

016405**May 2023****B.Tech. (CEOS) IV SEMESTER
Computer Networks (PCC-DS-405)**

Time : 3 Hours]

[Max. Marks : 75]

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
2. *Answer any four questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART-A

1. (a) Give example of Mesh, Star, Bus and Ring Topology. (1.5)
(b) Why transport layer is called true end-to-end layer? (1.5)
(c) Define piggybacking and its usefulness. (1.5)
(d) Differentiate between Bit and Byte stuffing. (1.5)
(e) Why location of a Repeater is vital in a LAN? (1.5)
(f) Why a medium-size or large-size corporation does not want a block of class C addresses. (1.5)
(g) What is the need of pseudo-header in UDP? (1.5)

- (h) Why ARP is often cited as a security weakness? (1.5)
- (i) List out open congestion control policies. (1.5)
- (j) How recursive resolution is different from Iterative resolution? (1.5)

PART-B

2. (a) If the data link layer can detect errors between hops, why do you think we need another checking mechanism at the transport layer? (5)
 - (b) What is the problem with Synchronous Time Division Multiplexing? What strategies are used to solve this problem? (5)
 - (c) What is Hidden station problem? How it can be solved? (5)
3. (a) Compare and contrast the Go-Back-N ARQ Protocol with Selective-Repeat ARQ. Also specify if using 5-bit sequence numbers, what is the maximum size of the send and receive windows for each of the following protocols ? (5)
 - (i) Stop-and-Wait ARQ.
 - (ii) Go-Back-N ARQ.
 - (iii) Selective-Repeat ARQ.
 - (b) If Hamming Code is used what should be the transmitted pattern for message m : 11011? (5)

- * (c) A pure ALOHA network transmits 200-bit frames on a shared channel of 200 kbps. What is the requirement to make this frame collision-free? (5)

4. (i) Find the subnet mask.
 (ii) Find the number of addresses in each subnet.
 (iii) Find the first and last addresses in subnet 1.
 (iv) Find the first and last addresses in subnet 32. (5)
- (b) Differentiate between IPv4 and IPv6. (5)
- (c) Write short note on DHCP Protocol. (5)
5. (a) UDP is a message-oriented protocol. TCP is a byte-oriented protocol. If an application needs to protect the boundaries of its message, which protocol should be used, UDP or TCP? Also explain TCP Connection and Termination process. (5)
- (b) Differentiate between TCP segment and SCTP Message. (5)
- (c) What is Quality of Service? Explain its improving techniques. (5)
6. (a) How FTP is different from other client/server applications. Explain file transfer process using FTP. (10)
- (b) Differentiate between Packet filter firewall and Proxy firewall. (5)

7. Write short note on following (any *three*) :

- (a) Transmission Media.**
- (b) ARP & RARP Protocol.**
- (c) Flow control Protocols.**
- (d) Bluetooth.**

(15)

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Total Pages : 3

016404

May 2023

B.Tech. (CE(DS)) - IV SEMESTER

Object Oriented Programming with Java (PCC-DS-402)

Time : 3 Hours]

[Max. Marks : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
2. *Answer any four questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART-A

1. (a) What are classes and objects? (1.5)
(b) What do you mean by the event Handling? (1.5)
(c) What do you mean by stream? (1.5)
(d) What do you mean by the model view controller (MVC)? (1.5)
(e) What is URL connection class? (1.5)
(f) What is RMI registry? (1.5)
(g) What are the entity beans? (1.5)
(h) What do you mean by package in Java. (1.5)

- (i) What do you mean by the containers? (1.5)
(j) What do you mean by bytecode? (1.5)

PART-B

2. (a) What is inheritance? Explain the various types of inheritance by taking suitable example? (9)
(b) What do you mean by the multithreading? Explain it by taking a suitable example. (6)
3. (a) What is constructor? Explain the various types of constructors by giving suitable example. (8)
(b) What is Applet? How can you create an applet in Java? Explain it by giving suitable example in Java. (7)
4. (a) Why the swing component is better than AWT component? How is list created in Java using swing? Explain it by taking example. (8)
(b) What is the role of layout in Java? Explain the Flow Layout with suitable Example. (7)
5. (a) What is a Socket? How can you create two-way communication between the server and client? Explain it by taking suitable example. (8)
(b) What do you mean by remote method invocation (RMI)? How can you create distributed application using RMI? Explain it by giving suitable example. (7)

6. (a) Differentiate between the Java Server Pages (JSP) and Servlet. Explain the life cycle of the JSP page. (8)
(b) What do you mean by the constrained properties of the Java beans? Explain it by taking suitable example. (7)

7. Write short note on following :

- (a) Interface.
(b) Exception Handling.
(c) Implicit Objects in JSP.

