

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2024
(Fourth Semester)

Branch – COMPUTER SCIENCE WITH DATA ANALYTICS

R PROGRAMMING FOR DATA ANALYSIS

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(5 x 1 = 5)

- 1 R is an _____ language
(i) Object Oriented (ii) Java
(iii) Python (iv) AI
- 2 Data frames can be converted to a matrix by calling data _____
(i) as.matr() (ii) as.mat()
(iii) as.matrix() (iv) as.max()
- 3 What package is need to be install for reading?
(i) Readexcel (ii) Readxl
(iii) Readcsv (iv) Read_csv
- 4 What is the function used to find current date in R?
(i) Sysdate() (ii) Date()
(iii) Now() (iv) All the above
- 5 Debug() flags a function for _____ mode in R mode.
(i) debug (ii) run
(iii) compiler (iv) recover

SECTION - B (15 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks

(5 x 3 = 15)

- 6 a Explain about creating vectors .
OR
b Apply the Names for R programming
- 7 a Compare the reading and writing data.
OR
b Classify binary formats.
- 8 a Bring out removing NA values.
OR
b Choose the dates in R.
- 9 a Explain about if else.
OR
b Summaries the optimization.
- 10 a Describe vectorizing a function.
OR
b State simulating a linear model.

Cont...

SECTION -C (30 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks

(5 x 6 = 30)

11 a Discuss in the features of R.

OR

b Describe data frames.

12 a Enumerate calculating memory requirements for R objects.

OR

b Differentiate using textual and binary formats for storing data.

13 a Highlight extracting multiple element of a list.

OR

b Justify managing data frames with the dplyr package.

14 a Assume about functions.

OR

b Identity a diversion on binding value to symbol.

15 a Analyze looping on the command line.

OR

b Select debugging tools in R.

Z-Z-Z

END

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2024
(Fourth Semester)

Branch – COMPUTER SCIENCE WITH DATA ANALYTICS

MODERN DATABASE SYSTEMS

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(5 x 1 = 5)

- 1 _____ is the advantage of distributed database over a centralized database.
(i) Software complexity (ii) Slow Response
(iii) Modular growth (iv) Software cost
- 2 _____ helps in implementing inter-operation parallelism.
(i) Interdependent parallelism (ii) Intra-query parallelism
(iii) Inter-query parallelism (iv) Pipelined parallelism
- 3 _____ is the benefit of using NoSQL database.
(i) Data Modelling (ii) Limited Scalability
(iii) Easy Schema Evolution (iv) Limited integration
- 4 _____ can best be described as a programming model used to develop Hadoop-based applications that can process massive amounts of data.
(i) MapReduce (ii) Mahout
(iii) Oozie (iv) Hive
- 5 A record in MongoDB is
(i) Document (ii) File
(iii) Application (iv) Table

SECTION - B (15 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks

(5 x 3 = 15)

- 6 a Explain Distributed database architecture.
OR
b Explain the concept of Fragmentation.
- 7 a Explain database clusters.
OR
b Elucidate the need for Parallel database system.
- 8 a Explain the Emergence of NoSQL.
OR
b Explain the concept of MapReduce.
- 9 a Explain any two next generation databases.
OR
b Elucidate the advantages of Hadoop.
- 10 a Explain the features of MongoDB.
OR
b Elucidate document data model.

Cont...

SECTION -C (30 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 x 6 = 30)

- 11 a Analyze the design issues in Distributed database system.
OR
b Explain promises and complications of Distributed database systems.
- 12 a Explain the steps involved in Query Processing.
OR
b Elucidate the architecture of Parallel database System.
- 13 a Highlight Aggregate Data Model with example.
OR
b Explain the steps to create graph databases.
- 14 a Explain the Revolution of Databases.
OR
b Classify the concepts of 3 V's of Big Data.
- 15 a Discuss about In-Memory Databases.
OR
b Distinguish between HBase and Hadoop.

