Test Booklet No. _____

This booklet consists of 100 questions and 16 printed pages.

RGUCET/2025/37

Series A

RGUCET 2025
Common Entrance Test, 2025
MASTER OF TECHNOLOGY IN COMPUTER SCIENCE AND ENGINEERING

Full Marks: 100 **Time: 2 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 100 Multiple Choice Questions (MCQs) from the concerned subject. Each question carries 1 mark. There shall be negative marking of 0.25 against each wrong attempt.
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 before completion of Examination.
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

1	Choose the word that is closest in meaning to "benevolent":				Generous
	a) Hostile	b) Generous	c) Cunning	d) Reserved	b
2	What does the idiom “break the ice” mean?				To start a conversation in a social setting
	a) To crack something frozen	b) To make a situation tense	c) To start a conversation in a social setting	d) To get angry suddenly	c
3	Choose the correct passive voice form: "The chef cooked a delicious meal."				A delicious meal was cooked by the chef.
	a) A delicious meal is cooked by the chef.	b) A delicious meal was cooked by the chef.	c) A delicious meal has been cooked by the chef.	d) A delicious meal is being cooked by the chef.	b
4	Choose the alternative which best expresses the meaning of *“step on someone’s toes”*				To offend someone
	a) To follow someone unwillingly	b)To treat someone cruelly	c) To kick someone	d) To offend someone	d)
5	Match the following pairs: A. Brain — i. Shell B. Turtle — ii. cover C. Book — iii. Bark D. Tree — iv. Skull				A-iv, B-i, C-ii, D-iii
	a) A-i, B-iv, C-ii, D-iii	b) A-iv, B-i, C-ii, D-iii	c) A-i, B-iv, C-iii,D-ii	d)A-iv, B-ii, C-i, D-iii	b)
6	Who is the current Secretary-General of the United Nations?				António Guterres
	a) Ban Ki-moon	b) António Guterres	c)Kofi Annan	d)Jens Stoltenberg	b
7	Which of the following statement(s) is/are true or false? A. Jaipur city is known as the "Pink City" B. Bangalore is known as “Graden City” C. Mysore is known as “City of Joy” D. Guwahati is known as “City of Nawabs”				A and B are true; C and D are false
	a) None of the	b) B and C are true;	c) C and D	d) A and B	d)

	statements is true	A and D are false	are True; A and B are False	are true; C and D are false	
8	The term "cyberspace" was coined by:				William Gibson
	a) Isaac Asimov	b) William Gibson	c) Philip K. Dick	d) Neal Stephenson	(b)
9	Assertion (A): Bluetooth is used for short-range wireless communication. Justification (J): Bluetooth uses infrared waves to transmit data between devices. In the light of above statements, choose the correct answer from the options given below:				A is true, but J is false.
	a) Both A and J are true, and J is the correct explanation of A.	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) A is false, but J is true.	(c)
10	Match the Famous Discovery with the Person Associated: A. Electromagnetism — i. Wilhelm Conrad Röntgen B. X-Rays — ii. James Clerk Maxwell C. Polio Vaccine — iii. Joseph John Thomson D. Electron — iv. Jonas Salk				A-ii, B-i, C-iv, D-iii
	a) A-ii, B-i, C-iv, D-iii	b) A-iii, B-ii, C-i, D-iv	c) A-i, B-iv, C-iii, D-ii	d) A-iv, B-iii, C-ii, D-i	(a)
11	Who is the current Chairperson of the Securities and Exchange Board of India (SEBI) as of May 2025?				Madhabi Puri Buch
	a)Nirmala Sitharaman	b) Madhabi Puri Buch	c) Urjit Patel	d) Shaktikanta Das	b
12	Which Indian state recently launched the 'Green India Mission' to boost afforestation?				Tamil Nadu
	a) Maharashtra	b) Sikkim	b) Tamil Nadu	d)Himachal Pradesh	c

<table>
<tr><td>13</td><td>Match the Data Science concepts (A–D) with their correct descriptions (i–iv).

<table><tr><td>A. COP28 Climate Summit</td><td>i. France</td></tr><tr><td>B. Gaza Conflict Escalation</td><td>ii. United Arab Emirates</td></tr><tr><td>C. AUKUS Defence Pact</td><td>iii. Australia</td></tr><tr><td>D. Olympic 2024 Preparations</td><td>iv. Israel</td></tr></table></td><td>A-ii, B-iv
C-iii, D-i</td></tr>
<tr><td></td><td>a) A-ii, B –iv, C-i, D-iii</td><td>b) A-iv, B- iii, C-ii, D-i</td><td>c) A-i, B-ii, C-iii, D-iv</td><td>d) A-ii, B-iv C-iii, D-i</td><td>d</td></tr>
<tr><td>14</td><td colspan="4">Who was appointed as the new Chief Justice of India in 2025?</td><td>Sanjay Kishan Kaul</td></tr>
<tr><td></td><td>a) D.Y.Chandrachud</td><td>b) U.U.Lalit</td><td>c) Sanjay Kishan Kaul</td><td>c) None of the above</td><td>c</td></tr>
<tr><td>15</td><td colspan="4">Which Indian airport recently became the first to run entirely on solar and hydro power (100% green energy)?</td><td>Cochin International Airport</td></tr>
<tr><td></td><td>a) Kempegowda International Airport</td><td>b) Cochin International Airport</td><td>c) Indira Gandhi International Airport</td><td>d) Rajiv Gandhi International Airport</td><td>c</td></tr>
<tr><td>16</td><td colspan="4">In certain code language, if RECEDE is written as ERECED, then CONVERTS will be coded as:</td><td>OCVNREST</td></tr>
<tr><td></td><td>a) OCVNREST</td><td>b) OCNVRTES</td><td>c) OCVENRST</td><td>d)OCVERNST</td><td>a)</td></tr>
<tr><td>17</td><td colspan="4">If P+Q means P is father of Q, P÷Q means P is son of Q, P-Q means P is brother of Q, then which of the following options represent A is wife of B?</td><td>P+N÷Q</td></tr>
<tr><td></td><td>a) B+N-A</td><td>b) A+N÷B</td><td>c) A-N+B</td><td>d) A+B-N</td><td>b)</td></tr>
<tr><td>18</td><td colspan="4">Find the item that can replace the question mark in the series:

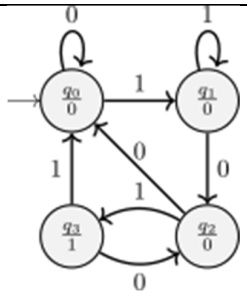
BZ, DX, GU, KQ,?</td><td>PL</td></tr>
<tr><td></td><td>a) OR</td><td>b) PI</td><td>c) PL</td><td>d) QR</td><td>c)</td></tr>
<tr><td>19</td><td colspan="4">Select the option that is related to the 5th number in the same way as the 2nd number is related to the 1st number and the 4th number is related to the 3rd number.

80:3:: 255:4:: 2400:?</td><td>7</td></tr>
<tr><td></td><td>a) 5</td><td>b) 9</td><td>c) 8</td><td>d) 7</td><td>d)</td></tr>
<tr><td>20</td><td colspan="4">E is the son of A, D is the son of B, E is married to C, C is the daughter of B. how is D related to E?</td><td>Brother in-law</td></tr>
</table>

	Brother	b)Uncle	c)Father in-law	d)Brother in-law	d
21	Which of the following properties must a relation R on a set A satisfy to be a lattice?				Every pair of elements has a least upper bound and a greatest lower bound
	a) Reflexive and antisymmetric only	b) Reflexive, symmetric, and transitive	c) Every pair of elements has a least upper bound and a greatest lower bound	d) The relation must be total and antisymmetric	c
22	Match the Boolean laws with their correct expression: A. Involution Law — i. $A\cdot(B+C)=A\cdot B+A\cdot C$ B. Distributive Law — ii. $\neg(\neg A)=A$ C. Complement Law — iii $A+\neg A=1$ D. De Morgan's Law — iv $\neg(A\cdot B)=\neg A+\neg B$				A–ii, B–i, C–iii, D–iv
	a) A–ii, B–i, C–iii, D–iv	b) A–i, B–ii, C–iii, D–iv	c) A–iii, B–ii, C–i, D–iv	d) A–iv, B–ii, C–iii, D–i	a
23	Let A={1,2,3} and let R={(1,1),(2,2),(3,3),(1,2),(2,1)} be a relation on A. Which of the following properties does R satisfy?				Reflexive and Symmetric only
	a)Reflexive, Symmetric, and Transitive	b)Reflexive and Symmetric only	c)Reflexive and Transitive only	d)Only Reflexive	b
24	Let R be a relation on a set A. If $R\circ R^{-1}=\Delta$, where Δ is the identity relation on A, then which of the following must be true?				R is a bijection from A to A
	a) R is reflexive	b) R is symmetric	c) R is injective and surjective	d) R is a bijection from A to A	d
25	**A:** The composition of two surjective functions is surjective. **B:** A function is surjective if every element in the codomain has a pre-image in the domain. In the light of above statements, choose the correct answer from the options given below:				Both A and B are true, and B explains A
	a) Both A and B are true, and B explains A	b) Both A and B are true, but B doesn't explain A	c) A is true, B is false	d) A is false, B is true	a

