

Written Test for Degree Engineering Interview

Date: 20/07/2024

Branch: E & TC Engineering

Time: 1 hr

Marks: 20

Note: All questions are compulsory and carry 2 marks each

- Let $m(t)$ be a strictly band-limited signal with bandwidth B and energy E . Assuming $\omega_0 = 10B$, the energy in the signal $m(t) \cos \omega_0 t$ is
 A. $\frac{E}{4}$ B. $\frac{E}{2}$ C. E D. $2E$
- In feedback control system shown in Figure 1 below $G(s) = \frac{6}{s(s+1)(s+2)}$, where $R(s)$, $Y(s)$, & $E(s)$ are Laplace transform of $r(t)$, $y(t)$, & $e(t)$ respectively, if the input $r(t)$ is a unit ramp function then ———
 A. $\lim_{t \rightarrow \infty} e(t) = 0$ B. $\lim_{t \rightarrow \infty} e(t) = \frac{1}{3}$ C. $\lim_{t \rightarrow \infty} e(t) = \frac{1}{4}$ D. $\lim_{t \rightarrow \infty} e(t)$ does not exist, $e(t)$ is oscillatory.

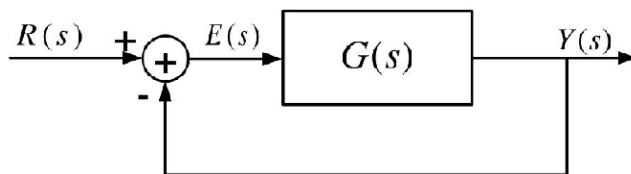


Figure 1: Q.22

- What is the z-transform of the following finite duration signal? $x[n] = \{2, 4, 5, 7, 0, 1\}$
 A. $2 + 4z + 5z^2 + 7z^3 + z^4$ B. $2 + 4z + 5z^2 + 7z^3 + z^5$ C. $2 + 4z^{-1} + 5z^{-2} + 7z^{-3} + z^{-5}$
 D. $2z^2 + 4z + 5 + 7z^{-1} + z^{-3}$
- The BJT as a switch is operated in one of the following: A. Only saturation region
 B. Active region C. Only cut off region D. Both saturation and cut off region
- A DC power supply has no load voltage of 30 V and full load voltage of 25 V at full load current of 1 A. Its output resistance and load regulation respectively are.
 A. 5Ω and 20% B. 25Ω and 20% C. 5Ω and 16.7% D. 25Ω and 16.7%
- A 500 W carrier signal is amplitude modulated with modulation percentage of 60%. The total power in the modulated signal if the amplitude modulation used is the double sideband AM with full carrier (A3E) is.

- A. 590 W B. 534 W C. 125 W D. 300 W

7. What will be the o/p of the given logic gate of Figure 2?

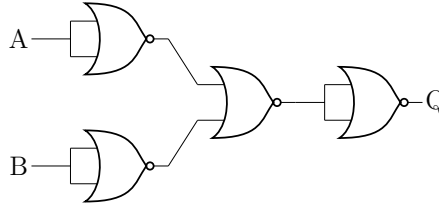


Figure 2: Q.27

- A. NOR B. NAND C. AND D. OR

8. Let \hat{i} and \hat{j} be the unit vectors along x and y axes respectively, and let A be the positive constant. Which one of the following is true for vector fields $\vec{F}_1 = A(\hat{i}y + \hat{j}x)$, $\vec{F}_2 = A(\hat{i}y - \hat{j}x)$

- A. Both \vec{F}_1 and \vec{F}_2 are electrostatic fields. B. Only \vec{F}_1 is an electrostatic fields.
C. Only \vec{F}_2 is an electrostatic fields. D. Neither \vec{F}_1 nor \vec{F}_2 are electrostatic fields.

9. The current I_y flowing through 660Ω resistance is (Refer Figure 3):

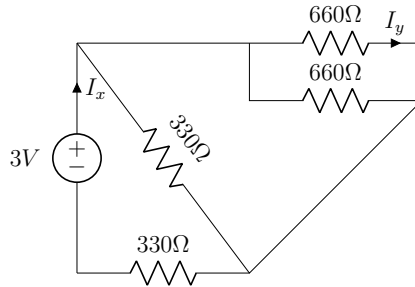


Figure 3: Q.29

- A. I_x B. $I_x/2$ C. $I_x/4$ D. $I_x/3$

10. In the circuit shown below, P and Q are the inputs. The logical function realized by the circuit shown Figure 4 below is:

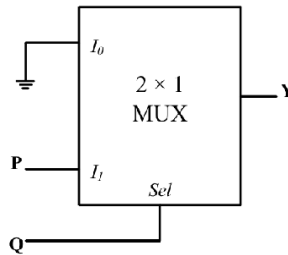


Figure 4: Q.30

- A. $Y = PQ$ B. $Y = P + Q$ C. $Y = \overline{PQ}$ D. $Y = \overline{P + Q}$