

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MCA DEGREE EXAMINATION DECEMBER 2024
(First Semester)

Branch – COMPUTER APPLICATIONS

STATISTICAL METHODS

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(10 × 1 = 10)

Question No.	Question	K Level	CO
1	The relationship between AM, GM and HM is (a) $AM = GM = HM$ (b) $AM > GM > HM$ (c) $AM < GM < HM$ (d) $AM \geq GM \geq HM$	K1	CO1
2	Quartile deviation is equal to (a) interquartile range (b) double the interquartile range (c) half the interquartile range (d) none of the above	K1	CO1
3	If $r = 1$, then the two regression lines are (a) coincident (b) parallel (c) perpendicular to each other (d) zero	K2	CO2
4	The regression coefficient is unaffected by taken of (a) origin (b) scale (c) both (a) and (b) (d) none	K2	CO2
5	If $P(A) = 0.4$ and $P(B) = 0.3$, what is the probability of either event A or event B occurring (assuming they are independent)? (a) 0.7 (b) 0.1 (c) 0.12 (d) 0.72	K3	CO3
6	In a Normal distribution, the value of mean, median and mode are: (a) equal (b) not equal (c) cannot define (d) none of the above	K3	CO3
7	A test based on the test statistic is called (a) randomised test (b) non- randomised test (c) Sequential test (d) none	K4	CO4
8	Student t- test is applicable in the case of (a) large sample test (b) small sample test (c) both (a) and (b) (d) none	K4	CO4
9	Analysis of variance utilizes: (a) t- test (b) chi- square test (c) both (a) and (b) (d) F - test	K5	CO5
10	The non – parametric test is (a) F - test (b) ANOVA (c) t - test (d) Run test	K5	CO5

SECTION - B (35 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 × 7 = 35)

Question No.	Question	K Level	CO
11.a.	Find mean, median and mode for the data given below: 29, 35, 54, 38, 54	K1	CO1
	(OR)		
11.b.	Write a short note on standard deviation	K2	CO2
12.a.	State the properties of correlation coefficient.		
	(OR)		
12.b.	State the properties of regression coefficient. Also write the uses of regression equations.		

Cont...

13.a.	Find the probability of a leap year contains 53 Sundays.	K3	CO3														
(OR)																	
13.b.	Define normal distribution. Also write its properties.																
14.a.	10 objects are chosen at random from a large population and their weights are found to be in grams: 63, 63, 66, 67, 68, 69, 70, 70, 71 and 71. In the light of the above data discuss the suggestion that the mean weight in the universe is 66 grams.	K4	CO4														
(OR)																	
14.b.	In a laboratory experiment, two samples gave the following results: <table><tr><th>Sample</th><th>Size</th><th>Sample mean</th><th>Sum of the square of the deviations from the mean</th></tr><tr><td>1</td><td>10</td><td>15</td><td>90</td></tr><tr><td>2</td><td>12</td><td>14</td><td>108</td></tr></table> Test the equality of sample means at 5% level of significance.			Sample	Size	Sample mean	Sum of the square of the deviations from the mean	1	10	15	90	2	12	14	108		
Sample	Size			Sample mean	Sum of the square of the deviations from the mean												
1	10	15	90														
2	12	14	108														
15.a.	The following table gives the number of aircraft accidents that occurred during the various days of the week: <table><tr><th>Days</th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th></tr><tr><td>No. of accidents</td><td>14</td><td>16</td><td>8</td><td>20</td><td>11</td><td>9</td><td>14</td></tr></table> Find whether the accidents are uniformly distributed over the week.	Days	1	2	3	4	5	6	7	No. of accidents	14	16	8	20	11	9	14
Days	1	2	3	4	5	6	7										
No. of accidents	14	16	8	20	11	9	14										
(OR)		K5	CO5														
15.b.	Write the test procedure of Mann – Whitney U test.																

SECTION -C (30 Marks)

Answer ANY THREE questions

ALL questions carry EQUAL Marks

(3 × 10 = 30)

Ques tion No.	Question										K Level	CO	
16	Calculate the standard deviation and its coefficient for the following data :										K1	CO1	
	Height	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60			
	No.of boys	20	26	44	60	101	109	84	66	10			
17	Find Karl Pearson's coefficient of correlation.										K2	CO2	
	X	10	25	13	25	22	11	12	25	21			20
	Y	12	22	16	15	18	18	17	23	24			17
18	The king , queen and jack of clubs are removed from a deck of 52 playing cards and well shuffled. One card is selected from the remaining cards. Find the probability of getting (i) a heart (ii) a queen (iii) clubs.										K3	CO3	
19	A random sample of 100 persons from town A, 40 are found to be consumers of wheat. In a sample of 80 from town B, 40 are found to be consumers of wheat. Do these data reveal a significant difference between town A and town B so far as the proportion of wheat consumers is concerned?										K4	CO4	
20	A sample analysis of examination results of 500 students was made. It was found that 220 students had failed,170 had secured a third class, 90 were placed in second class and 20 got a first class. Do these figures commensurate with the general examination result which is in the ratio of 4:3:2:1 for the various categories respectively.										K5	CO5	