Z-Z-Z

END

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2024
(Fourth Semester)

Branch- COMPUTER SCIENCE WITH DATA ANALYTICS

APPLIED STATISTICS

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(5 x 1 = 5)

1. Choose when a sample size is increased the effects upon the sampling error?
(i) It increases the sampling error (ii) It reduces the sampling error
(iii) It has no effect on the sampling error (iv) All of the above
2. Identify from the following which is not a component of time series.
(i) Regular variations (ii) Seasonal variations
(iii) Irregular variations (iv) Cyclical variations
3. Index number is a type of _____.
(i) Dispersion (ii) Average (iii) Correlation (iv) Regression
4. Which among the following is a type of control chart for variables?
(i) C chart (ii) P chart (iii) \bar{X} chart (iv) U chart
5. Indicate the function in Excel is a program developed by Microsoft.
(i) Spreadsheet (ii) Document
(iii) Data management (iv) All of the above

SECTION - B (15 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks

(5 x 3 = 15)

6. (a). Outline the importance of Randomization Numbers method.
OR
(b). Explain sampling and non sampling errors.
7. (a). Explain the components of time series
OR
(b). State the assumptions of least square method.
8. (a). Bring out the measures of unweighted index numbers.
OR
(b). State the time reversal test and factor reversal test.
9. (a). What are the advantages and limitations of statistical quality control?
OR
(b). Narrate the control chart for fraction defective.

Cont...

10. (a). State any three formulas for measure of dispersion.

OR

- (b). Explain ANOVA test in Excel.

SECTION -C (30 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks

(5 x 6 = 30)

11. (a). Discuss the stratified random sampling and systematic sampling methods.

OR

- (b). Elucidate the various Non probability sampling methods.

12. (a). Identify a trend line from the following data by the method of four yearly moving averages

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Production	464	515	518	467	502	540	557	571	586	612

OR

- (b). Prepare the trend values by the method of least square from the following data.

Year	2000	2001	2002	2003	2004	2005
Production	7	9	12	15	18	23

13. (a). Analyze the following data by price index numbers, using (i) Laspeyre's (ii). Paasche's and (iii) Fisher's methods.

Source	2001		2002	
	Price	Quantity	Price	Quantity
A	20	8	40	6
B	50	10	60	5
C	40	15	50	15
D	20	20	20	25

OR

- (b). Infer the cost of living index number for the following data.

Items	Price		Weight
	Base year	Current year	
Food	30	47	4
Fuel	8	12	1
Clothing	14	18	3
House rent	22	15	2
Miscellaneous	25	30	1

14. (a). A machine is set to deliver the packets of a given weight. Ten samples of size five each were examined and the following results were obtained.

Sample No	1	2	3	4	5	6	7	8	9	10
Mean	43	49	37	44	45	37	51	46	43	47
Range	5	6	5	7	7	4	8	6	4	6

Calculate the values for the central line and control limits for the mean chart and range chart. Comment on the state of control.

OR

- (b). Describe the benefits of statistical quality control.

15. (a). Highlight how to calculate Poisson distribution calculate for excel.

OR

- (b). Trace how to calculate Correlation Coefficient in Excel.

Z-Z-Z

END

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2024
(Second Semester)

Branch - **COMPUTER SCIENCE WITH DATA ANALYTICS**

FUNDAMENTALS OF DATA STRUCTURES / DATA STRUCTURES

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks

(10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	What is a data structure? a. A way to store and organize data b. A collection of algorithms c. A programming language d. A type of computer hardware	K1	CO1
	2	Which of the following is a linear data structure? a. Binary b. Tree c. Graph d. Array	K2	CO1
2	3	What is the maximum number of swaps that can be performed in the Selection Sort algorithm? a. n-1 b. n c. n+1 d. n+2	K1	CO2
	4	Which of the following is a Divide and Conquer algorithm? a. selection b. bubblesort c. merge sort d. heapsort	K2	CO2
3	5	Which data structure is used for balancing of symbols? a. Tree b. Stack c. Graph d. Queue	K1	CO3
	6	What is the prefix form of A-B/ (C * D ^ E) is? a) -A/B*C^DE b) -A/BC*^DE c) -ABCD*^DE d) -*^ACBDE	K2	CO3
4	7	Which of the following application makes use of a circular linked list? a) Recursive function calls b) Undo operation in a text editor c) Implement Hash Tables d) Allocating CPU to resources	K1	CO4
	8	A linked list node can be implemented using? a. struct b. class c. a&b d. None of these	K2	CO4
5	9	Which type of traversal of binary search tree outputs the value in sorted order? a) Pre-order b) In-order c) Post-order d) None	K1	CO5
	10	What is the maximum number of children that a node can have in a binary tree? a. 3 b. 1 c. 4 d. 2	K2	CO5

Cont...

