GATE 2026 Electronics and Communication Engineering (EC) Question Paper

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

General Instructions

Please read the following instructions carefully:

1. This question paper is divided into three sections:
   - **General Aptitude (GA):** 10 questions (5 questions × 1 mark + 5 questions × 2 marks) for a total of 15 marks.
   - **Environmental Science and Engineering + Engineering Mathematics:**
     - **Part A (Mandatory):** 36 questions (1 questions × 1 mark + 19 questions × 2 marks) for a total of 55 marks.
     - **Part B (Section 1):** Candidates can choose either Part B1 (Surveying and Mapping) or Part B2 (Section 2). Each part contains 16 questions (8 questions × 1 mark + 11 questions × 2 marks) for a total of 30 marks.
2. The total number of questions is **65**, carrying a maximum of **100 marks**.
3. The duration of the exam is **3 hours**.
4. Marking scheme:
   - For 1-mark MCQs, $\frac{1}{3}$ mark will be deducted for every incorrect response.
   - For 2-mark MCQs, $\frac{2}{3}$ mark will be deducted for every incorrect response.
   - No negative marking for numerical answer type (NAT) questions.
   - No marks will be awarded for unanswered questions.
5. Ensure you attempt questions only from the optional section (Part B1 or Part B2) you have selected.
6. Follow the instructions provided during the exam for submitting your answers.

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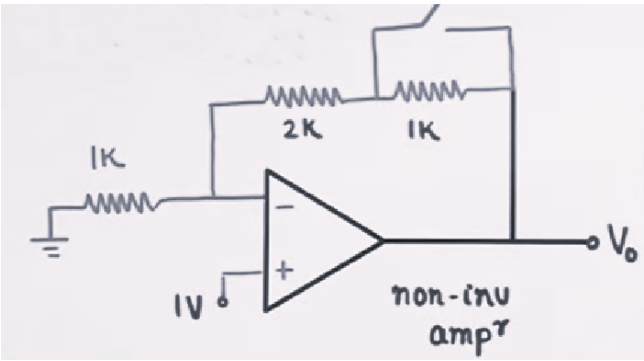
1. For the non-inverting amplifier shown in the figure, the input voltage is 1 V. The feedback network consists of 2 kΩ and 1 kΩ resistors as shown.
If the switch is open, $V_o = x$.
If the switch is closed, $V_o =$ ____x.



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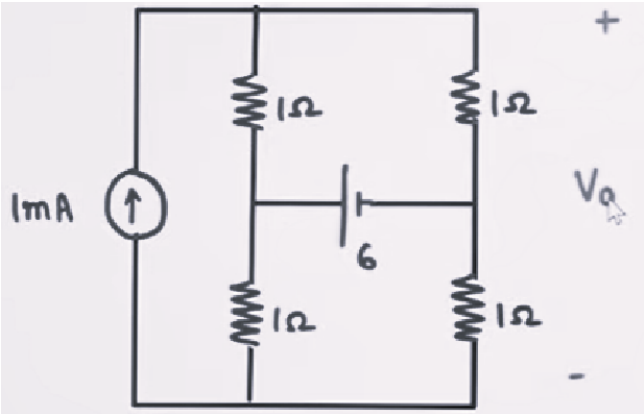
2. In the given circuit, all resistors are 1 kΩ. A 1 mA current source is connected between the top and bottom nodes. A 6 V source connects the midpoints of the two vertical branches as shown. Find the output voltage V_0.



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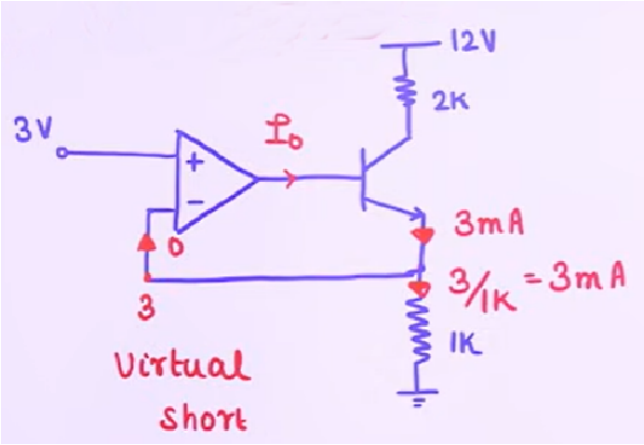
3. In the given circuit, the non-inverting input of the op-amp is at 3 V. The op-amp drives the base of a transistor as shown. The emitter is connected to a 1 kΩ resistor to ground and the collector is connected to 12 V through a 2 kΩ resistor. Find the output current I_o supplied by the op-amp.



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4. If

$$\log_{p^{1/2}} y \times \log_{y^{1/2}} p = 16,$$

then find the value of the given expression.

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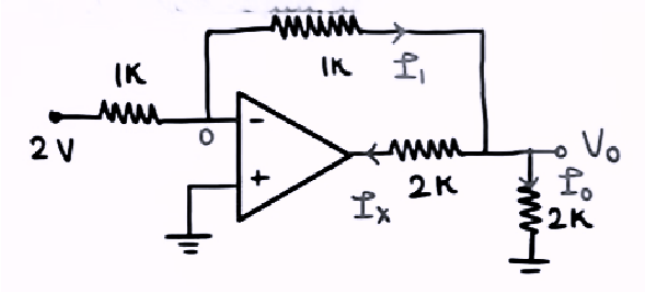
5. In the given op-amp circuit, the non-inverting terminal is grounded. The input voltage is 2 V applied through 1 kΩ. The feedback resistor is 1 kΩ. The output is connected to a 2 kΩ load to ground and also through a 2 kΩ resistor to the op-amp output. Find the output voltage V_0 and currents I_1, I_0, and I_x.