(3x5=15)

016402**May, 2023****B. Tech. (CE(DS))-IV SEMESTER
Statistics-II (BSC-DS-401)**

Time : 3 Hours] [Max. Marks : 75

Instructions :

1. It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.
2. Answer any four questions from Part-B in detail.
3. Different sub-parts of a question are to be attempted adjacent to each other.

PART-A

1. (a) Determine the binomial distribution for which the mean is 4 and variance 3 and also find its mode. (1.5)
- (b) Obtain the moment generating function of geometric distribution. (1.5)
- (c) Define exponential distribution and obtain its mean and variance. (1.5)
- (d) Differentiate between "Sample" and "Population". Point out their advantages and limitations. (1.5)
- (e) What are sampling errors? (1.5)

- (f) What do you understand by the term "regression analysis"? (1.5)
- (g) Describe the methods of moments for estimating the parameters. (1.5)
- (h) What do you by "statistical estimation"? (1.5)
- (i) What is the difference between "Statistics" and "Parameter"? (1.5)
- (j) Explain the concept of "Type-I and Type-II" errors. (1.5)

PART-B

2. (a) Prove that Poisson distribution as a limiting form of a Binomial distribution. (8)
- (b) Define Normal distribution. Also, find mean and variance of Normal distribution. (7)
3. (a) The probability of a man hitting a target is $\frac{1}{4}$. (8)
 - (i) If he fires 7 times, what is the probability of his hitting the target at least twice?
 - (ii) How many times must he fire so that the probability of his hitting the target at least once is greater than $\frac{2}{3}$?
- (b) What is sampling? Explain the importance of sampling in solving business problems. Critically examine the well-known methods of probability sampling and non-probability sampling. (7)

4. (a) Find the maximum likelihood estimate for the parameter λ of a Poisson distribution on the basis of a sample of size n . Also, find its variance. (8)
- (b) Obtain the method of moment estimator for α and β for rectangular Population. (7)
5. (a) In random sampling from normal population $N(\mu, \sigma^2)$, find the maximum likelihood estimators for
 - (i) μ , when σ^2 is known,
 - (ii) σ^2 , when μ is known,
 - (iii) the simultaneous estimation of μ and σ^2 . (8)
- (b) A cigarette manufacturing firm claims that its brand A of the cigarettes outsells its brand B by 8%. If it is found that 42 of a sample of 200 smokers prefer brand A and 18 out of another random sample of 100 smokers prefer brand B, test whether the 8 % difference is a valid claim. (Use 5 % level of significance). (7)
6. (a) The average hourly wage of a sample of 150 workers in a plant "A" was Rs. 2.56 with a standard deviation of Rs. 1.08. The average hourly wage of a sample of 200 workers in plant "B" was Rs. 2.87 with a standard deviation of Rs. 1.28. Can an applicant safely assume that the hourly wages paid plant "B" are higher than those paid by plant "A". (8)

- (b) Prove that sample mean is an unbiased estimate of the population mean. (7)
7. (a) Let X_1, X_2 be independent random variables each having Geometric distribution $q^k p$, $k = 0, 1, 2, \dots$. Show that the conditional distribution of X_1 given $X_1 + X_2$ is uniform. (5)
- (b) Using the following data, perform one way Analysis of variance

A	B	C
2	3	4
4	5	6
6	7	8
12	15	18

(Tabulated value is given as 5.14). (10)

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May 2023

B.Tech. (CE(DS)) 4th Sem.- IV SEMESTER
Essentials of Data Mining (PCC-DS-401)

Max. Marks: 75

Time: 3 Hours

- Instructions:**
1. It is compulsory to answer all the questions (1.5 marks each) of Part -A in short.
 2. Answer any four questions from Part -B in detail.
 3. Different sub-parts of a question are to be attempted adjacent to each other.

