Test Booklet No. _____
This booklet consists of 150 questions and 27 printed pages.

RGUPET/2024/__/_

RGUPET 2024
Common Entrance Test, 2024
DOCTOR OF PHILOSOPHY IN COMPUTER SCIENCE AND ENGINEERING

Full Marks: 150   **Time: 3 Hours**

Roll No. ☐☐☐☐☐☐☐☐

Day and Date of Examination: _____

Signature of Invigilator(s) _____

Signature of Candidate _____

_____
General Instructions:

PLEASE READ ALL THE INSTRUCTIONS CAREFULLY BEFORE MAKING ANY ENTRY.

1. DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE TOLD TO DO SO.
2. Candidate must write his/her Roll Number on the space provided.
3. This Test Booklet contains 150 Multiple Choice Questions (MCQs) from the concerned subject. Each question carries 1 mark.
4. Please check the Test Booklet to verify that the total pages and total number of questions contained in the test booklet are the same as those printed on the top of the first page. Also check whether the questions are in sequential order or not.
5. Candidates are not permitted to enter into the examination hall after the commencement of the entrance test or leave the examination hall within two hour.
6. Making any identification mark in the OMR Answer Sheet or writing Roll Number anywhere other than the specified places will lead to disqualification of the candidate.
7. Candidates shall maintain silence inside and outside the examination hall. If candidates are found violating the instructions mentioned herein or announced in the examination hall, they will be summarily disqualified from the entrance test.
8. In case of any dispute, the decision of the Entrance Test Committee shall be final and binding.
9. The OMR Answer Sheet consists of two copies, the Original copy and the Student's copy.

#	Question				Answer
1	Which of the following dams is not on Narmada river?				d
	a) Indira-Sagar Project	b) Maheshwar Hydel Power Project	c) Jobat Project	d) Koyna Power Project	Koyna Power Project
2	The area covered by forest in India is about:				c
	a) 46%	b) 33%	c) 23%	d) 19%	23%
3	In 2019, Which popular singer was awarded the Bharat Ratna award?				c
	a) Lata Mangeshkar	b) Asha Bhosle	c) Bhupen Hazarika	d) Manna Dey	Bhupen Hazarika
4	What is the full form of DRDL? None of the above				b
	a) Differential Research and Documentation Laboratory	b) Department of Research and Development Laboratory	c) Defense Research and Development Laboratory	d) Directorate of Research and Development Laboratory	Department of Research and Development Laboratory
5	The green planet in the solar system is?				b
	a) Mars	b) Uranus	c) Venus	d) Earth	Uranus
6	Recently, William Lai Ching-Te has become new President of which country?				Answer option (b)
	a)Philippines	b)Taiwan	c)Thailand	d)Indonesia	Taiwan
7	What is the theme for 'World Food Safety Day 2024'?				Answer option (a)
	a)Prepare for the unexpected	b)Food Standards Save Lives	c)Safer food, better health	d)Safe food today for a healthy tomorrow Show Answer	Prepare for the unexpected
8	Which regulatory body recently launched 'Saarthi 2.O' mobile app for investors?				Answer option (b)
	a)RBI	b)SEBI	d)NABARD	d)FCI	SEBI
9	Match the following:				Answer option (c)

A. Sukhbir Singh Gill, who passed away recently, was associated with which sports?	i Archery
B. Mandeep Jangra, who was seen in the news, associated with which sports?	ii Hockey
C. Sarita and Rakesh Kumar, who won medals for India recently, play which sports?	iii Swimming
D. Leon Marchand	iv Boxing

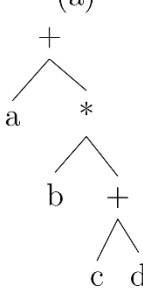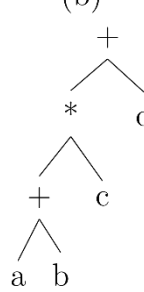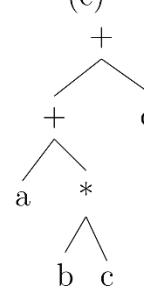|					
	a) A-iii, B-iv, A-ii, D-i	b) A-iv, B-iii, A-ii, D-i	c) A-ii, B-iv, A-i, D-iii	d) A-ii, B-i, C-iv, D-iii	A-ii, B-iv, A-i, D-iii
10	Choose the True statements from the following: A. Dipa Karmakar of Tripura made history by becoming the first Indian gymnast to win gold at the Asian Championships. B. Narva River, recently seen in the news, is a disputed river between India and China. C. ZiG currency, recently seen in news, is a new gold-backed currency launched by Kenya. D. Kabak Yano, a mountaineer and cricketer, made history as the first Nyishi tribe woman and fifth woman from Arunachal Pradesh to scale Mt. Everest.					Answer option (b)
	a) A, C	b)A,D	c) B, C	d) B, D	A,D
11	Please, come _____ the car					Answer option b
	a) from	b) out of	c) in	d) onto	out of
12	Find the word whose meaning is nearest to the word: DIVERSION					Answer option c
	a) Arrival	b)street	c) deviation	d) turning	deviation
13	Correct the underlined phrase The person <u>to who I sold</u> my car was a hard bargainer.					Answer option b
	a) to who I sell	b) to whom I sold	c) to whom I sell	d) whom I sold	to whom I sold
14	Choose a word below that is closest to the meaning of the underlined phrase. The Indian electorate should <u>do away with</u> divisive politics.					Answer option c
	a) imbibe	b) impede	c) abolish	d)ignore	abolish
15	Match the following columns: A. Conjunction i.huge B. Preposition ii.too C. adverb iii.and D. adjective iv.to					Answer option a
	a) A-iii, B-iv, C-ii, D-i	b) A-iii, B-ii, C-iv, D-i	c) A-iv, B-i, C-iii, D-ii	d)A-iv, B-iii, C-i, D-ii	A-iii, B-iv, C-ii, D-i
16	Find the word whose meaning is OPPOSITE of the word : IMPEDIMENT					Answer option d
	a) hindrance	b) blockage	c) restriction	d) benefit	benefit
17	4, 27, 16, 125……….? What is the next series?					Answer option (c)
	a) 32	b) 46	c) 36	d) 52	c) 36
18	In a code, CORNER is written as GSVRIV. How can CENTRAL be written in that code?					Answer option (b)
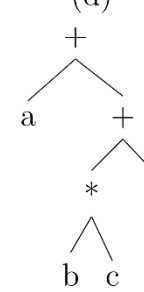
	a) DFOUSBM	b) GIRXVEP	c) GNFJKER	d) None of these	b) GIRXVEP
19	Which of following word pairs is mismatched? A. Grain: Granary B. Horse: Sty C. Family: House D. Weapons: Arsenal				Answer option b
	a) D only	b) B only	c) B and D only	d) A and B only	B only
20	Mr Deepak Mohan walks 5 km towards the south and then turns to the right. After walking 3 km he turns to the left and walks 5 km. What direction is he facing right now?				Answer option (b)
	a) West	b) South	c) North-East	d) South-West	b) South
21	What is the purpose of a literature review in thesis planning?				Answer option (b)
	a) To provide a biography of the author	b) To identify gaps in existing research	c) To summarize research findings	d) To outline the methodology	To identify gaps in existing research
22	What is the significance of defining the scope of your research?				Answer option (d)
	a) To make the research more theoretical	b) To make the research more general	c) To include as many hypotheses as possible	d) To ensure the research stays relevant and focused	To ensure the research stays relevant and focused
23	What is the primary goal of the introduction section in a thesis?				Answer option (a)
	a) To introduce the research question and objectives	b) To present the most significant findings	c) To review the literature	d) To describe the methodology	To introduce the research question and objectives
24	What is the primary objective of the discussion section in a thesis?				Answer option (c)
	a) To restate the research question	b) To present a discussion on the literature review	c) To interpret and analyze the findings	d) To describe the methodology	To interpret and analyze the findings
25	Match List-I with List-II				Answer option (c)