Z-Z-Z

END

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MCA DEGREE EXAMINATION DECEMBER 2024
(Second Semester)

Branch – COMPUTER APPLICATIONS

MAJOR ELECTIVE COURSE – I : CLOUD ARCHITECTURE AND SERVICES

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	A collection of independent computers act as single coherent system is known as a) Parallel system b) Distributed system c) Centralized system d) Network system	K1	CO1
	2	Amazon Web Services are also called a) Elastic cloud computing and S3 b) Extend Cloud company and S2 c) Enlarged Cloud computing and S3 d) Enterprise Cloud computing and S3	K2	CO1
2	3	Identify which one is not came under a type of virtualization a) Storage b) Network c) Client – Server d) Time and Cost	K1	CO2
	4	The technique of every source instruction is converted into native instruction is a) Interpretation b) Compilation c) Binary translation d) Machine code conversion	K2	CO2
3	5	Choose the cloud which is implemented and accessible to the members of an Institution or subset of them is a) Public Cloud b) Hybrid Cloud c) Community Cloud d) Private Cloud	K1	CO3
	6	Select the example of Science Cloud a) Private Cloud b) Community Cloud c) Public Cloud d) Hybrid Cloud	K2	CO3
4	7	Select the correct one that is used to schedule the required operation in desired time a) Cron jobs b) Task queues c) Periodic Jobs d) Priority queues	K1	CO4
	8	App Fabric is a comprehensive a) software b) hardware c) middleware d) none of these	K2	CO4
5	9	The agreement between cloud providers allows them to leverage each other services is called a) cloud federation b) cloud forum c) cloud community d) cloud globe	K1	CO5
	10	Select which is not a component of RESERVOIR a) service manager b) VEE manager c) VEE Host d) VM Host	K2	CO5

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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.	Prepare a note for Virtualization technique in cloud computing.	K4	CO1
		(OR)		
	11.b.	Examine how to provide utility oriented computing.		
2	12.a.	Infer the conceptual descriptions of Hypervisors.	K4	CO2
		(OR)		
	12.b.	Criticize the scenario of Hardware virtualization technique.		
3	13.a.	Describe the candidate sectors of community cloud.	K5	CO3
		(OR)		
	13.b.	Analyze the Security, Trust and Privacy issues of cloud.		
4	14.a.	Classify six major components of EC2 instances.	K5	CO4
		(OR)		
	14.b.	Sketch the different types of storage solutions provided by Azure.		
5	15.a.	Appraise the recent development of Energy-aware Dynamic Resource Allocation.	K6	CO5
		(OR)		
	15.b.	Test the challenges addressed by logical and operational level of cloud federation stack.		

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	Elucidate how the cloud computing environment provides solution for application development and systems.	K4	CO1
2	17	Distinguish the Pros and Cons of Virtualization technique.	K4	CO2
3	18	Appraise the economic benefits of cloud computing.	K5	CO3
4	19	Apply the relational database service hosted by Windows Azure in detail.	K5	CO4
5	20	Inspect the deployment and architecture of RESERVOIR federation.	K6	CO5

(AUTONOMOUS)

MCA DEGREE EXAMINATION DECEMBER 2024

(Third Semester)

Branch – **COMPUTER APPLICATIONS**

ARTIFICIAL INTELLIGENCE

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer ALL questions

ALL questions carry **EQUAL** marks

$$(10 \times 1 = 10)$$

Module No.	Question No.	Question	K Level	CO
1	1	Which of the following is an example of an uninformed search strategy? a) A* Search b) Greedy Best-First Search c) Depth-First Search d) Hill Climbing	K1	CO1
	2	What distinguishes an informed search strategy from an uninformed one? a) Use of a queue to store nodes b) Use of a heuristic function to estimate the cost c) Exploration of all possible nodes d) Utilization of random moves	K2	CO1
2	3	In the context of adversarial search, what is the primary purpose of alpha-beta pruning? a) To find the optimal move by exploring all possible nodes b) To reduce the number of nodes evaluated in the search tree c) To enhance the heuristic function d) To implement randomness in decision-making	K1	CO2
	4	Which of the following best describes backward chaining in inference for first-order logic? a) Starting from known facts and applying inference rules to derive new facts b) Starting from a goal and working backwards to determine the necessary conditions c) Enumerating all possible inferences from the knowledge base d) Using unification to match predicates	K2	CO2
3	5	Which of the following is a supervised learning algorithm? a) K-Means Clustering b) Decision Trees c) Apriori Algorithm d) Principal Component Analysis	K1	CO3
	6	In the context of artificial neural networks, what is the role of the activation function? a) To initialize the network weights b) To propagate input data through the network c) To introduce non-linearity into the network d) To perform backpropagation	K2	CO3
4	7	Which of the following is a primary task of natural language processing (NLP)? a) Image Recognition b) Text Classification c) Path Planning d) Robot Navigation	K1	CO4
	8	In speech recognition, what is the primary challenge that systems must overcome? a) Understanding grammar rules b) Converting text to speech c) Handling variations in pronunciation and accents d) Translating languages	K2	CO4

Cont...

