

SY C 2022-23 ECA(2020pattern) CIE test on UNIT No. 03 and UNIT No 04 (Duration 1.30 Hrs)

Note: All the questions are mandatory. You can give this test only once and it can not be resubmitted. Solve all problems and upload the PDF or image of the solution. Write your name and Roll no. on each page.

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Higher the quality factor of a series LCR circuit, greater is the operating bandwidth * 1 point
of the resonant circuit.

- ☐ True
- ☒ False

A coil of inductance 0.1H and resistance of 10Ω is connected in series with a * 2 points
capacitor of $0.1\mu\text{F}$. Find quality factor of the circuit at resonance.

- ☐ 103
- ☐ 102
- ☒ 100
- ☐ 98

A 12Ω resistor, a $40\mu\text{F}$ capacitor, and an 8mH coil are in series across an ac source. * 2 points
The resonant frequency is

- ☐ 28.1 Hz
- ☒ 281 Hz
- ☐ 2,810 Hz
- ☐ 10 kHz



The device parameters for an n-Channel JFET are: Maximum current $I_{DSS} = 10\text{mA}$, * 2 points
Pinch off voltage $V_p = -4\text{V}$. Calculate the drain current for $V_{GS} = -1.0\text{V}$.

- ☒ 5.6 mA
- ☐ 0.56 mA
- ☐ 6.5 mA
- ☐ 6.66 mA

The pinch off voltage for a n – channel JFET is 4 V, when $V_{GS} = 1\text{V}$, the pinch – off * 2 points
occurs for V_{DS} equal to

- ☐ 4V
- ☒ 3V
- ☐ 5V
- ☐ 6V

An n – channel JFET has $I_{DSS} = 2\text{mA}$ and $V_p = -4\text{V}$. An applied GATE to source * 2 points
voltage V_{GS} is -2V . Find its transconductance $g_m(\text{in mA/V})$.

- ☐ 0.25
- ☒ 0.50
- ☐ 0.75
- ☐ 1.0



When drain voltage equals the pinch-off-voltage, then drain current with the * 1 point
increase in drain voltage

- ☐ decreases
- ☐ increases
- ☒ remains constant
- ☐ none of the above

If the reverse bias on the gate of a JFET is increased, then width of the conducting * 1 point
channel

- ☒ is decreased
- ☐ is increased
- ☐ remains the same
- ☐ doubles

A JFET has a drain current of 5 mA. If $I_{DSS} = 10$ mA and $V_{GS}(\text{off}) = -6$ V, find the 2 points
value of (i) V_{GS} and (ii) V_P .

- ☒ -1.76 V, 6V
- ☐ -1.67 V, 6.6V
- ☐ -1.87 V, 7V
- ☐ 1.67 V, 6.4V
- ☐ Other:

Clear selection



When V_{GS} of JFET changes from -3.1 V to -3 V , the drain current changes from 1 mA to 1.3 mA . What is the value of transconductance? 2 points

- ☒ 3000 $\mu\text{ mho}$
- ☐ 3000 m mho
- ☐ 3500 mho
- ☐ 3698 mho

Clear selection

The datasheet of a JFET gives the following information: $I_{DSS} = 3\text{ mA}$, $V_{GS}(\text{off}) = -6\text{ V}$ and $g_m(\text{max}) = 5000\text{ }\mu\text{S}$. Determine the transconductance for $V_{GS} = -4\text{ V}$ and find drain current I_D at this point. 3 points

- ☒ $g_m = 1167\text{ }\mu\text{S}$ and $I_D = 333\text{ }\mu\text{A}$
- ☐ $g_m = 333\text{ }\mu\text{S}$ and $I_D = 1167\text{ }\mu\text{A}$
- ☐ $g_m = 1167\text{ mS}$ and $I_D = 333\text{ mA}$
- ☐ $g_m = 1107\text{ }\mu\text{S}$ and $I_D = 321\text{ }\mu\text{A}$
- ☐ Option 5

Clear selection

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