List–I (Citation Styles)	List – II (Bibliography format)
A. APA	i. Author's Last Name, First Initial. (year of publication). Title of the Book in italics and title case. Edition (if any). Place of publication: Publisher.

B. MLA	ii. Author's Last name, First name. Title of the Book in italics and title case. publisher, year of publication.			
C. Chicago	iii. Author's Last Name, First Initial. (Year of publication). Title of the book in italics and sentence case. Publisher.			
D. Harvard	iv. Author's Last Name, First Name. Title of the Book in italics and title case. Place of publication: Publisher, year of Publication.			

Choose the correct answer from the options given below:

a) A->i, B->ii, C->iii, D->iv	b) A->i, B->iii, C->ii, D->iv	c) A->iii, B->ii, C->iv, D->I	d) A->iii, B->ii, C->i, D->iv	A->iii, B->ii, C->iv, D->I

26	What is plagiarism in the context of thesis writing?				Answer option (b)
	a) Including too many citations	b) Using someone else's work without acknowledgement	c) Too many spelling and grammatical errors	d) Using statistical analysis tools	Using someone else's work without acknowledgement
27	What is a patent?				Answer option (a,b,c or d)
	a) A government document for business registration	b) A form of copyright	c) A type of trademark	d) A legal right granted for an invention	(d)
28	Which international agreement aims to streamline the process of obtaining patents globally?				Answer option (a,b,c or d)
	a) Paris Convention	b) Patent Cooperation Treaty (PCT)	c) Madrid Protocol	d) Hague Agreement	(b)
29	Which aspect of IPR is primarily affected by the "open source" movement in software development?				Answer option (a,b,c or d)
	a) Copyright Enforcement	b) Trade secret management	c) Trademark protection	d) Patent licensing	(d)
30	Which Indian act governs the protection of patents?				Answer option (a,b,c or d)

	a) The Designs Act, 2000	b) The Trademarks Act, 1999	c) The Patents Act, 1970	d) The Indian Copyright Act, 1957	(c)
31	Consider the following: 1. Aarogya Setu 2. CoWIN 3. DigiLocker 4. DIKSHA Which of the above are built on the top of open-source digital platforms?				Answer option d
	a) 1 and 2 only	b) 2, 3 and 4 only	c) 1, 3 and 4 only	d) 1, 2, 3 and 4	1, 2, 3 and 4
32	A licensing agreement allows a company to:				Answer option (b)
	a)Gain exclusive ownership rights to a patented technology.	b)Use a patented technology for a defined period under specific terms.	c)Publicly disclose and distribute the details of a patented technology.	d)Challenge the validity of a patent granted by the government.	Use a patented technology for a defined period under specific terms.
33	Match the Columns value on the left with correct values on the right: 	A Scope of Patent Rights	i Exclusive right to control an invention within a country.					B Licensing	iiPublicly available databases containing invention details.		C Patent Information Databases	iiiLegal protection for products linked to a specific origin.		D Geographical Indications	ivAgreements granting permission to use a patented invention.					Answer option (d)
	a)d)A-iv,B-i,C-ii, D-iii	b)d)A -i,B-iii,C-ii, D-iv	c)d)A -ii,B-iv,C-i, D-iii	d)A -i,B-iv,C-ii, D-iii	A -i,B-iv,C-ii, D-iii
34	Instructions: Indicate whether the following statements about patent rights are True or False. A A patent grants its owner the right to use their invention for 20 years anywhere in the world. B Licensing a patent involves selling all ownership rights to the invention. C Patent databases are a valuable resource only for companies with existing patents. D Geographical Indications (GIs) protect the names of famous brands.				Answer option (a)
	a) A-False, B-False, C-False, D-False	b)A-False, B-False, C-True, D-False	c)A-False, B-False, C-False, D-True	d)A-True, B-True, C-False, D-False	A-False, B-False, C-False, D-False
35	Assertion (A): A patent grants its owner the exclusive right to import an invention into their country. Reason (R): Patents are territorial rights, meaning they only apply within the country where they are granted.				Answer option (b)
	a)Both A and R are true, but R isthe ONLY	b)Both A and R are true, but R is not the ONLY	c) A is True and R is False	d) A is False and R is False	Both A and R are true, but R is not

		explanation of A.	explanation of A.			the ONLY explanation of A.
36	Which of the following is a popular free database for searching patent information worldwide?					Answer option (a)
	a)Google Scholar	b)WIPO's PatentScope	c)ScienceDirect	d)USPTO's		Google Scholar
37	Geographical Indications protect:					Answer option (a)
	a)Any product or service associated with a particular geographical location.	b)All scientific discoveries and inventions originating from a specific region.	c)Trademarks and brand names used by companies in a particular country.	d)The copyright of creative works produced by individuals in a specific area.		Any product or service associated with a particular geographical location.
38	Match the Columns value on the left with correct values on the right: A Territorial rights — i. Requirement for an invention to be new and not publicly known. B Patent infringement — ii Permission to use a patented invention for a specific purpose. C Novelty — iii Transfer of all ownership rights of a patent. D Assignment — iv Legal violation of patent rights by unauthorized use.					Answer option (d)
	a)A-i, B-iv, C-ii, D-iii	b)A-ii, B-v, C-iv, D-iii	c)A-iii, B-iv, C-i, D-ii	d)A-ii, B-iv, C-i, D-iii		A-ii, B-iv, C-i, D-iii
39	Instructions: Indicate whether the following statements about patent rights are True or False. A An invention must be commercially successful to be patentable. B You can keep your invention secret to maintain protection instead of filing a patent. C The inventor must be the first to file a patent application to secure rights. D Patent infringement occurs only when someone intentionally copies a patented invention.					Answer option (a)
	a)A-False, B-False, C-True, D-False	b)A-False, B-False, C-True, D-True	c)A-True, B-False, C-True, D-False	d)A-False, B-True, C-True, D-False		A-False, B-False, C-True, D-False
40	Assertion (A): Licensing a patent allows another party to use the invention for a fee. Reason (R): The patent owner retains ownership but grants permission for specific use.					Answer option (a)
	a)Both A and R are true, and R is the correct explanation of A.	b)Both A and R are true, and R is not the correct explanation of A.	c)Both A and R are false, and R is the correct explanation of A.	d)Both A and R are true, and R is not the correct explanation of A.		Both A and R are true, and R is the correct explanation of A.
41	Which of the following is NOT protected by a patent?					Answer option (b)