5	9	Which component of robot hardware is primarily responsible for processing information and making decisions? a) Actuators b) Sensors c) Central Processing Unit (CPU) d) Power Supply	K1	CO5
	10	In robotics, what is the primary purpose of perception systems? a) To execute movement commands b) To interpret sensory data and understand the environment c) To provide power to the robot d) To store data	K2	CO5

SECTION - B (35 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks

$$(5 \times 7 = 35)$$

Module No.	Question No.	Question	K Level	CO
1	11.a.	Develop the difference between an agent and its environment in the context of intelligent agents.	K3	CO1
	(OR)			
	11.b.	Build two uninformed search strategies and discuss their advantages and disadvantages.		
2	12.a.	Dissect the concept of stochastic games in adversarial search. How do they differ from deterministic games?	K4	CO2
	(OR)			
	12.b.	Divide the difference between forward chaining and backward chaining in knowledge-based agents.		
3	13.a.	Evaluate the process of learning decision trees in supervised learning. Include the steps involved in building the tree.	K5	CO3
	(OR)			
	13.b.	Opinion the difference between supervised and unsupervised learning. Provide examples of each.		
4	14.a.	Determine the process of syntactic analysis in natural language processing.	K5	CO4
	(OR)			
	14.b.	Deduct the basic steps involved in image formation and early image processing operations in computer vision.		
5	15.a.	Elucidate the key components of robot perception.	K6	CO5
	(OR)			
	15.b.	Propose the challenges involved in planning uncertain movements for robots.		

SECTION -C (30 Marks)

Answer **ANY THREE** questions

ALL questions carry **EQUAL** Marks

$$(3 \times 10 = 30)$$

Module No.	Question No.	Question	K Level	CO
1	16	Elaborate the role of heuristic functions in informed search strategies.	K3	CO1
2	17	Compare and contrast propositional logic and first-order logic in the context of knowledge representation.	K4	CO2
3	18	Prioritize the architecture of artificial neural networks and explain how they learn from examples?	K5	CO3
4	19	Justify the challenges and techniques involved in machine translation.	K5	CO4
5	20	Originate the importance of robotic software architectures in the development of intelligent robots.	K6	CO5

Z-Z-Z

END

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
MCA DEGREE EXAMINATION DECEMBER 2024
(Third Semester)

Branch – **COMPUTER APPLICATIONS**
PYTHON FOR MACHINE LEARNING

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	Find the open source tool used for Data Mining. a) Rapid miner b) Apple c) 7 point d) MangoDB	K1	CO1
	2	Extend a machine learning model has been run on clean data does not mean that the work of the ____ is done and dusted. a) data scientist b) data analytics c) deep learning d) data science	K2	CO1
2	3	What an important fact to remember about ____ is that it is a dynamically typed language. a) Python b) Data type c) Strings d) variables	K1	CO2
	4	Explain ____ enables us to carry out computational tasks with data in a very effective way. a) linear algebra b) non - linear c) algebra d) non- linear algebra	K2	CO2
3	5	Choose the field of ____ is thus interested in the systematic detection of regularities in a dataset, based on the use of algorithms. a) pattern recognition b) pattern evaluation c) pattern matching d) pattern letters	K1	CO3
	6	Demonstrate a common way to create new features is via ____ that make the variables suitable for exploitation by a particular algorithm. a) mathematical transformations b) transformations c) mathematical fuzzy d) fuzzy set	K2	CO3
4	7	____ is a data exploration technique. a) supervised b) un-supervised c) k-means d) clustering	K1	CO4
	8	____ similarity is given by the distance between data instances. a) cross-validation b) distance measure c) bias low d) KNN	K2	CO4
5	9	The result of hierarchical clustering are represented by a ____. a) Tree b) Mapping c) Decision –making d) dendrogram	K1	CO5
	10	____ minimises the generalisation error associated with the geometrical notion of a margin. a) Bagging b) Boosting c) Random forests d) support vector machine	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.	Spell out the objective of the data science team.	K1	CO1
		(OR)		
	11.b.	Outline the data science workflow in details.	K2	
2	12.a.	Find out the python basic types.	K1	CO2
		(OR)		
	12.b.	Simplify the linear algebra in machine learning.	K4	
3	13.a.	Explain the recognizing of patterns in machine learning.	K2	CO3
		(OR)		
	13.b.	Classify the k-fold cross validation of machine leaning.	K4	
4	14.a.	Identify the k-means in the action of clustering.	K3	CO4
		(OR)		
	14.b.	Explain the Naïve Bayes in Action of classification.	K2	
5	15.a.	Explain the hierarchical clustering.	K2	CO5
		(OR)		
	15.b.	Justify the SVM in action of classification.	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	List the characteristics of a data scientist.	K1	CO1
2	17	Classify the control flow functions and scripts.	K2	CO2
3	18	Explain the machine learning and data science in the process of feature selection.	K2	CO3
4	19	Analyze the clustering techniques with k-means algorithm.	K4	CO4
5	20	Build the SVM and kernel methods in details.	K6	CO5