SECTION - B (35 Marks)Answer **ALL** questions**ALL** questions carry **EQUAL** Marks

(5 × 7 = 35)

ALL questions carry EQUAL Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Explain the classification of data structure.	K2	CO2
	(OR)			
	11.b.	Summarize the Time and space complexity of Algorithm.		
2	12.a.	Illustrate the Selection sort with suitable example.	K4	CO1
	(OR)			
	12.b.	Examine the Radix sort algorithm.		
3	13.a.	Determine the various Operations performed on the Stack.	K5	CO2
	(OR)			
	13.b.	Explain the Implementation of recursion procedure in detail.		
4	14.a.	Discover the Searching procedure for Linked list.	K4	CO3
	(OR)			
	14.b.	Analyze the representation of Linked List in Memory.		
5	15.a.	Illustrate the binary search tree with neat diagram.	K5	CO5
	(OR)			
	15.b.	Determine the Searching and Inserting procedure for Binary tree.		

SECTION - C (30 Marks)Answer **ANY THREE** questions**ALL** questions carry **EQUAL** Marks

(3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Analyze the Multiple dimension Array in detail.	K4	CO1
2	17	Evaluate the Infix to postfix conversion with example.	K5	CO2
3	18	Explain about Circular Queue.	K4	CO3
4	19	Illustrate the Doubly Linked List Operations.	K4	CO4
5	20	Explain the Heap Sort algorithm with suitable example.	K5	CO5

Z-Z-Z

END

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2024
(Fifth Semester)

Branch - COMPUTER SCIENCE WITH DATA ANALYTICS

DISCIPLINE SPECIFIC ELECTIVE-I:
SOFTWARE PROJECT MANAGEMENT

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer ALL questions

ALL questions carry EQUAL marks (5 x 1 = 5)

- 1 Which of the following activities of a Generic Process framework provides a feedback report?
(i) Planning (ii) Deployment
(iii) Communication (iv) modeling & construction
- 2 The spiral model has two dimensions namely __ and __
(i) radial, angular (ii) diagonal, perpendicular
(iii) radial, perpendicular (iv) diagonal, angular
- 3 The objective of software project planning is to
(i) make use of historical project data
(ii) convince the customer that the project is feasible
(iii) enable a manager to make responsible estimates of cost and schedule
(iv) determine the probable profit margin prior to bidding on a project
- 4 Expand COCOMO
(i) Complete Cost Estimation Model
(ii) Collaborative Cost Estimation Model
(iii) Construction Cost Estimation Model
(iv) Conditional Cost Estimation model
- 5 Risk identification is a systematic attempt to specify threats to the _____.
(i) Project Plan (ii) Project Hierarchy
(iii) Project integration (iv) Project Maintenance

SECTION - B (15 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks (5 x 3 = 15)

- 6 a Discuss on Software project versus other type of project.
OR
b Write about plan & methodologies in SPM.
- 7 a Describe identify project Architecture.
OR
b Inscribe a note on structure versus speed of delivery.
- 8 a What are the basic for software estimating.
OR
b Illuminate on Expert judgement.

Cont...

- 9 a List out the objectives of activity planning.
OR
b How to manage the risk?
- 10 a Discuss on publishing resource scheduling.
OR
b Explain about creating critical path.

SECTION -C (30 Marks)

Answer ALL questions
ALL questions carry EQUAL Marks (5 x 6 = 30)

- 11 a Define Stakeholders. Describe on setting objectives & milestones of SPM.
OR
b What are the cost benefit evaluation techniques? Explain in detail.
- 12 a Explain about Step wise project planning.
OR
b What is software prototyping and what are the ways of categorizing prototypes?
- 13 a Explain about where estimation done and what are the problems with over and under estimates.
OR
b Discuss on bottom up approaching in software effort estimation with example.
- 14 a Explicate network planning models & formulation of network model.
OR
b Enlighten about A framework for dealing with risk.
- 15 a Describe about Cost schedules and Scheduling sequence.
OR
b Discuss on the Oldham Hackman job characteristics Model.