	a) A new and innovative machine.	b) A creative artistic work	c) A unique chemical compound.	d) A non-obvious improvement to an existing invention.	A creative artistic work
42	Why do you need to review the existing literature?				Answer option (c)
	a) To make sure you have a long list of references	b) Because without it, you could never reach the required word-count	c) To find out what is already known about your area of interest	d) To help in your general studying	To find out what is already known about your area of interest
43	Research is				c
	a) Searching again and again	b) Finding solution to any problem	c) Working in a scientific way to search for truth of any problem	d) None of the above	Working in a scientific way to search for truth of any problem
44	What are the conditions in which Type-I error occurs? **A:** The null hypotheses get accepted even if it is false. **B:** The null hypotheses get rejected even if it is true				b)
	a) A is True	b) B is True	c) Both A and B are True	d) None of the above	B is True
45	A statement of the quantitative research question should: **A:** Extend the statement of purpose by specifying exactly the question(s) the researcher will address. **B:** Help the research in selecting appropriate participants, research methods, measures, and materials.				d)
	a) A is True	b) B is True	c) None are True	d) Both A and Bare True	Both A and Bare True
46	Match the following:				a)

A.	Literature Review	i.To make sure you have a long list of references
B.	Problem Statement	i.Brief summary about research
C.	Bibliography	i.To find out what is already known about your area of interest
D.	Abstract	v.To help in your general studying

	a) A-iii, B-iv, C-i, D-ii	b) A-i, B-iv, C-ii, D-iii	c) A-ii, B-iv, C-i, D-iii	d) A-ii, B-i, C-iv, D-iii	A-iii, B-iv, C-i, D-ii
47	Survey is a …………… Study				b)
	a) Descriptive	b) Fact finding	c) Analytical	d) Systematic	Fact finding
48	**A) Assertion:** In order to pursue the research, formulating a research hypothesis is priorly required? **R) Reason:** Research hypothesis is an essential part of research study				c)
	a) A is True	b) R is True	c) Both are True	d) None are True	Both are True
49	What are the core elements of a Research Process?				(d)

	a) Introduction; Data Collection; Data Analysis; Conclusions and Recommendations	b) Executive Summary; Literature Review; Data Gathered; Conclusions; Bibliography	c) Research Plan; Research Data; Analysis; References	d)Introduction; Literature Review; Research Methodology; Results; Discussions and Conclusions	Introduction; Literature Review; Research Methodology; Results; Discussions and Conclusions

50	The essential elements of a research design are: A. Final assessments and conclusions B. Purpose statement C. Types of research methodology D. Free from bias and neutral **Choose the most appropriate answer from the options given below:**	Answer option

	a) A and C only	b) A and D only	c) B and C only	d) B and D only	**c**

51	For the arithmetic expression a + b * c + d, which parse tree is correct?	Answer option c

	a) Left associativity of both + and *	b) Right associativity of both + and *	c)Left associativity of +, * and higher precedence of *	d) Right associativity of + and higher precedence of *	Left associativity of +, * and higher precedence of *

52	The lexical analysis phase of a compiler uses the _____ computational model.	d

	a)Pushdown Automata	b) Linear Bounded Automata	c)Deterministic Infinite Automata	d) Finite Automata	Finite Automata

53	The regular grammar is closed under which of the following operations? A. union B. intersection C. kleene star D. concatenation	Answer option d

	a) A, C and D only	b) A, B, C only	c) A, B and D only	d) A, B, C and D	A, B, C and D

54	Questions here for assertion and justification A: Language L ={$a^n b^n c^n$: n > 1} is context free. B: Pumping lemma for context free languages proves that language L is context free.	Answer option b

	a) (A) is true and (B) is the correct explanation	b) Both (A) and (B) are false.	c) (A) is false but (B) is true	d) (A) is true but (B) is not the correct explanation	Both (A) and (B) are false.
55	Match the following: A. Token — i. flex Linux Program B. Abstract Syntax Tree — ii. Lexical Analyzer C. Lexical Analyzer Generator — iii. YACC Linux Program D. Parser Generator — iv. Syntax Analyzer				Answer option a
	a) A-ii, B-iv, C-i, D-iii	b) A-ii, B-i, C-iii, D-iv	c) A-iv, B-i, C-ii, D-iii	d) A-iv, B-i, C-iii, D-ii	A-ii, B-iv, C-i, D-iii
56	Which of the following options below correctly describe the language recognized by the following automata?				Answer option d
	a)Binary strings starting with 0 only.	b) Binary strings starting with 1 only	c)Binary strings starting with 0 and ending with 1.	d)Binary strings ending with 1 only	Binary strings ending with 1 only
57	Which of the following problems are undecidable? A. Whether a context-free grammar is ambiguous B. Whether a string belongs to a context free language C. Whether two context free languages are equal D. Whether a language is finite				Answer option d
	a) A only	b) A and B only	c) A and C only	d) A, C and D only	A, C and D only
58	 Regular expression for the above finite state automata is _____				Answer option a
	a) ϵ	b) ϕ	c) $\epsilon\phi$	d)$\phi\epsilon$	ϵ
59	Consider the following four statements in three address code in the first column and the corresponding optimizations performed by the compiler				Answer option b

in the second column. Identify which of the compiler optimizations are arithmetic simplifications.

