GATE 2026 EE Question Paper

Time Allowed :3 Hours	Maximum Marks :100	Total Questions :65

General Instructions

Read the following instructions very carefully and strictly follow them:

1. Each GATE 2024 paper consists of a total of 100 marks. The examination is divided into two sections – General Aptitude (GA) and the Candidate's Selected Subjects. General Aptitude carries 15 marks, while the remaining 85 marks are dedicated to the candidate's chosen test paper syllabus.
2. GATE 2024 will be conducted in English as a Computer Based Test (CBT) at select centres in select cities. The duration of the examination is 3 hours.
3. MCQs carry 1 mark or 2 marks.
4. For a wrong answer in a 1-mark MCQ, 1/3 mark is deducted.
5. For a wrong answer in a 2-mark MCQ, 2/3 mark is deducted.
6. No negative marking for wrong answers in MSQ or NAT questions.

1. Given an open-loop transfer function $GH = \frac{100}{s(s+100)}$ for a unity feedback system with a unit step input $r(t) = u(t)$, determine the rise time t_r.

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2. Consider a linear time-invariant system represented by the state-space equation:

$$\dot{x} = \begin{bmatrix} a & b \\ -a & 0 \end{bmatrix} x + \begin{bmatrix} 1 \\ 0 \end{bmatrix} u$$

The closed-loop poles of the system are located at $-2 \pm j3$. The value of the parameter b is:

(A) 3.25
(B) -3.25
(C) 13
(D) -13

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3. Consider a linear active two-terminal network connected across terminals Y and Z. If the Thevenin equivalent resistance (R_{TH}) of this network is calculated to be 0 Ω, the network behaves essentially as an:

(A) Ideal Current Source
(B) Ideal Voltage Source
(C) Practical Voltage Source
(D) Open Circuit

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4. A single-phase two-winding transformer is rated at 15 kVA, 1100/220 V. It is reconnected as an autotransformer with a voltage rating of 1320/1100 V. Find the kVA rating of the autotransformer.

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5. Which of the following statements is correct about the small-signal voltage gain of single-stage MOSFET amplifiers? Consider the statement: "Both common source and common gate amplifiers are inverting amplifiers."

(A) The statement is correct.
(B) The statement is incorrect.

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6. For the inverting operational amplifier circuit shown below, determine the closed-loop voltage gain ($A_{cl} = V_{out}/V_{in}$). The op-amp has an open-loop gain $A_{OL} = 10^5$.
(A) -20
(B) 20
(C) -19.996
(D) -20.042

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7. For the circuit shown below, find the value of the load resistance R_L that will absorb the maximum amount of power from the source circuit.

(A) 5 Ω
(B) 1.818 Ω
(C) 7.333 Ω
(D) 2.857 Ω

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8. In the series circuit shown containing a voltage source (V), a diode (D), a resistor (R), an inductor (L), and a capacitor (C), which of the following components are considered linear?

(A) R
(B) Diode
(C) L, C, D
(D) R, L, C only

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9. If P and Q are positive integers such that $P^2 = Q^2 + 13$, find the value of the product PQ.

(A) 13
(B) 42
(C) 49
(D) 36
