer all the questions:

1. Write the procedure for forming an LPP.
2. Define the following
 - (i) Basic feasible solution (ii) Optimum basic feasible solution
3. Define Pseudo-optimal solution.
4. Write a few important steps for the BIG M method.
5. How to form an initial LPP in Phase II from the Two-phase simplex method.

PART B

[4×10 = 40 Marks]

Answer all the questions:

6. Use graphical method to solve the following LPP:

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

subject to the constraints:

$$-x_1 + 3x_2 \leq 10,$$

$$x_1 + x_2 \leq 6,$$

$$x_1 - x_2 \leq 2,$$

$$x_1, x_2 \geq 0.$$

7. Solve the following LPP by using Simplex method:

$$\text{Maximize } Z = 10x_1 + 15x_2$$

subject to

$$2x_1 + x_2 \leq 26;$$

$$2x_1 + 4x_2 \leq 56;$$

$$-x_1 + x_2 \leq 5; \text{ and } x_1, x_2 \geq 0.$$

8. Use the Big-M (Penalty) method to solve the following LPP:

Minimize $Z = 5x_1 + 3x_2$ subject to the constraints

$$2x_1 + 4x_2 \leq 12;$$

$$2x_1 + 2x_2 \leq 10;$$

$$5x_1 + 2x_2 \geq 5;$$

$$\text{and } x_1, x_2 \geq 0.$$

9. (a) Explain the special case of Multiple optimal solution and an unbounded solution.
(b) Use graphical method to solve the following LPP:

Maximize $Z = 10x_1 + 6x_2$ subject to the constraints:

$$5x_1 + 3x_2 \leq 30,$$

$$x_1 + 2x_2 \leq 18, \text{ and } x_1, x_2 \geq 0.$$

Further investigate the special case of LPP.

End of Question Paper



School of Computing
First CIA Exam – Feb 2024

Course Code: CSE318
Course Name: Algorithm Design
Strategies & Analysis

Duration: 90 minutes Max Marks: 50

PART A

Answer all the questions

10 x 2 = 20 Marks

1. How to quantify the efficiency of an algorithm?
2. Define Theta notation.
3. Find the complexity of below codes.

```
function(int n) {  
    for (int i=1; i<=n; i++) {  
        for (int j=1; j*j<=n; j++) {  
            printf("*");  
            break;  
        }  
    }  
}
```

4. Compare the divide & conquer approach with dynamic programming approach.
5. Solve the following recurrence using Master theorem.

$$T(n) = 8T(n/2) + \Theta(n^3)$$

6. Prove that $(3n^2 + 7n)^2 \in O(n^4)$
7. Find the order of growth of the following sum.

$$\sum_{i=1}^n \sum_{j=1}^i (i+j)$$

8. Find the recurrence by analyzing the following simple algorithm.

Algorithm MyFun(n)

If n<=2 **Then**
Return n

Else

Return 2*MyFun(n/3)*MyFun(2*n/3)

End If

End MyFun

9. What is optimization problem? Which algorithm design strategy is used mostly for solving optimization problem?

10. Consider a set of unordered elements. Problem is to search an element from the list. Suggest a best searching algorithm and justify the reason.

PART B

$3 \times 10 = 30$ Marks

Answer all the questions

11. By applying divide & conquer strategy algorithm, solve the following maximum sub array problem. Show the step-by-step results of algorithm.

Index	1	2	3	4	5	6	7	8	9	10	11	12	13
Array	-3	-8	1	-2	1	5	-3	-4	3	10	-2	4	-1

12. (a) Using recursion tree method, solve the following recurrence.

$$T(n) = T(n-1) + T(n-2) + O(1) \quad \text{if } n > 2$$

$$T(n) = \Theta(1) \quad \text{if } n=1 \text{ or } n=2$$

- (b) Illustrate the greedy algorithm to find a sequence of jobs, which is completed within their deadlines and gives maximum profit for the following input.

n=8	Jobs With Profit & Deadlines							
	1	2	3	4	5	6	7	8
Jobs	1	2	3	4	5	6	7	8
Profits	18	31	24	5	53	42	67	39
Deadlines	3	2	1	2	5	5	4	3

13. Consider a modification of the rod-cutting problem in which, in addition to a price p_i , for each rod, each cut incurs a fixed cost of c . The revenue associated with a solution is now the sum of the prices of the pieces minus the costs of making the cuts. Give a dynamic programming algorithm to solve this modified problem. The algorithm should return the maximum revenue. Using this algorithm, find the maximum revenue for the 5-inch rod with the following price list and the fixed cut cost of Rs.5 per cut.