26	Let |A|=20|, |B|=25, |C|=15, |A∩B|=5, |A∩C|=3, |B∩C|=4 and |A∩B∩C|=2, Find |A∪B∪C| ?				50
	a) 50	b) 40	c) 45	d) None of the above	a
27	In a tree with branching factor b=3, depth d=4, how many nodes would be generated in the **worst case** for **breadth-first search?**				121
	a) 40	b) 81	c) 121	d) 242	c
28	Let $h_1(n)$ and $h_2(n)$ be two admissible heuristic functions for a search problem. Define: $h(n)=max(h_1(n),h_2(n))$ Which of the following is true about h(n) with respect to admissibility and efficiency?				$h(n)$ is admissible and more informed than either h_1 or h_2
	a) $h(n)$ is not admissible since it may overestimate	b) $h(n)$ is admissible and more informed than either h_1 or h_2	c) $h(n)$ is inadmissible unless both h_1 and h_2 are consistent	d) $h(n)$ is always less informed than the average of $h_1$and h_2	b
29	**A:** A vacuum-cleaner agent with a performance measure of dirt cleaned and electricity used is partially observable. **B:** Partial observability occurs when an agent cannot access the full state of the environment through its sensors. In the light of above statements, choose the correct answer from the options given below:				Both A and B are true, and B explains A
	a) Both A and B are true, but B doesn't explain A	b) Both A and B are true, and B explains A	c) A is true, B is false	d) A is false, B is true	b
30	Consider a search problem with branching factor b=2, uniform step cost = 1. If A* is used with a **perfect heuristic** (i.e., h(n)=h^*(n), the true cost-to-goal), what is the **maximum number of nodes expanded** to reach a goal at depth d=5?				6
	a) 6	b) 10	c) 15	d) 31	a
31	Which of the following regular expression(s) describe(s) the language of binary strings starting with 0 and ending with 1? A. $0(0+1)^*1$ B. $(0+1)^*$ C. $(0+1)(0+1)*(0+1)$ D. $01+0(0+1)^*1$				Both A and D
	a) A only	b) Both B and D	c) Both A and D	d) D only	c)

32	When an NFA with n states is converted into a DFA, the maximum number of states of the resultant DFA is				2^n
	a) 2^n	b) $2n$	c) n^2	d) n	a)
33	Which of the following regular expression identities are **true**? A. $\phi^* = \epsilon$ B. $L^* = LL^* + \epsilon$ C. $A.B = B.A$				Both (A) and (B)
	a) Both (B) and (C)	b) Both (A) and (B)	c) (A), (B) and (C)	d) (B) only	b)
34	Consider the language L = $\{a^n X b^n : n \geq 0\}$ where X is the centre marker. A: Language L is a context free language B: A deterministic pushdown automaton can be constructed to recognize L. C: Language L is also a regular language. Choose the correct option from the given below.				Both (A) and (B) are true
	a) Both (A) and (B) are true	b) (A), (B) and (C) are true	c) (A) is false but (B) is true	d) (A) is true but (B) is false	a)
35	Which of the following operations are closed for regular languages? A. Union B. Concatenation C. Complementation D. Kleene Star				A, B, C and D
	a) A and B only	b) A and D only	c) A, B and D only	d) A, B, C and D	d)
36	Consider the following grammar: $E \rightarrow E - E \mid E + E \mid a$ A. More than one parse tree is possible for string $a - a + a$ B. The above grammar is ambiguous due to precedence and associativity.				(A) is true but (B) is not the correct explanation
	a) (A) is true but (B) is not the correct explanation	b) (A) is true and (B) is the correct explanation	c) (A) is false but (B) is true	d) (A) is false and (B) is false	a)

37	 Which of the following statements are true regarding the above finite state machine? A. It is a Mealy machine B. FSA accepts all binary strings ending with 1 only. C. FSA accepts all binary strings ending with 101 only. D. FSA accepts all binary strings ending with either 101 or overlapped 101.				D only
	a) A and B only	b) A and C only	c) A and D only	d) D only	d)
38	Consider the following assertions regarding the Chomsky Normal Form: A. CNF can generate context sensitive languages B. A production can generate a single terminal $A \rightarrow B$ C. A production can also generate a terminal immediately followed by a non-terminal $A \rightarrow aB$ Which of the above assertions are true?				(B) only
	a) (A), (B) and (C) only	b) (B) and (C) only	c) (B) only	d) (C) only	c)
39	What is the result of applying the complement law A + A' in Boolean algebra?				1
	a) A	b) 0	c) 1	d) A'	(c)
40	Which of the following is the correct octal representation of the hexadecimal number 1A3				643
	a) 634	b) 643	c)124	d)346	(b)
41	**A:** A half adder is known as XOR gate, which can add only two bits and has nothing to do with the carry. **B:** If the input to a half adder has a carry, then it will neglect it, that means the binary addition process is not complete and that is why it is called a half adder. In the light of above statements A and B, choose the most appropriate answer from the options given bellow:				Both A and B are true, and B is the correct explanation of A

<table>
<tr><td></td><td colspan="4"></td><td></td></tr>
<tr><td></td><td>a) Both A and B are true, and B is the correct explanation of A</td><td>b) Both A and B are true, but B is not the correct explanation of A</td><td>c) A is true, but B is not true</td><td>d) A is false, but B is true</td><td>(a)</td></tr>
<tr><td>42</td><td colspan="4">Match the Following:

<table><tr><td>A. X.X = X, X + X = X</td><td>i Unit distance code/reflected binary code</td></tr><tr><td>B. Gray code</td><td>ii Idempotent law</td></tr><tr><td>C. A(A+B) = A, A+AB = A</td><td>iii Self-complementing code</td></tr><tr><td>D. Excess-3 code</td><td>iv Absorption law</td></tr></table></td><td>A-ii, B-i, C-iv , D- iii</td></tr>
<tr><td></td><td>a) A-ii, B-i, C-iii , D-iv</td><td>b) A-ii, B-iii, C-iv , D- i</td><td>c) A-iii, B-i, C-iv , D- ii</td><td>d) A-ii, B-i, C-iv , D- iii</td><td>(d)</td></tr>
<tr><td>43</td><td colspan="4">Which of the following one has the output dependent only on present input?</td><td>Combinational Circuit</td></tr>
<tr><td></td><td>a) Flip-Flop</td><td>b) Analog Circuit</td><td>c) Combinational Circuit</td><td>d) Sequencial Circuit</td><td>(c)</td></tr>
<tr><td>44</td><td colspan="4">Which of the following gates are known as the universal gate?