PART -A

Q1	(a) Differentiate between Database and Datawarehouse	(1.5)
	(b) Differentiate between supervised and unsupervised learning	(1.5)
	(c) Explain why k-medoids algorithm is better than k-means algorithm?	(1.5)
	(d) What is the difference between SLICE and DICE operator?	(1.5)
	(e) What is Information Gain in Decision Tree?	(1.5)
	(f) Explain Bias and Learning rate of Neural Network.	(1.5)
	(g) What do you mean by Elbow method of clustering?	(1.5)
	(h) Differentiate between Interval scaled Attributes and Ratio scaled Attributes.	(1.5)
	(i) Explain the method for handling noise.	(1.5)
	(j) What do you mean by Normalization? Explain methods of normalization.	(1.5)

PART -B

Q2	(a) Explain in detail KDD process.	(10)																		
	(b) Explain Star, Snowflake and Fact Constellation Schema with the help of example.	(5)																		
Q3	(a) Apply k-means on the following 1-dimensional data set for K=2. And find the clusters. Data set {2, 4, 10, 12, 3, 20, 30, 11, 25}	(5)																		
	(b) A database has eight transactions. Let min_sup= 3	(10)																		
Q4	<table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>TID</th> <th>Items-Bought</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>A, B</td> </tr> <tr> <td>20</td> <td>A, B, C</td> </tr> <tr> <td>30</td> <td>B, C, D</td> </tr> <tr> <td>40</td> <td>B, C</td> </tr> <tr> <td>50</td> <td>A, B, C, D</td> </tr> <tr> <td>60</td> <td>B, D</td> </tr> <tr> <td>70</td> <td>B, E</td> </tr> <tr> <td>80</td> <td>B, C, D, E</td> </tr> </tbody> </table> Find all the frequent item-sets using A-priori algorithm and FP-growth algorithm.	TID	Items-Bought	10	A, B	20	A, B, C	30	B, C, D	40	B, C	50	A, B, C, D	60	B, D	70	B, E	80	B, C, D, E	
TID	Items-Bought																			
10	A, B																			
20	A, B, C																			
30	B, C, D																			
40	B, C																			
50	A, B, C, D																			
60	B, D																			
70	B, E																			
80	B, C, D, E																			
(a) What are Neural networks? How they assist in classifying data? Explain with	(10)																			

IT - 13
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the help of suitable example. (5)

(b) Differentiate between OLTP and OLAP (10)

Q5 (a)

	51	52	53	54	55	56	57	58
51	0							
52	4.24	0						
53	4.47	5.1	0					
54	3.16	4	1.41	0				
55	2	5.83	4	3.16	0			
56	1	3.61	5	3.61	3	0		
57	6.08	3.61	3.61	3.61	6.71	6	0	
58	2	3.16	2.83	1.41	2.83	2.24	4.12	0

Consider Epsilon = 3.5 and minpoints=3, Find core points, Border points and outlier using DBSCAN algorithm.

(b) Apply Divisive Hierarchical Clustering (DIANA) method for following Dataset with given distances. (5)

Distance	a	b	c	d	e
a	0	2	6	10	9
b	2	0	5	9	8
c	6	5	0	4	5
d	10	9	4	0	3
e	9	8	5	3	0

Q6 (a) Raman is a BTech student. Recently, his mood has been highly influenced by three factors: the weather (W), his study habits (S), and whether his neighbor is at home or not (N). We want to predict his happiness according to these three factors using previous observations. The table below shows this data. (10)

Weather (W)	Study (S)	Neighbor (N)	Happy (H)
Bad	Fail	Home	No
Good	Fail	Out	No
Good	Fail	Out	No
Good	Fail	Out	No
Bad	Pass	Home	No
Bad	Pass	Home	Yes
Bad	Pass	Home	Yes
Good	Pass	Out	Yes

On a new day when W=Good, S=Pass, and N=Home, how would we predict his happiness using a Naive Bayes classifier? Show your calculations.

