M.E. Computer Engg.

Master Of Engineering

Question Papers May - June 2018

Sem – I & II

M.E (Comp) / Sem I / CBCGS / Operation Research

Q. P. Code: 27287

24/05/18

(3 Hours) (Marks: 80

N.B. : (1) Answer any four questions out of the six questions.
(2) Figures to the right indicate full marks.
(3) Illustrate answers with neat sketches where ever required.
(4) Answers to the questions should be grouped and written together.
(5) Assume suitable data if required.

1. (a) Consider the problem for Graphical Method 10

Max. $Z = 3X_1 + 5X_2$

Subject to,

$X_1 + 2X_2 \leq 2000$

$X_1 + X_2 \leq 1500$

$X_2 \leq 600$

$X_1, X_2 \geq 0$

(b) Explain the simulation with suitable example. 10

2. (a) Solve by Big M method 10

Minimize z $20 X_1 + 10 X_2$

Subject to

$X_1 + X_2 \leq 40$

$4 X_1 + 3 X_2 \geq 60$

$3 X_1 + X_2 \geq 30$

$X_1, X_2 \geq 0$

(b) The annual demand for a product is 64000 units. The buying cost per order is Rs.10 and the estimated cost of carrying one unit in stock for a year is 20%. The normal price of the product is Rs.10 per unit. However, the supplier offers a quantity discount of 2% on an order of at least 1000 units at a time and the discount of 5% if the order is for at least 5000 units. Suggest the most economic purchase quantity per order. 10

3. (a) Solve the following problem by Dual simplex method 10

Min.$Z = 2X_1 + 2X_2 + 4X_3$

$2X_1 + 3X_2 + 5X_3 \geq 2$

$3X_1 + X_2 + 7X_3 \leq 3$

$X_1 + 4X_2 + 6X_3 \leq 5$

$X_1, X_2, X_3 \geq 0$

(b) Explain in detail the structure of queuing system describing each element of queue with suitable example. 10

4. (a) A company has three factories X, Y, Z. It supplies goods to four warehouses W1, W2, W3 and W4. The production capacities of the factories and demand of the warehouses are as shown in the table. Determine the optimal solution of the problem. 10

		Warehouse				
		W1	W2	W3	W4	Production Capacity
Factory	X	19	30	50	12	7
	Y	70	30	40	60	10
	Z	40	10	60	20	18
Demand		5	8	7	15	

(b) A salesman estimates that the following would be the cost on his route, visiting the six cities as shown in the following table: 10

From city	To city 1	2	3	4	5	6
1	∞	20	23	27	29	34
2	21	∞	19	26	31	24
3	26	28	∞	15	36	26
4	25	16	25	∞	23	18
5	23	40	23	31	∞	10
6	27	18	12	35	16	∞

The salesman can visit each of the cities only once. Determine the optimal sequence he should follow to minimize the total distance travelled. What is the total distance travelled?

5. (a) Use two phase simplex method to solve following problem 10

Maximize $Z = 5X_1 + 3X_2$

Subject to the constraints $2X1 + X_2 \leq 1$

$X_1 + 4X_2 \geq 6$

$X_1, X_2 \geq 0$

(b) Find the sequence that minimizes the total time in hours required to complete the following tasks in the order $M_1M_3M_2$: 10

	Tasks A	B	C	D	E	F	G
M 1	3	8	7	4	9	8	7
M 2	6	7	5	11	5	6	12
M 3	4	3	2	5	1	4	3

6. (a) A boat company makes three different kinds of boats. All boats can be made profitably but the company's monthly production is constrained by limited amount of labour, wood and screws available each month. The director will choose the combination of the boats that maximizes his revenue in view of the information given in the following table: 10

Input	Row Boat	Canoe	Keyak	Monthly Availability
Labour (Hrs)	12	7	9	1,260 Hrs.
Wood (Board Feet)	22	18	16	19,008 Board Feet
Screws (KG)	2	4	3	396 KG
Selling Price	4, 000	2, 000	5,000	

Formulate the problem as LPP and solve by Simplex method.