A. NAND
B. OR
C. AND
D. NOR</td><td>A, D</td></tr>
<tr><td></td><td>a) A, B</td><td>b) A, D</td><td>c) B, C</td><td>d) C, D</td><td>(b)</td></tr>
<tr><td>45</td><td colspan="4">Match the following :

<table><tr><td>A. K-map</td><td>i. LIFO</td></tr><tr><td>B. Stack</td><td>ii. Memory</td></tr><tr><td>C. Bootstrap loader</td><td>iii. Venn diagram</td></tr><tr><td>D. JK Flip-flop</td><td>iv. BIOS</td></tr></table></td><td>A-iii, B-i, C-iv, D-ii</td></tr>
<tr><td></td><td>a) A-ii, B-i, C-iv, D-iii</td><td>b) A-iii, B-iv, C-i, D-ii</td><td>c) A-iii, B-i, C-iv, D-ii</td><td>d) A-iv, B-i, C-iii, D-ii</td><td>(c)</td></tr>
<tr><td>46</td><td colspan="4">Race Around condition can be avoided in Digital logic circuit using:</td><td>master Slave JK Flip-Flop</td></tr>
<tr><td></td><td>a) Shift Register</td><td>b) AND Gate</td><td>c) Full Adder</td><td>d) master Slave JK Flip-Flop</td><td>(d)</td></tr>
<tr><td>47</td><td colspan="4">In which addressing mode is the operand specified explicitly in the instruction?</td><td>Immediate Addressing</td></tr>
</table>

	a) Immediate Addressing	b) Direct Addressing	c) Indirect Addressing	d) Indexed Addressing	a)
48	A CPU uses a **direct-mapped cache** with a cache size of **16 KB a**nd a block size of **64 bytes**. How many **cache lines (blocks)** does it have?				256
	a) 128	b) 256	c) 512	d) 1024	b)
49	Determine the correct **T/F** sequence for the following: A. DMA improves I/O performance by eliminating the need for polling by the CPU. B. During a DMA transfer, the CPU and DMA controller can simultaneously access the system bus. C. The DMA controller issues memory read and write signals directly. D. DMA is slower than interrupt-driven I/O for large data transfers.				T, F, T, F
	a) F, F, T, T	b) T, T, F, T	c) T, F, T, F	d) T, F, T, T	c)
50	**Assertion (A):** Control signals in a hardwired control unit are generated by combinational logic. **Justification (J):** Hardwired control units use microinstructions stored in control memory. In the light of above statements, choose the most appropriate answer from the options given bellow:				A is true, but J is false.
	a) Both A and J are true, and J is the correct explanation of A	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) A is false, but J is true	c)

<table>
<tr><td>51</td><td>Match the following:

<table><tr><td>A. Data Hazard</td><td>i. A delay in the pipeline that occurs when the required data is not available at the time it's needed for the next instruction.</td></tr><tr><td>B. Control Hazard</td><td>ii. A hazard that occurs when the pipeline does not have enough functional units to execute all the instructions simultaneously, leading to a delay.</td></tr><tr><td>C. Structural Hazard</td><td>iii. A hazard that arises when the pipeline is stalled due to a branch instruction, where the next instruction depends on the outcome of a branch.</td></tr><tr><td>D. Pipeline Depth</td><td>iv. The number of stages in the pipeline, which impacts the throughput and latency of instruction processing.</td></tr></table></td><td>A-i, B-iii,
C-ii,
D-iv</td></tr>
<tr><td></td><td>a) A-i,
B-ii, C-iii, D-iv</td><td>b) A-i, B-iii,
C-iv, D-ii</td><td>c) A-i,
B-iii, C-ii,
D-iv</td><td>d) A-ii,
B-iii, C-i,
D-iv</td><td>c)</td></tr>
<tr><td>52</td><td>Which of the following statements about Control Unit Design is/are True (T)?

A. A hardwired control unit is faster than a microprogrammed control unit because it uses fixed logic circuits.
B. Microprogrammed control units are easier to design and modify than hardwired control units.
C. In microprogrammed control, microinstructions are stored in a memory and are fetched to generate control signals.
D. Hardwired control units can easily adapt to new instructions and architectures.</td><td>A, B and C</td></tr>
<tr><td></td><td>a) A,B and C</td><td>b) A,C and D</td><td>c) A and B</td><td>d) B,C and D</td><td>a)</td></tr>
<tr><td>53</td><td>A pipelined processor has 5 stages, each taking 1 clock cycle. Due to data hazards, there is a stall of 1 cycle after every 4 instructions. Calculate the total number of clock cycles needed to execute 20 instructions.</td><td>29</td></tr>
<tr><td></td><td>a) 24</td><td>b) 25</td><td>c) 27</td><td>d) 29</td><td>d)</td></tr>
<tr><td>54</td><td>What happens when a processor encounters a Non-maskable Interrupt (NMI)?</td><td>The processor stops execution and immediately handles the interrupt.</td></tr>
<tr><td></td><td>a) The processor ignores</td><td>b) The</td><td>c) The interrupt</td><td>d) The</td><td>b)</td></tr>
</table>