	Three address code	Local Optimization
A.	$a = b * 64$	$a = b << 5$
B.	$a = a - (- b)$	$a = a + b$
C.	$a = b * 0$	$a = 0$
D.	$a = 2 + 3$	$a = 5$

a) A only	b) A and B only	c) A, B and C only	d)A, B, C and D	A and B only

60	Consider a machine with a load/store architecture in which arithmetic operations can contain either registers or immediate operands only. Then, the minimum number of registers required for code generation of the expression $(x+2) / (((y - z) * 5) + w)$ is _____	Answer option d
	a) 5 b) 4 c) 3 d) 2	2
61	Consider the basic block B1 below: $p = q + r$ $s = p + q$ $u = s * v$ If we define use_{B1} as the set of variables whose values may be used in B1 prior to any definition of the variable, then use_{B1} contains _____ variables.	Answer option c
	a) 5 b) 4 c) 3 d) 2	3

62	In the ANSI C code fragment below, assume that variable y points to struct containing a field f1.
	
	$z = y \rightarrow f1 + k - 2;$
	
	   for (i = 0; i< 100; i = i + 1)
	   {
	      $p = p + k - 2;$
	      $q = q + y \rightarrow f1;$
	   }
	After common sub-expression elimination optimization is applied to the above code, the number of dereference operations $y \rightarrow f1$ in the optimized code is:
		Answer option b

	a) 101 b) 1 c) 2 d) 100	1
63	If a B+ tree can contain a maximum of 7 pointers in a node, then what is the minimum number of keys in leaves?	Answer option (a)
	a) 3 b) 4 c) 6 d) 7	3
64	Find matching pairs:	Answer option (b)

A Eulerian Path	i. A graph that can be drawn on a plane without any edges crossing.
B Hamiltonian Cycle	ii. A path in a graph that visits every vertex exactly once and returns to the starting vertex.

	CPlanar Graph	iii. A path in a graph that visits every edge exactly once.		
	D Bipartite Graph	iv. A graph whose vertices can be divided into two disjoint sets such that no two graph vertices within the same set are adjacent.		
	a) A-iv, B-ii, C-i, D-iii	b) A-iii, B-ii, C-i, D-iv	c) A-iii, B-i, C-ii, D-iv	d) A-iii, B-iv, C-ii, D-i	A-iii, B-ii, C-i, D-iv

65	Following statements are either True or False. A. Divide and Conquer algorithms solve problems by breaking them into smaller subproblems of different types. B. The Merge Sort algorithm is an example of a Divide and Conquer algorithm. C. The time complexity of a Divide and Conquer algorithm is always linear. D. In Divide and Conquer, the solutions to subproblems are combined to solve the original problem. Choose the correct answers from options given below:				Answer option (c)
	a) A & D only	b) B & D only	c) A & C only	d) A,B & C only	A & C only
66	Assertion (A) : All NP-Complete problems are NP-Hard. Justification (B) : NP-Complete problems are the hardest problems in NP, and a solution for any NP-Complete problem can be verified in polynomial time.				Answer option (a)
	a) Both A and B are true, and B is the correct explanation of A.	b) Both A and B are true, but B is not the correct explanation of A.	c) A is true, but B is false.	d) A is false, but B is true.	Both A and B are true, and B is the correct explanation of A.
67	How many distinct solutions exist for an 8-queen problem?				Answer option (d)
	a) 8	b) 12	c) 98	d) 92	92
68	The complete graph with 4 vertices has nnumber of edges, where n is ___ .				Answer option (d)
	a) 3	b) 4	c) 5	d) 6	6
69	How many edges are there in a forest of t-trees containing a total of n vertices?				B
	a)n + t	b) n -t	c)n * t	d)n^t	n -t
70	Let f and g be the functions from the set of integers to the set integers defined by $f(x) = 2x + 3$ and $g(x) = 3x + 2$ Then the composition of f and g and g and f is given as				a
	a)	b) 6x + 11, 6x + 7	c)5x + 5, 5x + 5	d)None of the above	6x+7, 6x+11
71	Assertion (A): If the primal Linear Programming problem has an unbounded solution.				a

	Reason (R): Then its dual problem will have no bounded solution at all.				
	a) Both A and R are true and R is the correct explanation of A.	b) Both A and R are true but R is not the correct explanation of A.	c) A is true but R is false	d)A is false but R is true.	Both A and R are true and R is the correct explanation of A.
72	Given a flow graph with 10 nodes,13 edges and one connected components, the number of regions and the number of predicate (decision) nodes in the flow graph will be				b
	a)4, 5	b) 5, 4	c)3, 1	d)13, 8	5, 4
73	A _____ complete subgraph and a _____ subset of vertices of a graph $G = (V, E)$ are a clique and a vertex cover respectively.				b
	a)minimal, maximal	b) minimal, minimal	c)maximal, maximal	d)maximal, minimal	minimal, minimal

74	Match the number of vertices with their characteristics		c

1. 5 vertices	a) 2 vertices of degree 4, 1 vertex of degree 3, 1 vertex of degree 2, rest degree 1
2. 6 vertices	b) 2 vertices of degree 4, 1 vertex of degree 3, 1 vertex of degree 2, rest degree 1
3. 7 vertices	c) 2 vertices of degree 4, 1 vertex of degree 3, 1 vertex of degree 2, rest degree 1
4. 8 vertices	d) 2 vertices of degree 4, 1 vertex of degree 3, 1 vertex of degree 2, rest degree 1

	a) 1-a, 2-b, 3-c, 4-d	b) 1-a, 2-b, 3-d, 4-c	c) 1-b, 2-c, 3-a, 4-d	d) 1-a, 2-c, 3-b, 4-d	1-b, 2-c, 3-a, 4-d
75	Which one of the following is NOT necessarily a property of a Group? A. Commutativity B. Associativity C. Existence of inverse for every element				a

	D. Existence of identity				
	a)A only	b) B only	c)A and C	d)D and B	A only
76	Match the size of the smallest MIS (Maximal Independent Set) with the corresponding description				a

1.	3 nodes	a)	A chain of nine nodes
2.	4 nodes	b)	A chain of eight nodes
3.	5 nodes	c)	A chain of seven nodes
4.	6 nodes	d)	A chain of six nodes

	a) 1-c, 2-d, 3-a, 4-b	b) 1-a, 2-b, 3-d, 4-c	c) 1-b, 2-c, 3-a, 4-d	d) 1-a, 2-c, 3-b, 4-d	1-c, 2-d, 3-a, 4-b
77	Let S be a set of n elements. The number of ordered pairs in the largest and the smallest equivalence relations on S is				b
	a)n and n	b) n^2 and n	c)n^2 and 0	d)n and 1	n^2 and n
78	Convert Cartesian coordinates (2, 6, 9) to Cylindrical and Spherical Coordinates.				d
	a)(6.32, 71.565, 6.32) and (11, 71.565, 35.097)	b) (6.32, 71.565, 9) and (6.32, 71.565, 35.097)	c)(6.32, 71.565, 6.32) and (6.32, 35.097, 71.565)	d)(6.32, 71.565, 9) and (11, 35.097, 71.565)	(6.32, 71.565, 9) and (11, 35.097, 71.565)
79	**Assertion (A):** The rank of matrix A must be equal to the rank of the augmented matrix [A	b] for the system Ax = b to have a solution. **Reason (R):** The rank of matrix A determines the dimension of the column space of A, which must be sufficient to include the vector b for the system to be solvable.				a
	a) Both A and R are true and R is the correct explanation of A	b) Both A and R are true but R is not the correct explanation of A	c) A is true but R is false.	d) A is false but R is true	Both A and R are true and R is the correct explanation of A
80	The system of linear equations *(4d - 1)x +y + z = 0* *- y + z = 0* *(4d - 1) z = 0* has a non-trivial solution, if *d* equals				b
	a)1/2	b) 1/4	c)3/4	d)1	1/4
81	How can the objectivity of the research be enhanced?				d
	a) Through its impartiality	b) Through its reliability	c) Through its validity	d) All of these	All of these
82	Manipulation is always a part of				c

	a) Historical research	b) Fundamental research	c) Descriptive research	d) Experimental research	Descriptive research