From the optimal table of the solved LPP , answer the following

questions:

i) How many boats of each type are produced and what will be the resulting revenue?

ii) Which, if any, of the resources are not fully utilized? If so, how much of spare capacity is left?

iii) How much wood will be used to make all the boats given in the optimal solution?

(b) An electronic device consists of four components, each of which must function for the system to function. The system reliability can be improved by installing parallel units in one or more of the components. The reliability (R) of a component with one, two or three parallel units and the corresponding cost (C) are given in the table below. The maximum amount available for this device is 100. The problem is to determine the number of parallel units in each component. 10

No. of Units	Components							
	1		2		3		4	
	R	C	R	C	R	C	R	C
1	0.7	10	0.5	20	0.7	10	0.6	20
2	0.8	20	0.7	40	0.9	30	0.7	30
3	0.9	30	0.8	50	0.95	40	0.9	40

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M.E | Computer | High Performance Computing | Sem - II | CBCGS

Q.P. Code: 40234

Date: 15/05/2018

[Total Marks 80]

(3 Hours)

N. B:

1. Question **No. 1 is Compulsory**.
2. Solve any **THREE** from Question No. 2 to 6.
3. Draw neat well labeled diagram wherever necessary

Q. 1	a)	What are the different network topologies? Explain in detail.	(10)
	b)	Compare and contrast loosely coupled and tightly coupled multiprocessors.	(10)
Q. 2	a)	Write a MPI program to find factorial of given number.	(10)
	b)	What is a Data Race? Why Data-Races are Undesired? How Data-Races Can be Prevented?	(10)
Q. 3	a)	Explain Flynn's classification in detail.	(10)
	b)	Explain Granularity, Concurrency and Dependency Path.	(10)
Q. 4	a)	Explain various levels of parallel processing.	(10)
	b)	What is OpenMP? Explain OpenMP compiler directives? What are the Pros and Cons of OpenMP.	(10)
Q. 5	a)	Draw and explain NVIDIA GPU architecture.	(10)
	b)	What are the different Performance metrics?	(10)
Q. 6		Write short notes on any **FOUR**: 1. Quantum Computers 2. Data flow computers 3. Memory organization. 4. Message passing interface 5. Non-uniform memory access model.	(20)

M.E. (Comp.) / SEM - II / Choice Base / Data Science

Q.P. Code:16986

17/05/18

Time: 3 Hours **Marks: 80**

Note: 1. Question 1 is compulsory

2. Answer any three out of remaining questions.
3. Assume suitable data wherever required and justify the same.

Q1 a) Explain time series mining with an appropriate example. [5]

b) What is sharding? Explain the advantages of sharding. [5]

c) What is data leakage with respect to big data? [5]

d) What are the basic differences between relational database and HDFS? [5]

Q2 a) Use PCA to transform 2D data space to 1D data space for the given matrix A. [10]

$$A = \begin{matrix} 0 & 1 \\ -2 & -3 \end{matrix}$$

b) Explain singular value decomposition (SVD) with an example. [10]

Q3 a) Explain Gaussian (normal) distribution with respect to pdf and cdf and its use in statistics. [10]

b) Explain Independent Component Analysis (ICA) in descriptive modeling. [10]

Q4 a) What type of problem were you looking to solve with text mining? How did you know how to text mine? What could be the challenges when text mining? [10]

b) What is Recommendation System (RS)? Explain types of RS and various issues and challenges in RS. [10]

Q5 a) Draw and describe the information visualization process. [10]

b) How would you validate a model you created to generate a predictive model of a quantitative outcome variable using multiple regressions? [10]

Q6 a) Describe the working of the Map-Reduce with an example. [10]

b) What is No SQL? Compare No SQL with SQL. [10]

M.E. (Comp. Engg.) / Choice Base / Sem-II - Ethical Hacking and Digital Forensics

Q. P. Code: 38873

21/05/18.

(3 Hours) Total Marks: 80

N.B.: (1) Question No.1 is compulsory.

(2) Attempt any three questions from the remaining five questions.

(3) Make suitable assumptions wherever necessary but justify your assumptions.