	the interrupt and continues execution.	processor stops execution and immediately handles the interrupt.	is delayed until other interrupts are serviced.	processor disables all other interrupts.	
55	The 8085 microprocessor operates on a _____ bit data bus.				8
	a) 4	b) 8	c) 12	d) 16	(b)
56	Statements: A) The 8085 microprocessor has a 16-bit address bus. B) The instruction ADD B adds the contents of register B to the accumulator. Choose the correct answer from the options given below:				Both are True
	a) A is True only	b) B is True only	c) Both are True	d) Both are False	(c)
57	**Assertion:** In Direct addressing mode, the operand given as part of the instruction itself. **Justification:** Direct addressing mode is a memory addressing mode. In the light of above statements, choose the most appropriate answer from the options given bellow:				Justification is True
	a) Both Assertion And Justification are True	b) Assertion is True	c) Justification is True	d) Both Assertion and Justification is False	c)
58	Match the following : A. MVI — i. Load accumulator B. MOV — ii. Store accumulator C. LDA — iii. Move data between registers D. STA — iv. Move immediate data to register				A –iv, B- iii, C –i, D - ii
	a) A – I, B- ii C – iii, D - iv	b) A – iv, B- iii, C – ii, D - i	c) A –iv, B- iii, C –i, D - ii	d) A – i, B- iii, C-ii, D-iv	(c)
59	Statements : A) In the 8085 microprocessor, the instruction CALL is used to return from a subroutine. B) The instruction INX H increments the HL register pair by 2. Choose the correct answer from the options given below:				A is False & B is True

<table>
<tr><td></td><td colspan="4"></td><td></td></tr>
<tr><td></td><td>a) Only A is True</td><td>b) Only B is True</td><td>c)A is True and B is False</td><td>d) A is False & B is True</td><td>(d)</td></tr>
<tr><td>60</td><td colspan="4">Assertion: The 8085 microprocessor has a 16-bit program counter.

Justification: The program counter holds the address of the next instruction to be executed.

In the light of above statements, choose the most appropriate answer from the options given bellow:</td><td>Both Assertion and Justification are True</td></tr>
<tr><td></td><td>a) Both Assertion and Justification are True</td><td>b) Assertion is True</td><td>c) Justification is True</td><td>d) Both Assertion and Justification is False</td><td>(a)</td></tr>
<tr><td>61</td><td colspan="4">Match the following:

<table><tr><td>A. Accumulator</td><td>i. address of the next instruction to be executed</td></tr><tr><td>B. Program counter</td><td>ii. Point address at the top of the stack</td></tr><tr><td>C. Temporary register</td><td>iii. Temporary data storage</td></tr><tr><td>D. Stack pointer</td><td>iv. Process register</td></tr></table></td><td>A-iv, B-i, C-iii, D-ii</td></tr>
<tr><td></td><td>a) A-i, B-ii, C-iii, D-iv</td><td>b) A-iv, B-i, C-iii, D-ii</td><td>c) A-i, B-ii, C-iv, D-iii</td><td>d) A-ii, B-i, C-iii, D-iv</td><td>b)</td></tr>
<tr><td>62</td><td colspan="4">Which of the following is a 16-bit register pair in the 8085 microprocessors?</td><td>All of the above</td></tr>
<tr><td></td><td>a) BC</td><td>b) DE</td><td>c) HL</td><td>d) All of the above</td><td>(d)</td></tr>
<tr><td>63</td><td colspan="4">The worst case complexity of quick sort is _____.</td><td>O(n²)</td></tr>
<tr><td></td><td>a) O(logn)</td><td>b) O(n)</td><td>c) O(n²)</td><td>d) O(nlogn)</td><td>c</td></tr>
</table>

<table>
<tr><td>64</td><td>Find matching pairs:

<table><tr><td>A. Every AVL tree is</td><td>i. not a Tree</td></tr><tr><td>B. Every Tree is</td><td>ii. a Complete Binary Tree</td></tr><tr><td>C. Every Graph is</td><td>iii. also a Graph</td></tr><tr><td>D. Every Heap is</td><td>iv. also a Binary Search Tree</td></tr></table></td><td>A-iv, B-iii, C-i, D-ii</td></tr>
<tr><td></td><td>a) A-iv, B-ii, C-i, D-iii</td><td>b) A-iii, B-iv, C-ii, D-i</td><td>c) A-ii, B-iii, C-i, D-iv</td><td>d) A-iv, B-iii, C-i, D-ii</td><td>d</td></tr>
<tr><td>65</td><td>For the following statements about printf function in C language :

A) The printf function returns an integer value to represent the number of characters that were successfully printed to the standard output.
B) The printf function returns void only.
C) If an error occurs during the printing process, printf returns zero.
D) If an error occurs during the printing process, printf returns a negative value.

Choose the correct answer from the options given below:</td><td colspan="3"></td><td>A & D are True</td></tr>
<tr><td></td><td>a) Only B is True</td><td>b) A & D are True</td><td>c) A & C are True</td><td>d) B& D are True</td><td>b</td></tr>
<tr><td>66</td><td>Two statements are given below, one is Assertion (A) and the other is Justification (B).

