[3 Hours] **[80 Marks]**

Note: 1. Question number 1 is compulsory. Solve any three out of remaining.

2. Draw figure wherever necessary.

3. Assume suitable data wherever necessary.

Q1.

a. Design and implement ILM for Storage Management system. 5 Marks

b. Consider a disk I/O system in which an I/O request arrives at a rate of 200 IOPS. The service time, R_s=8ms. Calculate the following measures of disk performance:
   a) Utilization of I/O controller (U)
   b) Total response time (R)
   c) Average queue size
   d) Total time spent by request in the queue. 5 Marks

c. Explain Boolean queries with an example. 5 Marks

d. Explain different types of backup with real time examples. 5 Marks

Q2 a. Consider an application that generates 3600 IOP with 60% reads and 40% writes. Calculate the disk load for different RAID levels. Also explain the steps for write penalty calculation and list the read and write penalty for different RAID levels. 10 Marks

b. Explain FC Protocol Stack and FC SAN topologies. 10 Marks

Q3 a. Explain in detail the different components required to design Intelligent Storage System. 10 Marks

b. Explain BC planning lifecycle with an example. 10 Marks

Q4 a. Explain IP Storage standards. 10 Marks

b. Explain Multilingual retrieval systems. 10 Marks

Q5 a. Explain different components of information system and its types. 10 Marks

b. Explain Network Data Management Protocol (NDMP) 10 Marks

Q6 Write a short note on 20 Marks
a) IP Storage
b) NAS
c) Stemming
d) Symmetric and Asymmetric virtualization

Total Marks 80   **Time 3 hours**

Question 1 is compulsory
Attempt any 3 questions from the remaining.

Q1

a.   What is measuring effectiveness of prioritized test suites? Consider a program   **10**
with 5 faults and a test suite of 5 test cases, as shown in table below:

	T1	T2	T3	T4	T5
F1			x		x
F2		x	x	x	
F3	x				x
F4			x	x	x
F5	x			x	

Calculate APFD for this program.

b   Explain STLC in detail   **10**

Q2

a   What is bug? Explain Life Cycle of Bug and different states of bug   **10**

b   Explain different regression testing types   **10**

Q3

a   Explain test design preparedness metrics   **10**

b   Consider a project with the following distribution of data and calculate its defect   **10**
spoilage:

SDLC phase	No. of Defects	Defect age
Requirement specification	34	2
HLD	25	4
LLD	17	5
Coding	10	6

Q4

a   Differentiate between   **10**
i. White box and Black box testing
ii. Verification and Validation

Turn Over

b   A program reads an integer number within the range [0,200] and determines   **10**
whether it is an even number or not. Design test cases for this program using
BVC, robust and worst case testing methods.

Q5

a   Explain with example class testing   **10**

b   Explain security testing in web based application   **10**

Q6

a   What is Test Point Analysis   **10**

b   Explain ISO 9126 quality characteristics   **10**

(3 Hours) [Total Marks: 80

N. B. i. Q. 1. Compulsory.
  ii.   Attempt any three from the remaining,
  v.   Assume suitable data.

Q1   One of the Municipal Corporation wants to take the offline Tender bidding   (**20**)
activity like vendor search, floating the tender, allocation of the tender,
execution of the contract and billing etc. online. Develop a business plan based
on the following guidelines:

  i. Identify the business model.
  ii. Develop the strategic plan based on Strategic Objectives, Strategic definition,
      SCM plan
  iii. Develop few webpages demonstrating the activities.
  iv. Organizational structure
  v. Hardware and Software requirement

Q2   a)   Discuss any two tools to secure channel of communication in an e-commerce   (**10**)
environment.
  b)   Discuss the CRM strategy for acquisition and retention of the customer need to be
adopted by a Travel Agency to improve the profit margin.   (**10**)

Q3   a)   List the e-payment modes available in e-commerce. Explain any two of them
in detail.   (**10**)
  b)   Explain with example the components of SOSTAC framework to promote the
product.   (**10**)