1.	(a) What is hacking? Who are the different types of hackers?	05
	(b) Explain qualified forensic duplicate, restored image and mirror image.	05
	(c) What volatile data can be obtained from investigation of routers?	05
	(d) What are the different ways to recover deleted files from a Unix system?	05
2.	(a) What do you mean by incident response methodology? Explain the different phases.	10
	(b) Briefly explain the process of collecting the volatile data in Windows system.	10
3.	(a) Briefly explain the role of Windows registry in collecting forensic evidence.	10
	(b) Explain the method for performing the mobile forensic.	10
4.	(a) Discuss the steps for investigating routers.	10
	(b) Explain the steps for e-mail forensic investigation.	10
5.	(a) What are the requirements of forensic duplication tools? Elaborate different ways of creating a forensic duplicate of a hard-disk.	10
	(b) What is digital evidence? What are the different types of digital evidence?	10
6.	Write a short note on: **(any two)**	20

(1) Challenges of performing mobile forensic.

(2) Layout of report writing

(3) Chain of custody

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M.E. (Comp.) / Sem II / Choice Base / Elective I – Semantic Web & Social Network Analysis

Q. P. Code: 39620

(3 Hours) **[Total Marks: 80]**

23/05/18

Note: i) Question no. 1 is compulsory
ii) Attempt any three from remaining
iii) Assume necessary data

1.	(a)	What are the key concepts and measures in social network analysis?	5
	(b)	Explain features of semantic social network application	5
	(c)	Explain RDF in detail	5
	(d)	Why ontologies are important in semantic web	5
2.	(a)	Explain Layered approach of Semantic Web	10
	(b)	Explain electronic discussion network.	10
3.	(a)	Explain with example architecture of semantic web application	10
	(b)	Explain reasoning with social network data	10
4.	(a)	Discuss different types of Recommendation systems	10
	(b)	Explain methods of community detection and mining	10
5.	(a)	Explain homophily community mining algorithm.	10
	(b)	Explain semantic based social network analysis.	10
6.		Write short note on **(any Two)**	20

a) SPARQL
b) Centrality
c) Community

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M.E (Comp.) / Sem II / Choice Base / Elective-II - Research Methodology

Q. P. Code: 24774

25/05/18

(3 hours) **[Total Marks-80]**

N.B. (1) Attempt any four questions out of six questions
(2) Assume any additional data if necessary and state it clearly
(3) Explain answers with neat sketches wherever necessary

1	a)	How Principle Research method different from Methodology? Give example to justify the difference.	[10]
	b)	Show the classification of research characteristics and discuss at least two classified characteristics with suitable example.	[10]
2	a)	Are quantitative and qualitative research types inter-related with each other? Justify your answer.	[10]
	b)	What are the methods for analyzing date in quantitative research?	[10]
3	a)	Show the significance of Sample design and describe essential steps to achieve good sampling design.	[10]
	b)	A car manufacturer claims that his cars will run for an average of 20,000 miles before needing their first repair. To prove this claim, you have tracked a test where you took random sample of 21 cars. It found that the sample average number of miles before repair was 18,700, with a standard deviation of 8,600 miles. If you have been asked to draw the random sample test analysis for this manufacturer what significant test limitations you can suggest or recommend to manufacturer while taking random sample of cars?	[10]
4	a)	There are various stages of scientific research process. Suppose you will have the opportunity to learn how to negotiate solutions to open engineering design problem using systematic design methods. What stages of scientific research process you will follow? Briefly discuss every stage that you like to consider.	[10]
	b)	What is the characteristic of Good Hypothesis? Explain type I and II errors, level of significance and variables in hypothesis.	[10]
5	a)	Identify any research area you are interested in. What procedural steps you will follow to formulate any research problem in this research area. Be specific to steps you follow and provide relevant description.	[10]
	b)	Summarize the difference between qualitative and quantitative two data collection methods.	[10]
6	a)	Discuss the validity of research thoroughly.	[10]
	b)	"Ethics in research is the need of the hour". Justify the statement.	[10]

$$\begin{array}{r} 6 \\ +10 \\ \hline 16 \end{array}$$