Assertion (A): Stack is a data structure that follows the Last-In-First-Out (LIFO) principle.

Justification (B): The first item added to the stack is the first item to be removed from the stack.

In the light of above statements, choose the most appropriate answer from the options given bellow:</td><td colspan="3"></td><td>A is correct, but B is not correct</td></tr>
<tr><td></td><td>a) Both A and B are correct, and B is the correct explanation of A</td><td>b) Both A and B are correct, and B is not the correct explanation of A</td><td>c) A is correct, but B is not correct</td><td>d) A is not correct, but B is correct</td><td>c</td></tr>
<tr><td>67</td><td>Find post order traversal for a binary search tree, whose order of insertion of elements in the tree is given below:

40, 8, 70, 30, 29, 60, 10, 80, 27, 50</td><td colspan="3"></td><td>27, 10, 29, 30, 8, 50, 60, 80, 70, 40</td></tr>
</table>

	a) 40, 8, 30, 29, 10, 27, 70, 60, 50, 80	b) 8, 10, 27, 29, 30, 40, 50, 60, 70, 80	c)27, 10, 29, 50, 60, 30, 8, 80, 70, 40	d) 27, 10, 29, 30, 8, 50, 60, 80, 70, 40	d
68	Find matching pairs from the given table, for data and format specifiers of C language. A. double — *i. %s* B. integer — *ii. %f* C. character array — *iii. %p* D. pointer — *iv. %d*				A-ii, B-iv, C-i, D-iii
	a) A-iv, B-ii, C-i, D-iii	b) A-ii, B-iv, C-i, D-iii	c) A-ii, B-iii, C-i, D-iv	d) A-iv, B-iii, C-i, D-ii	b
69	Following statements about binary tree are either True or False. A. The maximum number of nodes on any level L is 2^L where $L \geq 0$. B. In a non-empty binary tree, e=n-1 where e and n are total number of edges and nodes respectively. C. In a binary tree, every node must have either two child nodes or no child node (i.e. leaf node). D. In a non-empty binary tree, $n_0=n_2+1$ where $n_0$and n_2 are number of nodes with no child node and two child nodes respectively.				A, B &Dare true
	a) A, B &Dare true	b) A & C are True	c) B&C are True	d) A, C & D are True	a
70	Two statements are given below, one is Assertion (A) and the other is Justification (B). **Assertion (A):** A unique binary tree cannot be constructed if preorder and postorder traversals are only given. **Justification (B):** Inorder traversal is necessary to construct a unique binary tree along with either preorder or postorder as it provides the essential information about the placement of nodes in the tree's structure. In the light of above statements, choose the most appropriate answer from the options given bellow:				Both A and B are correct, and B is the correct explanation of A
	a) Both A and B are correct, and B is the correct explanation of A	b) Both A and B are correct, and B is not the correct explanation of A	c) A is correct, but B is not correct	d) A is not correct, but B is correct	a
71	If a graph has *n* nodes and *n* edges, what can we conclude?				It must contain a cycle
	a) It is a	b) It is	c) It must	d) It is a	(c)

	tree.	disconnected.	contain a cycle.	bipartite graph	
72	**Assertion (A):** Dynamic Programming is best for problems with overlapping sub problems. **Justification (J):** Overlapping sub problems are solved and reused using memorization. In the light of above statements, choose the most appropriate answer from the options given bellow:				Both A and J are true, and J is the correct explanation of A.
	a) Both A and J are true, and J is the correct explanation of A.	b) Both A and J are true, but J is NOT the correct explanation of A.	c) A is true, J is false.	d) A is false, J is true.	(a)
73	Match Algorithm with Time Complexity (Best Case) A. Quick Sort — *i. O(n)* B. Insertion Sort — *ii. O(n log n)* C. Binary Search — *iii. $O(n^2)$* D. Selection Sort — *iv. O(1)*				A-ii, B-i, C- iv, D-iii
	a) A-ii, B-i, C- iv, D-iii	b) A-iii, B-ii, C-i, D-iv	c) A-i, B-iv, C-iii, D-ii	d) A-iv, B-iii, C-ii, D-i	(a)
74	A Divide and Conquer problem has the recurrence $T(n) = T(n-1) + T(n-2)$. What is the time complexity of the recursive solution?				$O(2^n)$
	a) $O(n^2)$	*b) O(n)*	*c) $O(2^n)$*	*d) O(log n)*	*(c)*
75	Match Algorithm Type with its Primary Property A. Greedy Algorithm — i. Break into overlapping subproblems B. Dynamic Programming — ii. Explores all possibilities C. Divide and Conquer — iii. Makes the locally optimal choice D. Brute Force — iv. Solves subproblems independently				A-iii, B-i, C-iv, D-ii
	a) A-ii, B-i, C-iv, D-iii	b) A-iii, B-i, C-iv, D-ii	c) A-i, B-iv, C-iii, D-ii	d) A-iv, B-iii, C-ii, D-i	(b)
76	Which I/O scheduling algorithm selects the request **closest to the current head position** to minimize seek time?				Shortest Seek Time First
	a) First-Come First-Served	b) Shortest Seek Time First	c) SCAN	d) LOOK	b

<table>
<tr><td>77</td><td>Which of the following statement(s) is/are True or False?