Z-Z-Z

END

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2024
(Sixth Semester)

Branch – COMPUTER SCIENCE WITH DATA ANALYTICS

ARTIFICIAL INTELLIGENCE

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(5 x 1 = 5)

1. Which is not the commonly used programming language for AI?
(i) PROLOG (ii) Java
(iii) LISP (iv) Perl
2. Where does the values of alpha-beta search get updated?
(i) Along the path of search (ii) Initial state itself
(iii) at the end (iv) None of the mentioned
3. Wumpus World is a classic problem, best example of _____
(i) Single player Game (ii) Two player Game
(iii) Reasoning with Knowledge (iv) Knowledge based Game
4. The statement comprising the limitations of FOL is/are _____
(i) Expressiveness (ii) Formalizing Natural Languages
(iii) Many-sorted Logic (iv) All of the mentioned
5. Learning is a natural activity of _____
(i) Learner (ii) Living organism
(iii) Teachers (iv) Individuals

SECTION - B (15 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks

(5 x 3 = 15)

- 6 a. Explain the history of AI.
OR
b. Write notes on heuristic search strategies.
- 7 a. Discuss the methods of Gaming Optimal search.
OR
b. Explain the Local Search for CSP.
- 8 a. Write notes on Knowledge based agent.
OR
b. Explain the effective Professional model checking.

Cont...

- 9 a. Write note on Syntax and Semantic for first order logic.
OR
b. Discuss about Resolution of inference.
- 10 a. Explain the need of learning decision tree.
OR
b. Write short detail on Ensemble learning.

SECTION -C (30 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 x 6 = 30)

- 11 a. Explain the Foundation and Art of AI.
OR
b. Examine the Structure and Problem solving agent.
- 12 a. Explain the functions of Alpha and Beta pruning.
OR
b. Compare and construct Constraints satisfaction and propagation.
- 13 a. Describe the concept of Proportional theorem proving.
OR
b. Brief notes on Agent based of propositional logic.
- 14 a. Estimate the Knowledge engineering in FOL.
OR
b. Explain the difference between Forward and backward chaining.
- 15 a. Describe the following concept of
(i) Supervised Learning (ii) Theory of Learning.
OR
b. Demonstrate the regression and classification with linear models.

Z-Z-Z

END

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2024
(Sixth Semester)

Branch – COMPUTER SCIENCE WITH DATA ANALYTICS

MINING OF MASSIVE DATA

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer ALL questions

ALL questions carry EQUAL marks (5 x 1 = 5)

1. A _____ receives one or more keys and their associated value lists.
(i) Combiners (ii) Reduce task
(iii) Nodes (iv) Skew
2. _____ are, in a sense, permanently executing, and produce outputs at appropriate times.
(i) Stream Queries (ii) Moments
(iii) Space Requirements (iv) The Bloom Filter
3. Hubs-and-Authorities Algorithm is also called as _____.
(i) DGIM (ii) LSH
(iii) HITS (iv) CURE
4. The _____ phenomenon forces on-line institutions to recommend items to individual users.
(i) Item Profiles (ii) User Profiles
(iii) Clustering Users (iv) long-tail
5. The _____ of a graph is the set of pairs of nodes (u, v) such that there is a path from u to v of length zero or more.
(i) count triangles (ii) transitive closure
(iii) Simrank (iv) Laplacian Matrix

SECTION - B (15 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks (5 x 3 = 15)

- 6 a Summarize the statistical limits on Data Mining.
OR
b Determine the physical organization of compute nodes in distributed file systems.
- 7 a Explain the data stream management system with diagram.
OR
b Identify the sampling data in a stream.
- 8 a Show the efficient computation of PageRank.
OR
b Highlight the issues in On-Line advertising.

Cont...

- 9 a Describe the model for recommendation systems.
OR
b Develop an algorithm for performing the Singular Value Decomposition (SVD).
- 10 a Narrate the Social Networks as graphs.
OR
b How will you find overlapping communities? Explain.

