

Electrical Engineering

Sample Paper-2

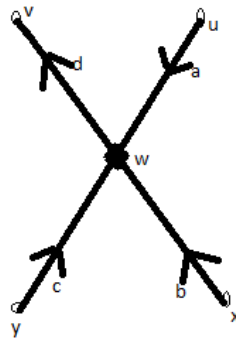
Q.1- A cable has following characteristics $L=0.201 \mu\text{H/m}$ & $C=196.2 \text{ pF/m}$. The velocity of wave propagation through the cable is

- (a) 32 m/s (b) $159.24 \mu\text{H/m}$ (c) 0.0312 m/s (d) $159.24 \text{ m}/\mu\text{s}$

Q.2- An Industrial consumer has a daily load pattern of 2000 kW, 0.8 lag for 12 Hrs., and 1000 kW UPF for 12 Hrs the load factor is

- (a) 0.5 (b) 0.75 (c) 0.6 (d) 2.0

Q.3- In the Signal flow graph shown below. The correct relationship is



- (a) $w = au + bx + cy - dv$ (b) $w = au + bx + cy$
(c) $w = au + bx + dv$ (d) $w = au + cy + bx - dw$

Q.4- The close loop transfer fcn of a control system is given by

$$\frac{C(s)}{R(s)} = \frac{1}{1 + S}$$

For input $r(t) = \sin t$, the steady state volume $c(t)$ is give by:-

- (a) $\frac{1}{\sqrt{2}} \cos t$ (b) 1 (c) $\frac{1}{\sqrt{2}} \sin t + \frac{1}{2} e^{-t}$ (d) $\frac{1}{\sqrt{2}} \sin (t - \frac{\pi}{2}) + \frac{1}{2} e^{-t}$

Q.5- Match the following

List-1	List-2
A. No load and blocked rotor	1. Transformer
B. Sumpner's test	2. Induction Machine
C. Swinburn's test	3. Synchronous Machine
	4. DC machine Function

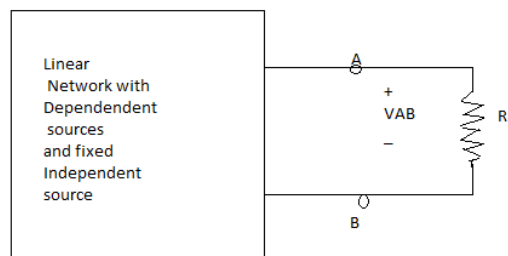
CODES:

- (a) A2 B1 C4
 (b) A1 B2 C3
 (c) A3 B2 C1
 (d) A4 B1 C2

Q.6- A 220 V, 15 kW, 1000 rpm shunt motor with armature resistance of 0.25Ω , has a rated line current of 68 A and a rated field current of 2.2 A. The change in field flux required to obtain a speed of 1600 rpm while drawing a line current of 52.8 Amp and a field current of 1.8 Amp is

- (a) 18.18% increase (b) 18.18% Decrease
 (c) 36.36% increase (d) 36.36% decrease

Q.7- In the following linear circuit, it is given that $V_{AB}=4v$ and $R_L = 10k$, and $V_{AB}= 1V$, & $R_L = 2k$



The value of thevenin resistance and voltage for the network "N" is given by

- (a) $16\ \Omega, 30v$ (b) $30k\ \Omega, 16v$ (c) $3k\ \Omega, 6v$ (d) $50k\ \Omega, 30v$

Q.8- A 800 kV transmission line is having per phase line inductance of 1.1 mH/km and per phase line capacitance of 11.78 nF/km. Ignoring the length of line its ideal power transfer capability in MW is

- (a) 1204 MW (b) 1504 MW (c) 2085MW (d) 2606 MW

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Q.9- An EHV transmission line of length 300 km can be approximate by a loss less line having propagation constant $\beta=0.00127$ rad/km. then the percentage ratio of line length to the wave length will be given by

- (a) 24.24 % (b) 12.12 % (c) 19.05 % (d) 6.06 %

Q.10- state equation are represented by

$$\dot{X} = \begin{bmatrix} 0 & 1 \\ -2 & -1 \end{bmatrix} X + \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix} u$$

The Eigen value are

- (a) 1, -1 (b) $-0.5 \pm j 1.323$ (c) -1, -1 (d) +1, +1

Q.11- A system is having a damping ratio of 1.25 and ω_n (natural frequency) of 200 rad/sec and D.C gain of “1”.