A. A process has its own memory space, whereas threads share the memory space of the process they belong to.
B. Context switching between threads is generally more expensive than between processes.
C. separate Processes can communicate more efficiently than Threads within the same process.
D. Multithreading always improves performance, regardless of the type of application.</td><td>only A is TRUE</td></tr>
<tr><td></td><td>a) only A is TRUE | b) only B is TRUE | c) A and C are TRUE | d) all are TRUE</td><td>a</td></tr>
<tr><td>78</td><td>Match the following :
<table><tr><td>A. Pre emptive scheduling</td><td>i. CPU is taken from a process mid-execution</td></tr><tr><td>B. SJF Scheduling</td><td>ii. Minimum average waiting time</td></tr><tr><td>C. Critical Section Problem</td><td>iii. Mutual exclusion requirement</td></tr><tr><td>D. Virtual Memory</td><td>iv. Execution of processes beyond physical memory</td></tr></table></td><td>A-i, B-ii, C-iii, D-iv</td></tr>
<tr><td></td><td>a) A-i, B-ii, C-iii, D-iv | b) A-ii, B-iii, C-i, D-iv | c) A-i, B-iii, C-ii, D-iv | d) A-iv, B-i, C-ii, D-iii</td><td>a</td></tr>
<tr><td>79</td><td>In public key cryptography, the public key is used for:</td><td>Encryption</td></tr>
<tr><td></td><td>a) Decryption | b)Hashing | c)Signing | d)Encryption</td><td>d)</td></tr>
<tr><td>80</td><td>Which of the following statement(s) is/are True or False?

A. Fiber optic cables are immune to electromagnetic interference.

B. The sliding window protocol is used for both flow control and error control.

C. DNS is used to convert IP addresses into domain names.

D. Token Ring networks are faster and more scalable than Ethernet.</td><td>Statements A, B are true and statements C, D are false.</td></tr>
<tr><td></td><td>a) Statements A, B are false and statements C, D are true. | b) Statements A, B are true and statements C, D are false. | c) All the statements are true. | d) None of the statements are true.</td><td>b)</td></tr>
</table>

81	**Assertion (A):** Routers are used to interconnect different networks. **Justification (B):** Routers operate at the physical layer of the OSI model. In the light of above statements, choose the most appropriate answer from the options given bellow:				Assertion is true but the justification is not true.
	a) Both the assertion and justification are false.	b) Justification is true but Assertion is false.	c) Assertion is true but the justification is not true.	d) Both assertion and Justification are true.	c)
82	A gateway is used to:				Connect networks with different protocols
	a) Connect different sub networks	b) Connect networks with different protocols	c) Filter spam	d) Encrypt data	b)
83	Which of the following statement(s) is/are True or False? A. VLAN is a physical segmentation of a LAN. B. Bridges work at the network layer and use IP addresses for decision making. C. Firewalls inspect and control traffic based on predetermined security rules. D. MAC address is used for identifying devices at the Data Link Layer.				Statements A, B are false; statements C, D are true.
	a) Statements A, B are false; statements C, D are true.	b) Statements A, B are true; statements C, D are false.	c) Statements B and C are false; statements C and D are true.	d) None of the statements is true.	a)
84	**Assertion (A):** Sliding window protocol improves the efficiency of data transmission. **Justification (B)**: It allows multiple frames to be sent before requiring an acknowledgment. In the light of above statements, choose the most appropriate answer from the options given bellow:				Both assertion and justification are true and B is correct justification on A.
	a) Both assertion and justification are true and B is correct	b) Assertion is true but the justification is	c) The assertion is not correct and justification	d)The assertion is not correct	a)

	justification on A.	not proper justification and not true	is also false.	but the justification is correct.	
85	SSL is used to:				Encrypt web communication
	a)Speed up DNS queries	b)Authenticate emails	c)Encrypt web communication	d)Route packets	c)
86	What type of cipher is Caesar Cipher?				Substitution cipher
	a) Substitution cipher	b) Transposition cipher	c) Stream cipher	d) Block cipher	a)
87	Hill cipher is based on which mathematical concept?				Matrix multiplication
	a) Boolean logic	b) Modular arithmetic	c) Matrix multiplication	d) Permutation	c)
88	**Assertion (A):** The Hill Cipher becomes unusable if the key matrix has no modular inverse. **Justification (B)**: Without an inverse matrix, decryption cannot be performed correctly. In the light of above statements, choose the most appropriate answer from the options given bellow:				Assertion A is true and Justification B is also true.
	a) Assertion A is False and justification B is true.	b) Assertion A is true and justification B is not true.	c) Both the Assertion A and justification B are False.	d) Assertion A is true and Justification B is also true.	d)
89	Which cipher technique does not preserve the frequency of letters?				Poly alphabetic substitution
	a) Mono alphabetic substitution	b) Poly alphabetic substitution	c) Caesar cipher	d) ROT13	b)
90	Which of the following is an example of unstructured data?				Text documents or emails
	a)Excel spreadsheet with sales records	b)SQL database table	c) Text documents or emails	d) CSV file with employee information	c
91	What is the main goal of data preprocessing?				Improving data quality for analysis