SECTION -C (30 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 x 6 = 30)

- 11 a Develop an algorithms using Map Reduce.
OR
b Draw and explain the graph model for Map Reduce problems.
- 12 a Examine the implementation of filtering streams.
OR
b Demonstrate the steps to counting distinct elements in a stream.
- 13 a Outline the several improvements of Topic – Sensitive Page Rank.
OR
b Evaluate the basic concept of matching problem with example.
- 14 a Discuss the general architecture for content – based recommendations.
OR
b Illustrate the technique for principal component analysis (PCA).
- 15 a Elucidate the clustering of social network graphs.
OR
b Discover the neighborhood properties of graphs.

Z-Z-Z

END

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2024
(Sixth Semester)

Branch – COMPUTER SCIENCE WITH DATA ANALYTICS

EXPLORATORY DATA ANALYTICS

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(5 x 1 = 5)

1. _____ add new variables/columns or transform existing variables.
(i) mutate (ii) add
(iii) append (iv) arrange
2. A _____ is a two-dimensional rectangular data set.
(i) Vector (ii) Lists
(iii) Matrix (iv) Functions
3. Which of the following is lattice command for producing boxplots?
(i) plot() (ii) bwplot()
(iii) xyplot() (iv) barlm()
4. _____ function returns fixed number of colors that interpolate the palette.
(i) colorRamp (ii) colorRampPalette()
(iii) pal() (iv) color()
5. _____ grammar makes a clear distinction between data that gets displayed on the screen or page.
(i) ggplot1 (ii) ggplot2
(iii) d3.js (iv) ggplot3

SECTION - B (15 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks

(5 x 3 = 15)

- 6 a Explain the data frames in dplyr package.
OR
b Illustrate the need for Exploratory data analysis.
- 7 a Explain the principles of Analytic Graphics.
OR
b Illustrate histogram with suitable example.
- 8 a Explain the use of base plotting system.
OR
b Elucidate the process of making a plot.

Cont...

- 9 a Explain the purpose of RcolorBrewer package.
OR
b Illustrate gplot() function with example.
- 10 a Explain smooth and facets used in layers.
OR
b Illustrate the steps to modify geom properties.

SECTION -C (30 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 x 6 = 30)

- 11 a Explain the various functions used in dplyr package.
OR
b Elucidate the process of reading data in data analysis.
- 12 a Discuss the basic concept of bar plots with example.
OR
b Compare and construct multiple box plots and scatter plots.
- 13 a Elucidate the Lattice system and its function.
OR
b Explain the base plotting functions with example.
- 14 a Determine the color utilities in R.
OR
b Elucidate smooth Scatter function with example.
- 15 a Illustrate the ggplot2 with suitable example.
OR
b Explain the steps involved in loading and processing data.

Z-Z-Z END

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2024
(Sixth Semester)

Branch – **COMPUTER SCIENCE WITH DATA ANALYTICS**

DISCIPLINE SPECIFIC ELECTIVE – II : INTERNET OF THINGS

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks

(5 x 1 = 5)

1. What is the primary function of an actuator in an IoT system?
 - i) To sense environmental changes
 - ii) To process data from sensors
 - iii) To control physical devices or systems
 - iv) To transmit data to the cloud
2. Which of the following statements is true regarding the optimization of IP for IoT?
 - i) IoT devices primarily use private IP addresses for communication
 - ii) IoT devices do not require IP addresses for communication
 - iii) IoT devices must have unique public IP addresses for communication
 - iv) IoT devices can only communicate over IPv4 networks
3. What is the primary purpose of data analytics in IoT?
 - i) To collect data from IoT devices
 - ii) To visualize data for end-users
 - iii) To analyze data and extract insights
 - iv) To security of IoT devices
4. Which of the following is a primary challenge in IoT security?
 - i) Lack of IoT devices
 - ii) Interoperability between devices
 - iii) Limited bandwidth
 - iv) Slow data processing
5. What is the primary objective of implementing IoT in smart parking systems?
 - i) To increase the number of parking spaces
 - ii) To reduce traffic congestion
 - iii) To enhance user experience and optimize parking operations
 - iv) To decrease the cost of parking infrastructure

SECTION - B (15 Marks)

Answer **ALL** Questions

ALL Questions Carry **EQUAL** Marks

(5 x 3 = 15)

6. a) What is IoT oneM2M architecture? Explain.
(OR)
b) Summarize the IoT data management and computer stack.