The response of system to a unit step input is

- (a) $1 + \frac{5}{3} e^{-50t} - \frac{2}{3} e^{-150t}$ (b) $1 + \frac{1}{3} e^{-100t} - \frac{4}{3} e^{-400t}$
 (c) $1 - \frac{4}{3} e^{-100t} + \frac{1}{3} e^{-400t}$ (d) $1 + \frac{2}{3} e^{-50t} - \frac{5}{3} e^{-150t}$

Q.12- The surge impedance of 400 km long overhead transmission line is 400 ohm. For a 200 km length of the same line, the surge impedance will be

- (a) 200 ohm (b) 800 ohm (c) 400 ohm (d) 100 ohm

Q.13- The closed loop transfer function of a system is given by

$$\frac{C(S)}{R(S)} = \frac{50}{S(1+ST)(1+0.5S)+50}$$

Find the value of ‘T’ such that the system is driven on to verge of instability and find Resulting frequency of oscillation.

- (a) $T = \frac{1}{48}$, $w = 9.8$ rad/sec (b) $T = \frac{1}{41}$, $w = 19.7$ rad/sec
 (c) $T = \frac{2}{41}$, $w = 7.8$ rad/sec (d) None of these

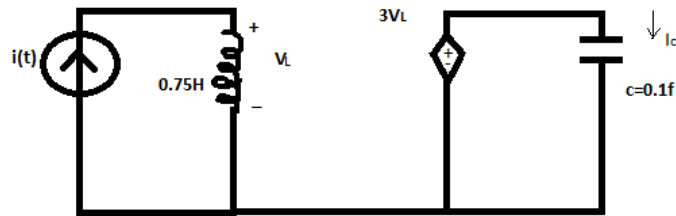
Q.14- The forward transfer function of a unity feedback “type 1”, 2nd order system has a pole at -2 the nature of Gain K is so adjusted that the damping ratio is 0.4. The above equation is subjected to the input $r(t)=1+4t$

Find steady state error?

- (a) $e_{ss}=1.28$ (b) $e_{ss}=2.94$ (c) $e_{ss}=1.12$ (d) $e_{ss}=1.02$

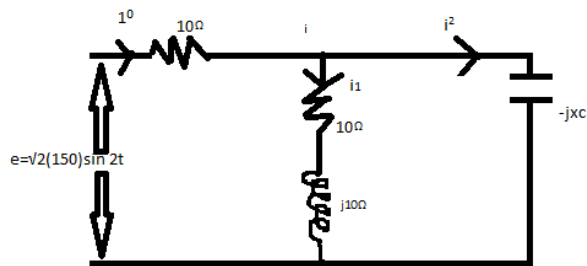


Q.15- $L(t) = 2 \sin 2t$ in the following circuit



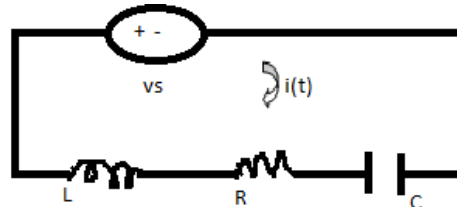
- (a) $1.8 \sin 2t$ (b) $-1.8 \sin 2t$ (c) $-0.9 \cos 2t$ (d) $0.9 \cos 2t$

Q.16- In the given circuit below, e , and “ i ” are in phase calculate phase angle between “ e ” and “ i_1 ”,



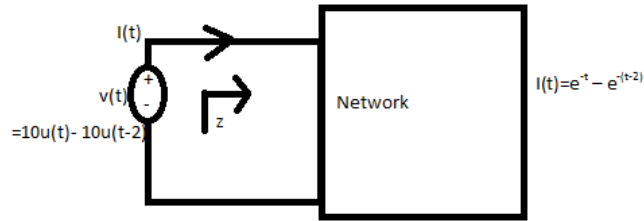
- (a) -45° (b) 45° (c) 90° (d) 63°

Q.17- Construct the dual network for curves circuit diagram.