<table>
<tr><td></td><td>a) Storing data efficiently</td><td>b) Visualizing the data</td><td>c)Encrypting the data</td><td>d) Improving data quality for analysis</td><td>d</td></tr>
<tr><td>92</td><td colspan="4">Which of the following statements about data types and machine learning is TRUE?</td><td>Classification is a type of supervised learning algorithm.</td></tr>
<tr><td></td><td>a) Structured data cannot be used in supervised learning models</td><td>b) unstructured data is typically organized into rows and columns</td><td>c) Classification is a type of supervised learning algorithm.</td><td>d) Reinforcement learning does not use rewards or penalties to guide learning</td><td>c</td></tr>
<tr><td>93</td><td colspan="4">Assertion (A): Clustering is an unsupervised machine learning technique.
Reason (R): Clustering algorithms classify data into predefined labels.

In the light of above statements, choose the most appropriate answer from the options given bellow:</td><td>A is true, but R is false</td></tr>
<tr><td></td><td>a) Both A and R are true, and R is the correct explanation of A</td><td>b) Both A and R are true, but R is not the correct explanation of A</td><td>c) A is true, but R is false</td><td>d) A is false, but R is true</td><td>c</td></tr>
<tr><td>94</td><td colspan="4">Match the Data Science concepts (A–D) with their correct descriptions (i–iv).

<table><tr><td>A.Structured Data</td><td>i. Data arranged in rows and columns</td></tr><tr><td>B. Clustering</td><td>ii. Grouping data without predefined labels</td></tr><tr><td>C. Normalization</td><td>iii. Scaling values to a specific range</td></tr><tr><td>D. Reinforcement Learning</td><td>iv. Learning via rewards and penalties</td></tr></table></td><td>A-i, B-ii C-iii, D-iv</td></tr>
<tr><td></td><td>a) A-ii, B-i, C-iv, D-iii</td><td>b) A-i, B-ii C-iii, D-iv</td><td>c) A-iii, B- iv, C-ii, D-i</td><td>d) A-iv, B-iii, C-i D-ii</td><td>b</td></tr>
<tr><td>95</td><td colspan="4">Which of the following is a key purpose of data visualization?</td><td>Communicating data insights effectively</td></tr>
<tr><td></td><td>a) Encrypting</td><td>b) Cleaning raw</td><td>c)Communicating</td><td>d)Generating</td><td>c</td></tr>
</table>

<table>
<tr><td></td><td>sensitive information</td><td>data</td><td>data insights effectively</td><td>more data</td><td></td></tr>
<tr><td>96</td><td colspan="4">Which of the following statements about data preprocessing and visualization is FALSE?</td><td>Visualization is only useful after the model is trained</td></tr>
<tr><td></td><td>a) Normalization is used to scale data into a specific range</td><td>b) Data smoothing helps in reducing noise from datasets</td><td>c) Visualization is only useful after the model is trained</td><td>d)Preprocessing may include handling missing values and outliers.</td><td>c</td></tr>
<tr><td>97</td><td colspan="4">What type of machine learning is used in recommendation systems like Netflix or Amazon?</td><td>Reinforcement learning</td></tr>
<tr><td></td><td>a)Supervised learning</td><td>b)Unsupervised learning</td><td>c)Reinforcement learning</td><td>d)Clustering</td><td>c</td></tr>
<tr><td>98</td><td colspan="4">Match the following machine learning and data processing concepts (A–D) with their correct descriptions (i–iv):

<table><tr><td>A. Supervised Learning</td><td>i. Reducing noise in data to make trends more visible</td></tr><tr><td>B. Clustering</td><td>ii. Representing data graphically to understand patterns and insights</td></tr><tr><td>C. Data Smoothing</td><td>iii. A method where input data is labeled and used to train models</td></tr><tr><td>D. Data Visualization</td><td>iv. Grouping unlabeled data based on similarity or patterns</td></tr></table></td><td>A–iii, B–iv, C–i, D–ii</td></tr>
<tr><td></td><td>a) A–iii, B–iv, C–i, D–ii</td><td>b) A–ii, B–i, C–iv, D–iii</td><td>c)A–iv, B–iii, C–ii, D–i</td><td>d)A–i, B–ii, C–iii, D–iv</td><td>a</td></tr>
<tr><td>99</td><td colspan="4">What does normalization in data preprocessing help with?</td><td>Scaling values to a similar range</td></tr>
<tr><td></td><td>a)Converting categorical data into numbers</td><td>b)Scaling values to a similar range</td><td>c)Reducing data size</td><td>d)Filling missing values</td><td>b</td></tr>
<tr><td>100</td><td colspan="4">A: In Boolean algebra, the expression A·¬A=0 always holds.

B: In Boolean algebra, each element has a complement such that A+¬A= 1 and A·¬A=0.

In the light of above statements, choose the correct answer from the options given below:</td><td>Both A and B are true, and B explains A</td></tr>
</table>

	a)A is false, B is true	b)Both A and B are true, but B doesn't explain A	c)A is true, B is false	d)Both A and B are true, and B explains A	d