83	Action-research is: A. An applied research B. A research carried out to solve immediate problems C. A longitudinal research D. A linguistic research				b
	a) A only	b) B only	c) C only	d) A and D	A and D

84	Choose the correct option: Assertion (A): Experimental research applies established laws during field study to gain clearer insights into the problem. Reason (R): Experimental research involves designing controlled experiments to manipulate variables and observe their effects, aiming to validate or establish causal relationships based on existing scientific principles.				a
	a) Both Assertion A and Reason R- are true, and Reason R- is the correct explanation of Assertion (A).	b) Both Assertion (A) and Reason ® are true, but Reason ® is not the correct explanation of Assertion (A)	c) Assertion (A) is true, but Reason ® is false	d) Assertion (A) is false, but Reason ® is true.	Both Assertion A and Reason R- are true, and Reason R- is the correct explanation of Assertion (A).

85	When a research problem is related to heterogeneous population, the most suitable sampling method is:				b
	a) Cluster Sampling	b) Stratified Sampling	c) Convenient Sampling	d) Lottery Method	Stratified Sampling

86	Which of the following statements is **not true** in the context of participatory research? A. It recognizes knowledge as power. B. It is a collective process of enquiry. C. It emphasizes on people as experts. D. Its sole purpose is production of knowledge.				a
	a) A and B	b) B only	c) A ,B ,C and D	d) D only	A and B

87	A research problem is not feasible only when: Assertion (A): It must be researchable. Reason (R): Feasibility of a research problem depends on whether it can be effectively studied or investigated.	c

a) Both A and R are true and R is the correct explanation of A.	b) Both A and R are false.	c) A is true but R is false	d) A is false but R is true.	A is true but R is false

88	Research problem is selected from the stand point of:				c
	a) Researcher's interest	b) Financial support	c) Social relevance	d) Availability of relevant literature	Social relevance

89	Which one is called non-probability sampling?				b
	a) Cluster sampling	b) Quota sampling	c) Systematic sampling	d) Stratified random sampling	Quota sampling

90	Formulation of hypothesis may NOT be required in: Assertion (A): Historical studies Reason (R): Historical studies often rely on descriptive analysis and interpretation of past events rather than hypothesis testing.				b
	a) Both A and R are true and R is the correct explanation of A.	b) Both A and R are true but R is not the correct explanation of A.	c) A is true but R is false.	d) A is false but R is true	

91 Match the columns:

Assembly coding	Use
P. text section	1. entry point
Q. data section	2. system loader
R. _start symbol	3. system linker
S. ld executable	4. variable
	5. machine code

Answer option b

a) P-5, Q-4, R-1, S-3	b) P-4, Q-3, R-2, S-5	c) P-3, Q-1, R-2, S-4	d) P-4, Q-2, R-1, S-3	P-5, Q-4, R-1, S-3

92	What is the significance of "a+" in the fopen() function call below? FILE *fp = fopen("abcd.txt", "a+"); P. If file abcd.txt does not exist, create a zero length file. Q. If file abcd.txt already exists, truncate it to a zero-length file. R. If file abcd.txt already exists, do not truncate it to a zero-length file.	Answer option (d)

	a) P only	b) Q only	c) R only	d) P and R only	P and R only
93	Listed below are some operating system abstractions and hardware components. Which matching pairs are correct?				Answer option (b)
	OS abstraction / **Hardware** table: P. File System — 1. Timer; Q. System call — 2. Interrupt; R. Linux jiffies — 3. Memory; S. global variable — 4. Disk				
	a) P-4, Q-3, R-1, S-2	b) P-4, Q-2, R-1, S-3	c) P-3, Q-1, R-2, S-4	d) P-4, Q-2, R-3, S-1	P-4, Q-2, R-1, S-3
94	Consider the following statements regarding function call and system call: Q. Any number of functions can be implemented by a programmer. R. The number of system calls is determined by Linux/other OS. S. System call can access hardware T. System call requires the issue of an interrupt				Answer option (d)
	a) Q and R	b) Q, R and S	c) R, S and T	d) Q, R, S, T	Q, R, S, T
95	How does the exec() system call work in Linux? P. It executes the command given as argument and returns. Q. exec() destroys all code and data of the current process. R. exec() loads the code and data of program given in its argument.				Answer option (c)
	a) P only	b) P and R only	c) Q and R only	d) None of these	Q and R only
96	What UNIX signals are generated due to following ctrl key sequences?				Answer option (c)
	Ctrl Key Sequence / **UNIX Signal** table: P. Ctrl-c — 1. SIGQUIT; Q. Ctrl-\ — 2. SIGSTP; R. Ctrl-z — 3. SIGINT				
	a) P-1, Q-2, R-3	b) P-2, Q-1, R-3	c) P-3, Q-1, R-2	d) P-2, Q-3, R-1	P-3, Q-1, R-2
97	What is the output of this bourne shell program? VAR1=Hello echo $VAR1 ${VAR2:-World}				Answer option (d)
	a) Hello - World	b) Hello World	c) Hello	d) Hello-World	Hello World
98	What is the output of the following egrep command in Linux? **echo "1234 abcd"	egrep '[0-9]*]'**				Answer option (c)
	a) 1234	b) abcd	c) 1234 abcd	d) None of these	1234 abcd
99	The **nice** command is used in Linux to				Answer option (b)

17

		a) monitor next inject code eject sequences	b) control scheduling priority of process	control scheduling priority of process	d) Periodically monitor device drivers	control scheduling priority of process

100	What will be file permissions for the owner of the file **myfile.txt** after execution of the following chmod command in a Linux environment? **chmod 755 myfile.txt**				Answer option (d)
	a) Read, Write only	b) Write only	c) Execute only	d) Read, Write and Execute	Read, Write and Execute

101	Consider the production grammar S → AB/AS A→ a/aA B → b Which of the following regular expressions corresponds to the production grammar?				Answer option (d)
	a) $(ab)^*$	b) a(ab)* b	c) aa* b⁺	d) aa*b	aa*b