Q4   Attempt *any four.*
  a)   Differentiate between the buy-side and sell-side SCM.   (**05**)
  b)   Discuss any one revenue model with one example.   (**05**)
  c)   Discuss the 7 P's of the marketing strategies with oneexample each.   (**05**)
  d)   Explain the SLEPT framework.   (**05**)
  e)   Explain the effect of Porter's five forces on e-business.   (**05**)

Q5   a) Explain with examples the multi-channel marketplace model.   (**10**)
  b) Justify with example "e-business strategy model is dynamic and not static".   (**10**)

Q6   Write a short note (Any 2)   (**20**)
  a)   Discuss 7s Strategic framework for change management.
  b)   Comment on the drives, risks and impact of e-procurement.
  c)   Draw a flow process chart showing the main operations performed by users on
any of the e-commerce web-site.

(3 Hours) [Total Marks: 80]

N.B.: (1) Question **No.1** is **Compulsory**.
  (2) Attempt **any three** questions from **remaining** questions.
  (3) Assume **suitable** data wherever required but **justify** the same.
  (3) **Figures** to the **right** indicate **full marks**.
  (4) Use of **Statistical Table** is allowed.

1. (a) Define model. Explain different models with suitable example. **(10)**
   (b) Explain Naylor Finger approach for validation of simulation model. **(10)**

2. (a) Consider a single server system. Let the arrival distribution be uniformly distributed between 1 **(10)** and 10 minutes and the service time distribution is as follows:

Service Time (Min)	1	2	3	4	5	6
Probability	0.04	0.20	0.10	0.26	0.35	0.05

Develop the simulation table and analyze the system by simulating the arrival and service of 10 customers. Random digits for inter-arrival time and service times are as follows:

Customer	1	2	3	4	5	6	7	8	9	10
R.D. for Inter-arrival Time	--	853	340	205	99	669	742	301	888	444
R.D. for Service Time	71	59	12	88	97	66	81	35	29	91

   (b) Explain the following terms: Event Scheduling, Process Interaction, Activity Scanning, **(10)** Bootstrapping, and Terminating Event.

3. (a) Suppose that the life of an industrial lamp, in thousands of hours, is exponentially distributed **(10)** with failure rate $\lambda=1/3$ (one failure every 3000 hours, on average).
   i) Determine the probability that lamp will last longer than its mean life of 3000 hours.
   ii) Determine the probability that the lamp will last between 2000 and 3000 hours.
   iii) Find the probability that the lamp will last for another 1000 hours, given that it is operating after 2500 hours.
   (b) Explain Direct Transformation method for random variate generation using Normal and **(10)** Lognormal distribution.

4. (a) Test the following random numbers for independence by Poker test. **(10)**
   {0.594, 0.928, 0.515, 0.055, 0.507, 0.351, 0.262, 0.797, 0.788, 0.442, 0.097, 0.798, 0.227, 0.127, 0.474, 0.825, 0.007, 0.182, 0.929, 0.852}
   Use $\alpha = 0.05$, $\chi^2_{0.05,1} = 3.84$
   (b) Explain Inventory system. Discuss the cost involved in inventory systems. **(10)**

5. (a) Give the equations for steady state parameters for M/G/1 queue and derive M/M/1 from **(10)** M/G/1.
   (b) A federal agency studied the records pertaining to the number of job-related injuries at an **(10)** underground coal mine. The values for the past 100 months were as follows:

Injuries per Month	0	1	2	3	4	5	6
Frequency of Occurrence	35	40	13	6	4	1	1

   i. Apply the Chi-Square test to these data to test the hypothesis that the underlying distribution is Poisson.
   ii. Apply the Chi-Square test to these data to test the hypothesis that the underlying distribution is Poisson with mean 1.0.

   Use level of significance $\alpha = 0.05$ and $\chi^2_{0.05,2} = 5.99$, $\chi^2_{0.05,3} = 7.81$

6. Write short notes on (**any two**): **(20)**
   (a) Poisson Process and its properties.
   (b) Manufacturing and Material Handling Systems.
   (c) Initialization bias in steady state simulation.
   (d) Steps in simulation study.