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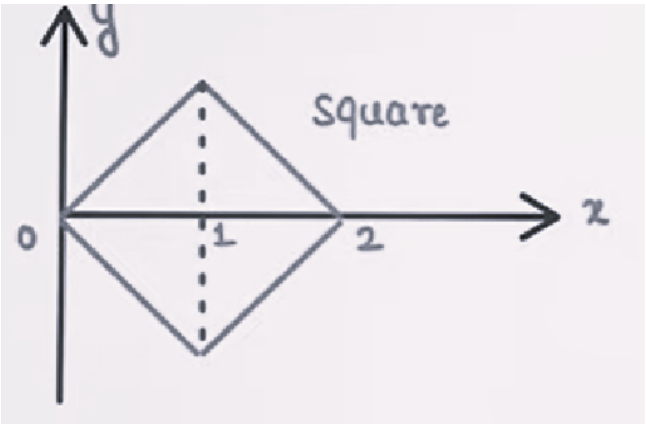
6. Find the area of the square shown in the figure whose vertices are at $(0, 0)$, $(1, 1)$, $(2, 0)$ and $(1, -1)$.



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7. Consider the system described by the difference equation

$$y(n) = \frac{5}{6}y(n-1) - \frac{1}{6}(4-n) + x(n).$$

Determine whether the system is linear and time-invariant (LTI).

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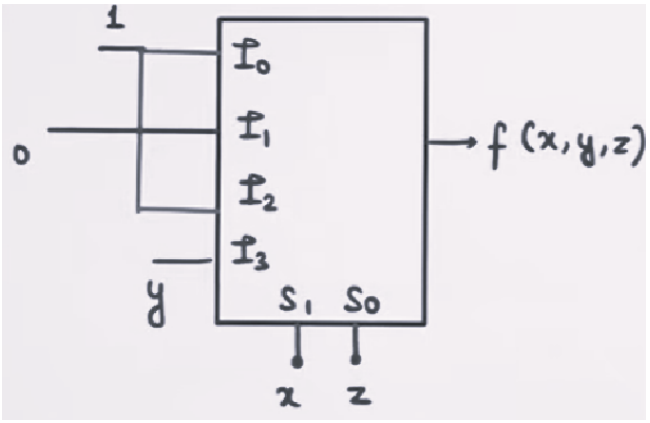
8. Given the state-space system:

$$\dot{x} = \begin{bmatrix} -4 & -1.5 \\ 4 & 0 \end{bmatrix} x + \begin{bmatrix} 2 \\ 0 \end{bmatrix} u$$

$$y = \begin{bmatrix} 0.15 & 0.625 \end{bmatrix} x$$

Find the Transfer Function (TF).

9. The figure shows a 4-to-1 multiplexer. The inputs are connected as:
$I_0 = 1, \quad I_1 = 0, \quad I_2 = 1, \quad I_3 = y.$
The select lines are $S_1 = x$ **and** $S_0 = z$.
Find the Boolean function $f(x, y, z)$.



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10. f(w, x, y, z) $= \Sigma(0, 2, 5, 7, 8, 10, 13, 14, 15)$

Find the correct simplified expression.

1. xz + wxy + $\mathbf{w}\overline{x}\,\overline{z} + \overline{w}xy\overline{z}$
2.$\overline{x}\,\overline{z} + wxy + w\overline{x}\,\overline{z} + \overline{w}xy\overline{z}$
3.$\overline{x}\,\overline{z} + xz + wy\overline{z}$
4.$\overline{x}\,\overline{z} + xz + wxy$

Rijak saimarini (option) bising soi kok kiphilmung saidi:

(1) xz + wxy + $\mathbf{w}\overline{x}\,\overline{z} + \overline{w}xy\overline{z}$
(2)$\overline{x}\,\overline{z} + wxy + w\overline{x}\,\overline{z} + \overline{w}xy\overline{z}$
(3)$\overline{x}\,\overline{z} + xz + wy\overline{z}$
(4)$\overline{x}\,\overline{z} + xz + wxy$

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11. mod-64 ripple counter can be designed using

1. 4
2. 5
3. 6
4. 7

Rijak saimarini (option) bising soi kok kiphilmung saidi:

(1) 4
(2) 5

(3) 6
(4) 7

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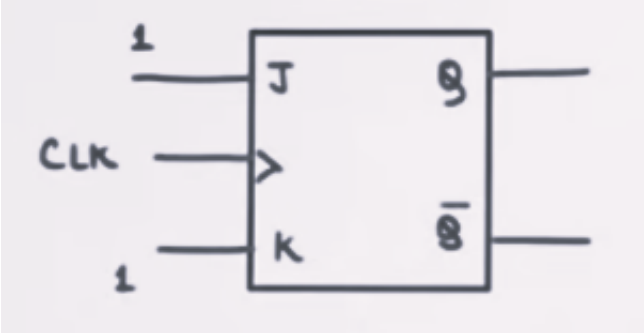
12. A JK flip-flop has inputs $J = 1$ and $K = 1$.
The clock input is applied as shown. Find the output clock cycles per second (output frequency).



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13. Find $P_1 + P_2 + \cdots + P_{10}$ if P_k is the perimeter of a square having side length k.