102	Match the following :	Answer option (d)

A Uses a read/write head and tape to manipulate symbols, representing the most powerful computational model	i Pushdown Automata
B Employs a stack to store and manipulate symbols during processing, suitable for languages with nested structures.	ii Finite State Automata
C Operates on a finite set of states and transitions, well-suited for recognizing simple patterns in input strings.	Iii Mealy Machine
D Outputs a symbol based on both the current state and the input symbol, offering additional flexibility.	iv Turing Machine

	a) A-iv, B-i, C-ii, D-iii	b)A-i, B-iv, C-ii, D-iii	c)A-iv, B-ii, C-i, D-iii	d)A-iv, B-i, C-iii, D-ii	A-iv, B-i, C-iii, D-ii

103	Statement: PDAs are always more complex and slower than FSAs. Part A: True - The additional stack in PDAs introduces overhead compared to simpler FSAs. Part B: False - PDAs are essential for recognizing context-free languages with nested structures, which FSAs cannot handle. A Part A True, Part B True B Part A False, Part B True C Part A True, Part B False D Part A False, Part B False	Answer option (a)

	a) A	b) B	c) C	d) D	A
104	Assertion (A): A Mealy machine is a type of finite state automaton (FSA) that can output a symbol along with a state transition. Reason (R): All regular languages (recognizable by FSAs) can also be represented by regular expressions				Answer option (b)
	a) A is True, R is False	b) A is True, R is True	c) A is False, R is False	d) A is False, R is True	A is True, R is True
105	A Push Down Machine(PDM) behaves like a Turing Machine(TM), when the number of auxillary memory it has is				Answer option (a)
	a) 2	b) 1	c) 0	d) 4	2
106	If there is an NP-complete language L whose complement is in NP, then the complement of any language in NP is in				Answer option (b)
	a) P	b) NP	c) Both a and b	d) None of the above	NP
107	Match the Columns value on the left with correct values on the right:				Answer option (d)

A Image recognition system classifying handwritten digits.	I Deep Learning - Supervised
B Dimensionality reduction for compressing high-dimensional data.	ii Supervised
C Text summarization tool automatically generating summaries of news articles.	iii Unsupervised
D Recommender system suggesting products based on user purchase history.	iv Transformer Network

a)A -ii, B-i, C-iii, D-iv	b)A -ii, B-iii, C-iv, D-i	c)A -ii, B-iii, C-i, D-iv	d)A -i, B-iii, C-iv, D-ii	A -i, B-iii, C-iv, D-ii

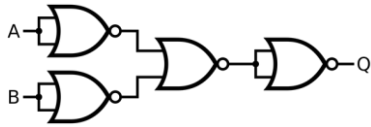|					
108	We have a classification problem with labels 0 and 1. We train a logistic model and find out that ω_0 learned by our model is -17. We are to predict the label of a new test point x using this trained model. If $\omega^T x = 1$, which of the following statements is True? A We cannot make any prediction as the value of $\omega^T x$ does not make sense B The label of the test point is 0. C The label of the test point is 1. D We cannot make any prediction as we do not know the value of x.				Answer option (a)
	a) A is True	b) A and B are False	c) C is False	d) D is True	A is True
109	Assertion (A): Depth-first search (DFS) is guaranteed to find a solution to a problem if one exists, as long as the search space is finite. Reason (R): DFS explores all possible paths systematically until it reaches the goal or exhausts all possibilities.				Answer option (b)
	a) A is False, R is True	b) A is True, R is True	c) A is False, R is False	d) A is True, R is False	A is True, R is True
110	Which of the following is NOT a common activation function used in deep neural networks?				Answer option (b)

		a)Sigmoid function	b)ReLU	c)Tanh function	d)Softmax function	ReLU

111	Compared to the MSE loss in linear regression, how does the deep neural network loss function with cross-entropy handle multi-class classification problems?					Answer option (b)
	a)It remains the same, calculating the squared error for each class.	b)It directly calculates the probability for each class, enabling classification.	c)It requires manual feature engineering for each class before applying MSE.	d)It only works for binary classification problems	It directly calculates the probability for each class, enabling

112	Match the Columns value on the left with correct values on the right:	Answer option (c)

A Support Vector Machine (SVM)	i Euclidean distance for measuring similarity between data points
B K-Means Clustering	Ii Expectation-Maximization (EM) algorithm for handling missing data
C Logistic Regression	iii Kernel functions for mapping data into higher-dimensional space
D Linear Regression	iv Gradient descent for optimizing model parameters.

a)A-iii, B-i, C-iv, D-ii	b)A-ii, B-iv, C-i, D-iii	c)A-iii, B-i, C-iv, D-ii	d)A-ii, B-i, C-iv, D-iii	A-iii, B-i, C-iv, D-ii

113	Which of the following is the correct syntax of including a user defined header files in C++?				Answer option (c)
	a)#include <userdefined.h>	b)#include {userdefined.h}	c)#include "userdefined"	d)#include [userdefined]	#include "userdefined"

114	Which of the following is the purpose for using clipping in computer graphics?				Answer option (b)
	a) copying	b)removing objects and lines	c) Zooming	d) adding graphics	removing objects and lines

115	Which of the following is true for variable names in C? A. They can contain alphanumeric characters as well as special characters except hyphen (-) and underscore(_). B. Variable names cannot start with a digit C. Variable names can contain letters, digits and underscores D. It is not an error to declare a variable to be one of the keywords(like goto, static)				Answer option (b)
	a) A, B	b) B, C	c) C, D	d) A, C	B, C

116	A:A bitmap is a set of pixels that make up an image. B: Bitmap is a sort of computer graphics that lets you store and show photographs on your computer.	Answer option (a)