Cont...

7. a) Determine the need of optimization in IoT.
(OR)
b) Write short notes on physical and MAC layer.
8. a) Describe the data analytics in IoT.
(OR)
b) Show the role of machine learning in IoT.
9. a) Enumerate the overview of the key milestones and developments in IoT security.
(OR)
b) Highlight the security challenges in IoT.
10. a) Explain the benefits of grid blocks reference model.
(OR)
b) Examine the Centralized Control System in street lighting.

SECTION -C (30 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 x 6 = 30)

11. a) Explain the simplified architecture of an IoT system, highlighting its key components and their roles.
(OR)
b) Explain the roles of sensors, actuators, and smart objects in an IoT ecosystem. Discuss how they interact with each other and contribute to the functionality and intelligence of IoT systems.
12. a) What is IEEE 802.15.4, 802.15.4g, 802.15.4e protocol in IoT? Explain with a neat diagram.
(OR)
b) Evaluate the application protocols in IoT.
13. a) What is big data analytics in IoT? What is the application of big data analytics in IoT?
(OR)
b) Elaborate the key aspects of network analytics in IoT.
14. a) Explain in brief any 3 key security practices and systems commonly employed in IoT environments.
(OR)
b) Elaborate the octave and fair in IoT.
15. a) Describe the overview of the key components and layers of connected manufacturing architecture for the connected factory in IoT.
(OR)
b) What is smart traffic management system using IoT? Sketch on its Architecture.

Z-Z-Z

END

**PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)**

**BSc DEGREE EXAMINATION MAY 2024
(Second Semester)**

Branch - **COMPUTER SCIENCE WITH DATA ANALYTICS**

DISCRETE STRUCTURES AND GRAPH THEORY

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks

(10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	If x is a set and the set contains the real number between 1 and 2, then the set is _____. a) Empty set b) Finite set c) Infinite set d) countable set	K1	CO1
	2	In how many ways 2 students can be chosen from the class of 20 students? a)190 b) 200 c)180 d)240	K2	CO2
2	3	Every finite lattice must be a _____. a) sub lattice b) complete lattice c) free lattice d) partial lattice	K1	CO1
	4	The partial ordering relation on $\mathcal{P}(S)$ corresponding to the operations \cap and \cup is the subset relation _____. a) \subseteq b) \leq c) = d) \geq	K2	CO2
3	5	Conjunction of two tautologies is also a _____. a) tautology b) contradiction c) inverse d) converse	K1	CO1
	6	Which of the following is not a factor of $\sim Q \wedge P \wedge \sim P$? a) $\sim Q$ b) $P \wedge \sim P$ c) $\sim Q \wedge P$ d) Q	K2	CO2
4	7	A graph that has neither self-loops nor parallel edges is called a _____. a) simple graph b) linear complex c) parallel edges d) self-loop	K1	CO1
	8	An isomorphic graph must have the same number of _____. a) labels b) edges c) series d) loops	K2	CO2
5	9	A connected acyclic graph is called _____. a) cyclic graph b) tree c) Walk d) Path	K1	CO1
	10	There is a _____ path between every two vertices in a tree. a) unique b) different c) many d) ifinite	K2	CO2

Cont...

SECTION - B (35 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Show that any positive integer n greater than or equal to 2 is either a prime or a product of primes.	K3	CO1
		(OR)		
	11.b.	How many 4 digits can be formed using figures 0,1,2,3,4 and 5?		
2	12.a.	Explain when the binary relation is said to be a partial ordering relation with an example.	K2	CO2
		(OR)		
	12.b.	Define upper bound, lower bound and lattice with an example.		
3	13.a.	Show that $(\neg P \wedge (\neg Q \wedge R)) \vee (Q \wedge R) \vee (P \wedge R) \Leftrightarrow R$.	K3	CO3
		(OR)		
	13.b.	Show that $R \wedge (P \vee Q)$ is a valid conclusion from premises $P \vee Q, Q \rightarrow R, p \rightarrow M$ and $\neg M$.		
4	14.a.	Define isomorphic and complement of a subgraph with example.	K3	CO4
		(OR)		
	14.b.	In a graph with n vertices, if there is a path from vertex v_1 to vertex v_2 , then show that there is a path of no more than n-1 edges from vertex v_1 to vertex v_2 .		
5	15.a.	Criticize about rooted tree with suitable example.	K4	CO5
		(OR)		
	15.b.	Every circuit has an even number of edges in common with every cut-set. Justify.		