Length of Rod = 5					
Length	1	2	3	4	5
Price	2	3	7	8	9



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School of Computing
First CIA Examination – Feb '24
Course Code: CSE215
Course Name: Software Engineering
Duration: 90 minutes Max Marks: 50

PART A

Answer all the questions

5 x 2 marks = 10 marks

1. Build the layered technology components of software.
2. Derive any four umbrella activities of software engineering.
3. Enlist all prescriptive process models, specialized process models.
4. How does the Capability Maturity Model Integration level(CMMI) determines the company reputation?
5. Developer A wants to develop similar existing Online shopping app as flipkart,
Developers B Team wants to develop a new satellite to Jupiter.
Justify your answer for the given software system with suitable decomposition strategies, process models.

PART B

Answer to all Questions

3 x 10 marks = 30 marks

6. Identify the process flow, process model, life cycles steps, effort nature of given software.(5 marks)
Draw its process model with its advantages and disadvantages.

Software Name	Process flow Name	Process model Name	Life cycle phases	Organic/ Semi attached/ embedded
Jinux OS				
National Rose				
Smart watch ver3.0				
Open OfficeXP Package				

7. Calculate FP count, Value Adjustment Factor and Total FP count of given ABC company's MIS using Cost constructive model- COCOMO.

Marketing MIS:

Function	Raw FP
<hr/>	
Monthly sales	4 reports
Sales summary1	5 documents
Sales summary2	5 documents
Sales summary3	5 documents
Sales summary4	5 documents
Sales summary5	5 documents
Sales Enquiry	4
Sales files	10
Product files	7
Location file	7

General Specification Characteristics are: (GSC)

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Performance = 3 , reusability = 4,
Online updates =3, Installation easiness = 4
Online data entry = 3, Operational easiness = 4
End-user efficiency = 4, change facilitation = 5

8. Find Software size of given CAD software: A range of LOC estimates is developed for each function. For example, the range of LOC estimate for the 3D geometric analysis function is optimistic, 4600 LOC; most likely, 6900 LOC and pessimistic, 8600 LOC, And calculate Effort of the same using $E = 3.2 * (KLOC)^{1.05}$ Boehm simple KLOC method.



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CELESTIAL SPARKS



School of Computing First CIA Exam -Feb 2024

Course Code: CSE308

Course Name: OPERATING SYSTEMS

Duration: 90 minutes Max Marks: 50

PART A

Qs - 18

Answer all the questions

10 X 2 = 20

1. State the advantage of accessing system calls through API.
2. List the information contained in a PCB and its role in context switching.
3. Justify the role of long term scheduler in maintaining the CPU's performance.
4. What happens when a parent process issue a wait() system call and what happens if the parent fails to issue a wait() system call ?
5. Between shared memory and message queue, which one is better to reduce number of mode switches involved and why?
6. Mention the characteristics of an ordinary pipe with its syntax and parameters.
7. How many processes get created if the following code is executed?

```
If(fork() || fork())
    fork();
```
8. Write the formula used for predicting the burst time using exponential average and mention the three possible ways its prediction can be controlled.
9. Calculate the number of context switches involved in scheduling of the following processes under preemptive SJF

	P1	P2	P3	P4	P5	P6
AT	0	2	4	6	7	9
BT	5	2	3	4	6	3

10. Prove with an example that preemptive algorithms may lead to race conditions

PART B

Answer all the questions

$3 \times 10 = 30$

11. Calculate the turn-around times and waiting times of the following processes using the SJF algorithm. Note that you should consider the BT1 of processes which are yet to commence the first turn of execution and should consider BT2 of processes which have completed IO, for the selection of shortest processes.

	P1	P2	P3	P4	P5
AT	2	3	5	6	8
BT1	4	6	9	4	6
IO	4	3	5	4	3
BT2	2	4	5	2	3

12. Discuss the concept of system calls with the role API, parameter passing methods and types of system calls (7). Identify the system calls invoked during the execution of the program for the creation of parent-child processes and communication between them(3)
13. Find the waiting time of processes using Multi-level feedback queue scheduling with three queues having the time quantum of 2,4 and 6 respectively

	P1	P2	P3	P4	P5
AT	0	2	6	7	9
BT	3	8	6	11	9