	a)Both A and B are the true and B is a correct explanation of Assertion A	b)A is False and B is true, but B is not a correct explanation of Assertion A	c)A is false, but B true, and B is a correct explanation of Assertion A	d)A is true, but B is false.	Both A and B are the true and B is a correct explanation of Assertion A
117	Match the following entries: <table><tr><td>A. number of pixels stored in the frame buffer of a graphics system</td><td>i. Interface window/ graphical user interface (GUI)</td></tr><tr><td>B. set of pixels that make up an image</td><td>ii clipping</td></tr><tr><td>C. the process of elimination of parts of a scene outside a window or a viewport</td><td>iiiBitmap</td></tr><tr><td>D. window opened on the raster graphics screen in which the image will be displayed</td><td>ivResolution</td></tr></table>					Answer option (d)
	a) A-iii, B-iv, D-i, C-ii	b) A-ii, B-iii, C-ii, D-i	c)A-iii, B-iv, C-i, D-ii	d)A-iv, B-iii, C-ii, D-i	A-iv, B-iii, C-ii, D-i
118	Which is more effective while calling the C++ functions?				Answer option (c)
	a)call by object	b)call by value	c)call by reference	d)call by pointer	call by reference
119	Asymptotic tight bound for the recurrence $T(n) = 4T\left(\frac{n}{2}\right) + n^2\sqrt{n}$ is				Answer option (a)
	a) $\theta(n^{2.5})$	b) $\theta(n^{2.5} \log$	c) $\theta(n^2)$	d) $\theta(n^{2.5} \log$	$\theta(n^{2.5})$
120	Find the postfix notation for the expression $(3 + 1)^\wedge 2 + (7 - 4) * 6 - 5$				Answer option (c)
	a) 3, 1, +, 2,∧, 7, 4, -, 6, *, 5, -, +	b) 3, 1, 2, ∧, +, 7, 4, -, 6, *, +, 5, -	c) 3, 1, +, 2, ∧, 7, 4, -, 6, *, +, 5, -	d) 3, 1, +, 2, ∧, 7, 4, 6, *, -, +, 5, -	3, 1, +, 2, ∧, 7, 4, -, 6, *, +, 5, -
121	What is the maximum number of nodes an AVL tree of height 5 can have?				Answer option (a)
	a) 63	b) 31	c) 25	d) 10	63
122	Match the following: <table><tr><td colspan="2">Algorithm</td><td colspan="2">Worst-case cost</td></tr><tr><td colspan="2">(A) Linear probing with uniform and independent hash function</td><td>(i)</td><td>$c * \log_2 n$</td></tr><tr><td colspan="2">(B) Binary Search</td><td>(ii)</td><td>n</td></tr><tr><td colspan="2">(C) Binary Search Tree (BST)</td><td>(iii)</td><td>$2 * \log_2 n$</td></tr><tr><td colspan="2">(D) 2-3 Binary Search Tree (2-3 BST)</td><td>(iv)</td><td>$\log_2 n$</td></tr></table> Choose the correct answer from the options given below:				Answer option (b)
	a) A-(i), B-(ii), C-(iv), D-(iii)	b) A-(i), B-(iv), C-(ii), D-(iii)	c) A-(ii), B-(i), C-(iv), D-(iii)	d) A-(i), B-(vi), C-(iii), D-(i)	A-(i), B-(iv), C-(ii), D-(iii)
123	Given below two statements: **Assertion (A)**: *A diagraph has a topological order.*				Answer option (a)

	Justification (J): Topological ordering of an undirected graph and a directed cycle cannot be defined. Which of the following options is correct with respect to the above statements:	
	a) (A) is false, but (J) is true.	b) Both (A) and (J) are true, but (J) is not the correct explanation of (A).	c) (A) is true, but (J) is false.	d) Both (A) and (J) are true and (J) is the correct explanation of (A).	(A) is false, but (J) is true.

124	Consider the following instance of 0/1 Knapsack problem: N = 4, (w1, w2, w3, w4) = (1, 3, 4 ,6), (p1, p2, p3, p4)=5, 20, 25, 35) and capacity of the Knapsack M=7. The maximum profit obtainable is:				Answer option (a)
	a) 45	b) 40	c) 50	d) 60	45

125	Given $F = \{A \rightarrow BC, CD \rightarrow E, E \rightarrow C, D \rightarrow AEH, ABH \rightarrow BD, DH \rightarrow BC\}$. The canonical cover of F is:				Answer option (a)
	a) $\{A \rightarrow BC, D \rightarrow AEH, E \rightarrow C, AH \rightarrow D\}$	b) $\{A \rightarrow BC, CD \rightarrow E, D \rightarrow AEH, E \rightarrow C, AH \rightarrow D\}$	c) $\{A \rightarrow BC, D \rightarrow AEH, E \rightarrow C, H \rightarrow D\}$	d) $\{A \rightarrow BC, CD \rightarrow E, D \rightarrow H, E \rightarrow C\}$	$\{A \rightarrow BC, D \rightarrow AEH, E \rightarrow C, AH \rightarrow D\}$

126	Relation R (A, B, C, D) with functional dependencies $F = \{A \rightarrow B, A \rightarrow C, C \rightarrow D\}$ is decomposed into $R_1(A, B, C)$ and $R_2(C, D)$. The decomposition is				Answer option (c)
	a) Lossless but not dependency-preserving	b) Lossy but dependency preserving	c) Lossless and dependency preserving	d) Neither lossless nor dependency-preserving	Lossless and dependency preserving

127	Given two relations STUDENT (stdt#, std_name) and REGISTRATION (std#, course#), what is the minimum number of disk access required to generate the list (std#, std_name, course#). The only catalogue information available is that the number of tuples in STUDENT and REGISTRATION is 200 and 1000, respectively, and the blocking factor is 25 and 50, respectively.				Answer option (b)
	a) 180	b) 168	c) 1200	d) 160	168

128	The following schedules involve two transactions T_1 and T_2 $S_1: r_1(A); r_1(B); r_2(A); r_2(B); w_2(A); w_1(B)$ $S_2: r_1(A); r_2(A); r_2(B); w_2(B); r_1(B); w_1(A)$ Which of the following statements is correct with respect to the above:				Answer option (d)
	a) S_1 is conflict serializable and	b) Both S_1 and S_2 are	c) Neither S_1 nor S_2 is	d) S_1 is not conflict serializable and	S_1 is not conflict serializable and

	S_2 is not conflict Serializable	conflict serializable	conflict serializable	S_2 is conflict Serializable	S_2 is conflict Serializable

129	Given below two statements: S1: *Hadoop streaming is a utility that allows users to create and run jobs with any executables as the mapper and/or the reducer.* S2: *Hash partitioner is the default partitioner for MapReduce.* In the light of the above statements, select the most appropriate answer:	Answer option (a)
	a) Both S1 and S2 are true | b) S1 is true and S2 is false | c) Both S1 and S2 are false | d) S1 is false and S2 is true	Both S1 and S2 are true

130	1. Match List-I with List-II

List – I	List – II
A. Boosting	i. A scenario where a model learns the noise in the training data results in poor generalization of new data.
B. Overfitting	ii. Combines the predictions of several base estimators to improve robustness over a single estimator.
C. Cross-Validation	iii. An optimization algorithm is used to minimize the loss function in training a machine learning model.
D. Gradient Descent	iv. A technique used to evaluate the performance of a model by splitting the data into training and testing sets multiple times.

Choose the correct answer from the options given below:

a) A-iii, B-iv, C-ii, D-i | b) A-i, B-iii, C-iv, D-ii | c) A-ii, B-i, C-iv, D-iii | d) A-iv, B-ii, C-i, D-iii		(c)

131	A B-tree of order M can have a maximum of ____ children.	b
	a) M-1 | b) M | c) M+1 | d) 2M	M

132	Match the following:	b

A. Distributed Query Processing	i. The detailed roadmap followed by a database engine to execute a specific query, including access methods and join operations.
B. Two-Phase Commit Protocol	ii. A strategy to ensure that a distributed transaction is either committed at all sites or aborted at all sites.
C. Statistics	iii. The process of managing and executing a query that accesses data across multiple distributed sites.