SECTION -C (30 Marks)

Answer ANY THREE questions

ALL questions carry EQUAL Marks

(3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Show that $1^2 + 2^2 + \dots + n^2 = \frac{n(n+1)(2n+1)}{6}, n \geq 1$ by mathematical induction.	K4	CO1
2	17	Explain Pigeonhole principal with example.	K4	CO2
3	18	Obtain the principal conjunctive normal form of the formula S given by $(\neg P \rightarrow R) \wedge (Q \Leftrightarrow P)$.	K4	CO3
4	19	Let G be a graph of n vertices. If the sum of the degrees for each pair of vertices in G is n-1 or larger the show that there exists a Hamiltonian path in G.	K4	CO4
5	20	Discuss the properties of trees.	K4	CO5

**PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)**

**BSc DEGREE EXAMINATION MAY 2024
(Second Semester)**

Branch - **COMPUTER SCIENCE WITH DATA ANALYTICS**

PYTHON FOR DATA ANALYSIS

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks

(10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	The length of the character data is a) 0 b) 2 c) 1 d) 4	K1	CO1
	2	Find the output of the following statements >>> a =100 >>> print(a+100) a) 100 b) 0 c) 300 d) 200	K2	CO1
2	3	The function can be defined within a) Class b) Module c) Another function d) All the above	K1	CO2
	4	The Slice operator is used to _____ the character in the string. a) deleted b) extract c) split d) join	K2	CO2
3	5	List l=[] is a) an empty set b) list with one element c) list with null character d) list with one	K1	CO3
	6	Which statement is used to display "ace" from tuple x=("c", "d", "a", "c", "e") a) x[] b) x[:] c) x[2:5] d) x[2:4]	K2	CO3
4	7	Dictionary contains a _____ a) Key b) Value c) Key & value d) Elements	K1	CO4
	8	_____ is used to relocate the file object. a) Open() b) write() c) Seek() d) truncate()	K2	CO4
5	9	What function is used to read a CSV file into a pandas data frames? a) df.describe() b) plt.savefig () c) pd.read_csv () d) np.load ()	K1	CO5
	10	What python library provides interactive and web-based data visualization? a) Plotly b) Seaborn c) Pandas d) Matplotlib	K2	CO5

Cont...

SECTION - B (35 Marks)Answer **ALL** questions**ALL** questions carry **EQUAL** Marks

(5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	State interactive and scripting modes of programming in detail.	K2	CO1
		(OR)		
	11.b.	Explain the concepts of while and for loop.	K2	
2	12.a.	Develop a Python program to find the square root of a number using function.	K2	CO2
		(OR)		
	12.b.	How to traversing string with for and while loop? Discuss with example.	K2	
3	13.a.	Summarise the basic list operations that can be performed in python? Describe it.	K3	CO3
		(OR)		
	13.b.	Define Python tuples. Describe the concepts of accessing values in tuples, updating and deleting tuple elements.	K3	
4	14.a.	What is Dictionary? Explain creating, Adding, formatting and deleting elements from dictionary.	K3	CO4
		(OR)		
	14.b.	Classify the concepts of in operator, not in operator and set operations.	K3	
5	15.a.	Loading and saving data to CSV file – Discuss it.	K4	CO5
		(OR)		
	15.b.	Analyze the methods for combining data from multiple Excel files.	K5	

SECTION -C (30 Marks)Answer **ANY THREE** questions**ALL** questions carry **EQUAL** Marks

(3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Classify the various operators in python with suitable example.	K3	CO1
2	17	Define function and how parameters are passed to function explain with example.	K3	CO2
3	18	Discuss the concepts of list Indices and list slicing.	K4	CO3
4	19	Summarize the concepts of sets in python.	K5	CO4
5	20	Build the steps to preparing data with cleaning, creating and organizing the data.	K5	CO5