Z-Z-Z

END

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MCA DEGREE EXAMINATION DECEMBER 2024
(Third Semester)

Branch – COMPUTER APPLICATIONS

MAJOR ELECTIVE COURSE - II BLOCK CHAIN TECHNOLOGY

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	In blockchain, hash pointers are primarily used for _____. a) Identifying blocks b) Encrypting transactions c) Storing user information d) Linking blocks together	K1	CO3
	2	Which of the following is a challenge in traditional financial arrangements? a) High transaction speed b) Centralized control c) Complete transparency d) No transaction fees	K2	CO1
2	3	What is the key difference between hot storage and cold storage? a) Hot storage is offline, cold storage is online b) Hot storage is connected to the internet, cold storage is offline c) Cold storage is faster to access than hot storage d) Both refer to online options	K1	CO5
	4	Which of the following is a key feature of crypto currency payment services? a) Instant verification of identity b) Requirement of a central authority c) Decentralized processing of transactions d) Centralized transaction verification	K2	CO6
3	5	Which technology has been proposed to improve Bitcoin's scalability? a) Proof of Stake b) Sharding c) Centralized mining d) Lightning Network	K1	CO4
	6	In Bitcoin transactions, what is an input? a) The private key of the sender b) The output from a previous transaction c) The recipient's address d) The Bitcoin transaction fee	K2	CO1
4	7	What is Bitcoin Core? a) A Bitcoin hardware wallet b) A decentralized exchange for trading Bitcoin c) The open-source software that implements Bitcoin protocol d) The Bitcoin transaction fee	K1	CO5
	8	Which one of the following statements of Bitcoin anonymity is true? a) Bitcoin is completely anonymous b) Bitcoin transactions are always untraceable c) Bitcoin requires users to provide identity verification for all transaction d) Bitcoin provides pseudonymity, but transactions can be traced	K2	CO1
5	9	Which of the following is considered one of the earliest Altcoins? a) Ethereum b) Litecoin c) Ripple d) Dogecoin	K1	CO2

Cont...

5	10	What is Smart Contract? a) A traditional legal contract enforced by the blockchain b) A document that must be signed before cryptocurrency trading c) A self-executing contract with the terms of the agreement directly written into code d) A contract that requires miners to approve transactions	K2	CO5
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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.	Identify the security vulnerabilities of using Credit Card Online.	K3	CO3
	(OR)			
	11.b.	How cryptographic hash functions SHA-256 are used in the process of mining in Bitcoin? Explain.		
2	12.a.	Analyze the limitations of blockchain-based payment systems.	K4	CO4
	(OR)			
	12.b.	Discuss the impact of volatility in cryptocurrency markets.		
3	13.a.	Identify the security features of Bitcoin transactions. Explain.	K3	CO2
	(OR)			
	13.b.	Discuss the various applications of Bitcoin scripts in real-world use cases.		
4	14.a.	Illustrate the function and role of Bitcoin Core Software in the Bitcoin ecosystem.	K2	CO1
	(OR)			
	14.b.	Summarize on Roots of Bitcoin.		
5	15.a.	How Bitcoin-backed Altcoins integrate with decentralized finance (DeFi) ecosystems? Analyze.	K4	CO4
	(OR)			
	15.b.	Discuss the key challenges and risks associated with the deployment of smart contracts on the Ethereum blockchain.		

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	What do you mean by Digital Signature? Differentiate private and public keys in digital signatures.	K4	CO3
2	17	Discuss the advantages and disadvantages of decentralization in blockchain networks.	K4	CO2
3	18	Evaluate different strategies used by miners to maximize profitability.	K5	CO5
4	19	Analyze the impact of De-anonymization on the cryptocurrency ecosystem.	K4	CO4
5	20	Evaluate the trade-offs between security and scalability in sidechain adoption.	K5	CO4

Z-Z-Z

END