- (a)
- (b)
- (c)
- (d)

Q.18- The Impedance of following network consists of



- (a) Resister only (b) Resister and capacitor
 (c) Capacitor, inductor, resister (d) resister, inductor

Q.19- The step response of RLC series ckt. Is given by

$$\frac{d^2 I(t)}{dt^2} + \frac{2dI(t)}{dt} + 5I(t) = 10$$

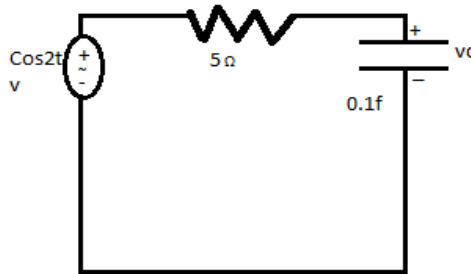
$$I(0+) = 2, \frac{dI(0+)}{dt} = 4$$

Find $I(t) = ?$

- (a) $1 + e^{-4t} \cos 4t$ amp (b) $4 - 2e^{-4t} \cos 4t$ amp
 (c) $2 + e^{-4t} \sin 4t$ amp (d) $10 + e^{-4t} \sin 4t$ amp

Q.20- In the given ckt. Of fig. below

$V_c(t)$ is



- (a) $1/\sqrt{2} \cos(2t - 45^\circ)$ v (b) $1/\sqrt{2} \cos(2t + 45^\circ)$ v
 (c) $1/\sqrt{2} \sin(2t - 45^\circ)$ v (d) None of these

Q.21- The Integral

$$\frac{1}{2\pi} \int_0^{2\pi} \sin(t - \tau) \cos \tau \, d\tau \text{ equals}$$

- (a) $\sin t \cos t$ (b) 0 (c) $\frac{1}{2} \cos t$ (d) $\frac{1}{2} \sin t$

Q.22- Let $A = \begin{bmatrix} 2 & -0.1 \\ 0 & 3 \end{bmatrix}$ and $A^{-1} = \begin{bmatrix} \frac{1}{2} & a \\ 0 & b \end{bmatrix}$ then a+b is equal to

- (a) 7/20 (b) 3/20 (c) 19/60 (d) 11/20

Q.23- The area in first quadrant under curve

$$y = \frac{1}{x^2+6x+10} \text{ is}$$

(a) $\frac{\pi}{2}$ (b) $\frac{\pi}{4} - \tan^{-1} 3$ (c) $\frac{\pi}{2} - \tan^{-1} 3$ (d) $\frac{\pi}{2} - \tan^{-1} 3$

Q.24-The Newton Raphson method

$$X_{n+1} = \frac{X_n}{2} + \frac{3}{2X_n}$$

Can be used to solve the equal

(a) $x^2=3$ (b) $x^3=3$ (c) $x^2=3$ (d) $x^{-3}=3$

Q.25- The solution of $x \frac{dy}{dx} + y = x^4$ with the condition

$$Y(1) = \frac{6}{5} \text{ is}$$

(a) $y = \frac{x^4}{5} + \frac{1}{x}$ (b) $y = \frac{4x^4}{5} + \frac{4}{5x}$ (c) $y = \frac{x^4}{5} + 1$ (d) $y = \frac{x^5}{5} + 1$

Q.26- Mamta had no _____ about going the chairman's clerk and throwing her resignation letter to him.

- (a) Apathy (b) Penchant (c) Compunction (d) Juxtaposition

Q.27- Make the correct word from the meaning given in the question:-

To speak in an indirect manner to evade a point, to mislead

- (a) Prevaricate (b) Concede (c) Relegate (d) Remonstrate

Q.28- Three pipes of varying diameters can fill the vessels of 1,2,and 3 L in 4, 18, and 48 min respectively. What is the ratio of the diameters?

- (a) 6:4:3 (b) 2:3:4 (c) 1:4:5 (d) 2:5:8

Q.29- $125^x + 45^x = 2 \cdot (27)^x$ has.....

- (a) No solution (b) One solution (c) Two solution (d) More than two solution

Q.30- If X follows binomial distribution with parameter n=8 and p=1/2 then $p (|x-4| \leq 2)$ equals to

- (a) $\frac{118}{128}$ (b) $\frac{119}{128}$ (c) $\frac{117}{128}$ (d) None of these

