Raosaheb Wangde Master Charitable Trust's

DNYANSHREE

INSTITUTE OF ENGINEERING & TECHNOLOGY

A/P. Sonvadi-Gajvadi, Sajjangad Road, Tal. & Dist.: Satara - 415 013. (Maharashtra) India

Founder & Chairman
Hon.Dnyaneshwar B. Wangde (Bhai)

ACCREDITED WITH GRADE B+ NAAC 1st Cycle

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

---

1. 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. $2E$

2. In feedback control system shown in Figure 1 below $G(s) = \dfrac{6}{s(s+1)(s+2)}$, 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. $\lim_{t\to\infty} e(t) = 0$ B. $\lim_{t\to\infty} e(t) = \frac{1}{3}$ C. $\lim_{t\to\infty} e(t) = \frac{1}{4}$ D. $\lim_{t\to\infty} e(t)$ does not exist, $e(t)$ is oscillatory.

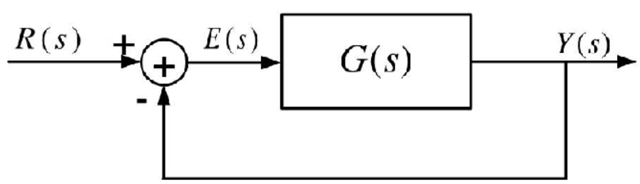

Figure 1: Q.2

3. What is the z-transform of the following finite duration signal?

$$x[n] = \{2, 4, \underset{\uparrow}{5}, 7, 0, 1\}$$

   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. $2z^2 + 4z + 5 + 7z^{-1} + z^{-3}$

4. 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

5. 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%

6. 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?

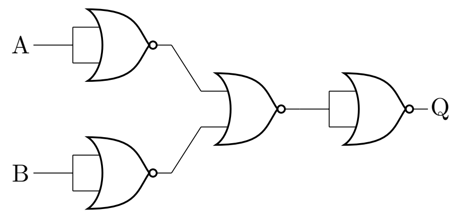

Figure 2: Q.7

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

8. Let $\hat{\imath}$ and $\hat{\jmath}$ 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 $\bar{F_1} = A(\hat{\imath}y + \hat{\jmath}x)$, $\bar{F_2} = A(\hat{\imath}y - \hat{\jmath}x)$

A. Both $\bar{F_1}$ and $\bar{F_2}$ are electrostatic fields. B. Only $\bar{F_1}$ is an electrostatic fields. C. Only $\bar{F_2}$ is an electrostatic fields. D. Neither $\bar{F_1}$ nor $\bar{F_2}$ are electrostatic fields.

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

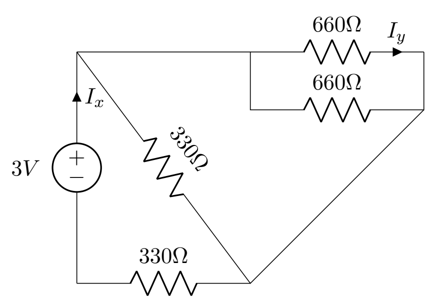

Figure 3: Q.9

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:

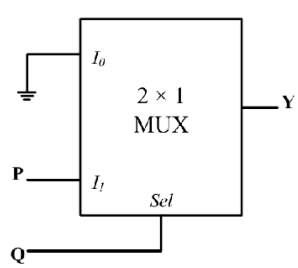

Figure 4: Q.10

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