	D. Execution Plan	iv. Information about the distribution of values in columns and tables used by the query optimizer to estimate query costs.			
	a) A-iii, B-iv, C-i, D-ii	b) A-iii, B-ii, C-iv, D-i	c) A-ii, B-i, C-iv, D-iii	d) A-iv, B-iii, C-ii, D-i	A-iii, B-ii, C-iv, D-i
133	Which of the following statements are true: A. The DIVISION operation in relational algebra is used to find tuples in one relation that are related to all tuples in another relation. B. B+ trees store all data in the internal nodes and use the leaf nodes only for pointers. C. In a B-tree, searching for a key always requires examining all keys in a node. D. 5NF deals with cases where information can be reconstructed from smaller pieces of information without loss.				b
	a) A and C	b) A and D	c) B and C	d) D only	A and D
134	For the given statements which of the following is correct? A: Time-stamp ordering protocol can lead to deadlocks. B: Time-stamp ordering protocol ensures that older transactions are given higher priority.				c
	a) (A) and (B) are True, and (B) is the correct explanation of (A).	b) (A) and (B) are True, but (B) is not the correct explanation of (A).	c) (A) is True, but (B) is False.	d) (A) is False, but (B) is True.	(A) is True, but (B) is False.
135	Let R1(a,b,c) and R2(x,y,z) be two relations where a is the foreign key of R1 referencing the primary key of R2. Which of the following operation will violate the referential integrity constraints?				a
	a) Insert into R1 and delete from R2	b) Insert into R2 and delete from R1	c) Insert into R1 only	d) Delete from R2 only	Insert into R1 and delete from R2
136	Which of the following operation allows us to combine certain selections and a Cartesian product into one operation?				b
	a) Set-intersection operation	b) Natural-Join operation	c) Division operation	d) Assignment operation	Natural-Join operation

137	The following truth table describes the operation of _____ operator.	Answer option (b)

X	Y	f(X,Y)
0	0	0
0	1	1
1	0	1
1	1	1

	a) AND	b)OR	c)NAND	d)NOR	OR

138	Which of the following circuit is used to store one bit of data?				Answer option (d)
	a) Register	b) Decoder	c) Encoder	d) Flip Flop	Flip Flop

139	What is Universal Logic Gate?	Answer option (b)

A AND, OR and NOT gates are commonly known as **Universal Logic Gates.**

B NAND and the NOR gates are commonly referred to as **Universal Logic Gates.**

C AND, OR gates are Universal Logic Gates, but NOT gate is not Universal Gate.

D Any logic gate which can be combined into a set to realize all other logical functions is said to be a universal gate with a complete logic set being a group of gates that can be used to form any other logic function

	a) A,D	b) B, D	c) B, D	d) B, C	B, D

140	**What is a Truth Table?**	Answer option (d)

A: It is a table representing what output will one get for a given input.
B: It is a table representing what input and output will be given by a given Boolean operator.

	a) A is true, but B is false	b) A is false, but B is True	c) Both A , B are false	d) A is true, B is true	A is true, B is true

141	Match the following :	Answer option (c)

A AND, OR, NOT	i Universal Gate
B NOR	ii Commutative Law
C $A + B = B + A$	iii DeMorgan's Law
D $\overline{A + B} = \overline{A}.\overline{B}$	iv Basic Logic Gate

	a) A-i, B-iv, C-iii, D-ii	b) A-iv, B-i, C-iii, D-ii	c) A-iv, B-i, C-ii, D-iii	d) A-iii, B-i, C-iv, D-ii	A-iv, B-i, C-ii, D-iii

142	What will be the output of the given logic gate?	Answer option (b)

	a) NOR	b) NAND	c) AND	d) OR	NAND
143	Which of the following combination is preferred with respect to cohesion and coupling?				c
	a) Low and low	b) Low and high	c) High and low	d) High and high	High and low

144	Match the following pairs:	
	A. Regression Testing — i. Testing technique that explores the system informally and without predefined test cases. B. Functional Testing — ii. Testing technique that ensures that changes or updates to the software do not adversely affect existing functionality. C. Ad Hoc Testing — iii. Testing technique that verifies if the software meets performance, reliability, and security criteria. D. Non-functional Testing — iv. Testing technique that verifies if the software functions as intended, focusing on user requirements.	(c)

	a) A-i, B-iv, C-ii, D-iii	b) A-iii, B-iv, C-ii, D-i	c) A-ii, B-iv, C-i, D-iii	d) A-iv, B-i, C-iii, D-ii	A-ii, B-iv, C-i, D-iii

145	Which of the following statements are true? A. Risk mitigation involves eliminating all identified risks completely. B. Software design focuses only on the technical aspects of a software solution and does not consider user needs or business requirements. C. A layered architecture allows for loose coupling between different layers, making it easier to modify or replace individual components without affecting the entire system. D. Software maintenance involves only fixing bugs and addressing technical issues after the software is deployed.				(a)
	a) C only	b) A and C	c) B and D	d) B and C	C only

146	Statements: A: Risk management is essential for project success because it helps in identifying potential threats, assessing their impact, and developing strategies to mitigate or avoid them. B: Risk management ensures that all risks can be completely eliminated from a project.	(c)

	Which of the following is true?				
	a) (A) and (B) are true, and (B) is a correct explanation of (A).	b) (A) and (B) are true; but (B) is not a correct explanation of (A).	c) (A) is True, but (B) is False.	d) (A) is False, but (B) is True.	(A) is True, but (B) is False.
147	Which of the following is NOT one of the steps in the risk management process?				(d)
	a) Risk assessment	b) Risk identification	c) Risk tracking	d) Risk response control	Risk response control
148	Which of the following is not a recognized software project type under COCOMO model?				D
	A. Semidetached	B. Organic	C. Embedded	D. Detached	Detached
149	Match the following: 	A.	Research title	i.	Judge the depth of any research
B.	Research objectives	ii.	Topic of research
C.	Bibliography	iii.	List of references
D.	Research duration	iv.	To help in time taken for general studying					c)
	a) A-iii, B-iv, C-i, D-ii	b) A-ii, B-iv, C-i, D-iii	c) A-ii, B-i, C-iii, D-iv	d) A-iii, B-i, C-i, D-ii	A-ii, B-i, C-iii, D-iv
150	**A) Assertion:** Research proposal is a formal document that presents the research objectives, design of achieving these objectives, and the expected outcomes/deliverables of the study. **R) Reason:** Research proposal is a part of research work				(a)
	a) A is True	b) R is True	c) Both are True	d) None	Both are True