(b) Given the following training instances, Compute class label for test instance M1= (3,7) using k-nearest neighbors (KNN, K=3) (5)

Training Instance	X1	X2	Output
T1	7	7	0
T2	7	4	0
T3	3	4	1
T4	1	4	1

Q7 Write Short note on following:

1. Web content Mining
2. Social Network Analysis
3. Genetic Algorithm

(15)

Roll No. 01001607

Total Pages : 3

003406

May 2023

B.Tech. (CE/CE(DS)/CSE(AIML))/CE

(Hindi Medium)) 4th Semester

ENVIRONMENTAL SCIENCES (MC-03/MCH-03)

Time : 3 Hours]

[Max. Marks : 75

Instructions :

1. It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.
2. Answer any four questions from Part-B in detail.
3. Different sub-parts of a question are to be attempted adjacent to each other.

PART-A

1. Write a short note on the following :

- (a) Green marketing. (1 $\frac{1}{2}$)
- (b) Eutrophication. (1 $\frac{1}{2}$)
- (c) Ocean Thermal Energy Conservation (OTEC). (1 $\frac{1}{2}$)
- (d) Ecological succession. (1 $\frac{1}{2}$)
- (e) Biogeographic Zones of India. (1 $\frac{1}{2}$)
- (f) Hotspot of biodiversity. (1 $\frac{1}{2}$)
- (g) Endemic species. (1 $\frac{1}{2}$)

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- (h) Sanitary landfills. (1 $\frac{1}{2}$)
(i) Sustainable Development. (1 $\frac{1}{2}$)
(j) Watershed Management. (1 $\frac{1}{2}$)

PART-B

2. (a) How would environmental awareness help to protect our environment, explain briefly? (5)
(b) Write an explanatory note on the multidisciplinary nature of environmental science. Briefly describe, how computer engineering plays an important role in conservation and protection of environmental quality? (10)
3. (a) Give a detailed account of various impacts of traditional and modern agricultural practices on environment. (7 $\frac{1}{2}$)
(b) What are the environmental impacts associated with mineral extraction? Briefly explain the remedial measures to reduce the impacts of mining. (7 $\frac{1}{2}$)
4. (a) Define ecosystem. Give a detailed account of structural and functional attributes of an ecosystem. (10)
(b) Why the concept of food web is more realistic than the concept of food chain? (5)
5. (a) What do you understand by the term biodiversity? Discuss the concept of biodiversity at different hierarchical levels. (7 $\frac{1}{2}$)

- (b) Elucidate different approaches of biodiversity conservation along with their merits and demerits. (7 $\frac{1}{2}$)

6. (a) What is water pollution? Briefly explain the effects and various control measures of water pollution. (7 $\frac{1}{2}$)
(b) What are wastelands. Give a detailed account of various methods or techniques for reclamation of wastelands. (7 $\frac{1}{2}$)
7. Write short note on any *three* of the following :
(a) Environmental ethics.
(b) Life expectancy.
(c) Role of IT in environmental and health.
(d) Universal Declaration of Human Rights. (5x3=15)
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003405**May 2023****B.Tech. [CE/CE (DS)/CSE (AIML) IV SEMESTER
Economic For Engineers (HSMC-02)]**

Time : 3 Hours

Max. Marks : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
2. *Answer any four questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART-A

1. (a) Define micro economics. (1.5)
- (b) What is production possibility curve? (1.5)
- (c) State the limitations of NPV method of capital budgeting. (1.5)
- (d) How pay-back period is calculated? (1.5)
- (e) Define demand forecasting. (1.5)
- (f) What is meant by elasticity of demand? (1.5)
- (g) Examine the relevance of depreciation towards Industry. (1.5)

- (h) What is opportunity cost? (1.5)
- (i) Explain the various types of market. (1.5)
- (j) State the features of Indian Economy. (1.5)

PART-B

2. Explain and illustrate the relationship between science, technology and economic development. (15)
3. Discuss the factors that determine elasticity of demand. (15)
4. State the advantages and limitations of Internal rate of Return Method of capital budgeting. (15)
5. Examine the importance of the law of variable proportions. What do you think to be its causes and effects? (15)
6. Explain the features of monopoly competition through appropriate examples. (15)
7. State the differences between :
(a) Fiscal and monetary policy. (15)
(b) Central bank and Commercial bank. (15)