TS PGECET 2025 Question Paper

Time Allowed :2 Hours	**Maximum Marks :**120	**Total questions :**120

General Instructions

Read the following instructions very carefully and strictly follow them:

1. **Mode of Examination:** Online (Computer-based examination)
2. **Medium of Exam:** English
3. **Duration of Exam:** 2 hours
4. **Type of Questions:** Multiple-choice questions
5. **Number of Questions:** 120 Questions
6. **Total Marks:** 120 Marks
7. **Marking Scheme:**
   - 1 mark for each correct answer.
   - No negative markings for incorrect answers.

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1. Find the inverse of the matrix:

$$\begin{pmatrix} 2 & 3 \\ 1 & 4 \end{pmatrix}$$

(1) $\begin{pmatrix} 4 & -3 \\ -1 & 2 \end{pmatrix}$

(2) $\begin{pmatrix} 4 & 3 \\ -1 & 2 \end{pmatrix}$

(3) $\begin{pmatrix} 2 & -3 \\ -1 & 4 \end{pmatrix}$

(4) $\begin{pmatrix} -4 & 3 \\ 1 & -2 \end{pmatrix}$

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2. Evaluate the limit:

$$\lim_{x \to 0} \frac{\sin x - x}{x^3}$$

(1) $-\frac{1}{6}$

(2) $\frac{1}{6}$

(3) 0

(4) ∞

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3. Solve the differential equation:

$$\frac{dy}{dx} + y = e^x$$

(1) $y = \frac{e^x}{2} + Ce^{-x}$

(2) $y = e^x + Ce^{-x}$

(3) $y = \frac{e^x}{2} + Ce^x$

(4) $y = e^x + Ce^x$

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4. If a fair die is rolled twice, what is the probability that the sum is at least 10?

(1) $\frac{1}{12}$

(2) $\frac{1}{6}$

(3) $\frac{1}{9}$

(4) $\frac{1}{4}$

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5. Use the bisection method to find the root of $f(x) = x^2 - 2 = 0$ in $[1, 2]$ with an error less than 0.01.

(1) 1.414

(2) 1.5

(3) 1.732

(4) 1.618

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6. Which of the following correctly describes a binary search tree (BST)?

(1) A tree where each node has at most two children, with left child $<$ node $<$ right child

(2) A tree where each node has exactly two children

(3) A tree where all leaves are at the same level

(4) A tree where the root is the smallest value

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7. What is the time complexity of merge sort in the worst case?

(1) $O(n \log n)$

(2) $O(n^2)$

(3) $O(n)$

(4) $O(\log n)$

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8. Which of the following are necessary conditions for a deadlock?

(1) Mutual Exclusion and Hold and Wait

(2) Preemption and Circular Wait

(3) Mutual Exclusion and No Preemption

(4) Hold and Wait and Preemption

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9. Which of the following correctly describes the TCP/IP model?

(1) A 4-layer model: Application, Transport, Internet, Network Access

(2) A 7-layer model including Physical and Data Link layers

(3) A 5-layer model including Session and Presentation layers

(4) A 3-layer model: Application, Transport, Network

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10. What is normalization in database design?

(1) Process of organizing data to eliminate redundancy

(2) Process of indexing tables for faster queries

(3) Process of encrypting database records

(4) Process of backing up database files
