Electrical Engineering — Sample Paper-1

Q.1- In a four pole, 3-phase,50hz induction machines, the slip rings of the machine are open circuited. The frequency of the voltage across slip ring is 75hz. The rotor speed is.
(a) 750 rpm (b) 1500rpm (c) 2250 rpm (d) 3850rpm

Q2. A 6 pole, 3-phase induction motor develops the maximum torque at 1000rpm. When operated from a 60hzs supply. Rotor resistance per phase is 1.2 Ω. Neglecting stator impedance the speed at which it will develop maximum torque. When operated from 50hzr supply will be.
(a) 1000rpm. (b) 600rpm. (c)800rpm. (d) 200rpm .

Q3. The sending of voltage of a feeder with reactance 0.2p.m is 1.2p.u.if the reactive power at the receiving end of the feeder is 0.3p.u, the approximate drop of volts in feeder is.
(a) 0.2p.u. (b) 0.06p.u. (c) 0.05p.u. (d) 0.072p.u.

Q4. The corona loss on a particular transmission system at 50hz is 1km per phase per km. the corona loss of the system at 25hz will be.
(a) 1kw/phase/km. (b) 0.5kw/phase/km (c)0.66kw/phase/km. (d) none of the above.

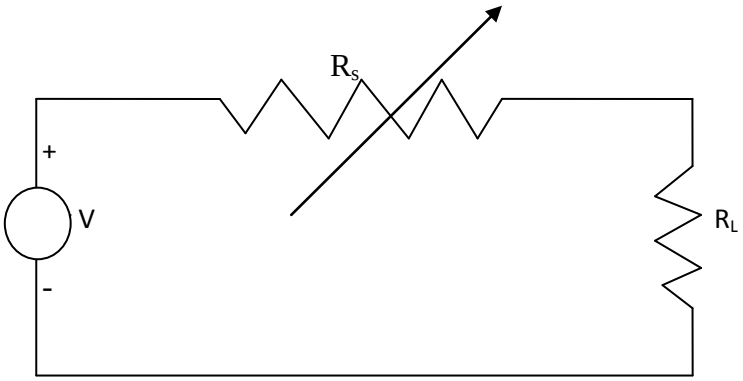
Q5.Consider a system whose state model is given below :

$$\dot{X} = \begin{vmatrix} 0 & 1 \\ -2 & +3 \end{vmatrix} X + \begin{vmatrix} 0 \\ 1 \end{vmatrix} U$$

The eigen values for the system are :-
(a) 2,3 (b) 1,0 (c)0,2 (d)1,2

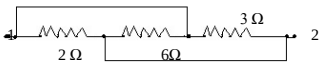
Q6. The condition of maximum power transfer to the load in circuit given below will be.

(a) $R_s = R_L$ (b) $R_s = 0$ (c) $R_L = 0$ (d) $R_{s=} \infty$

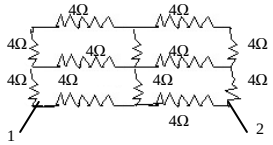


Q.7 in the table A are shown configuration of circuits and in table B are shown. Equivalent resistance between terminals 1&2. Match the table and select correct answer using codes given below the table.

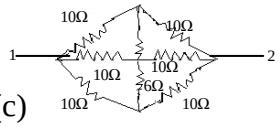
Table-A table-B

(a) 

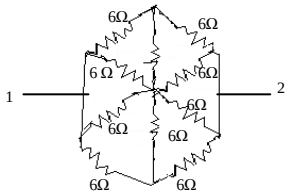
1. 5Ω.

(b) 

2. 1Ω

(c) 

3. 20/3



(d)

4. 3Ω

Codes:

a1	b2	c3	d4
b1	a2	c3	d4
d1	c2	a3	b4
b1	a2	c3	d4

Q.8- Three, two winding transformers heaving following leakage independence are connected in parallel without overloading any transform ate, maximum load that can be supplied by three transformers will be.

Transformer 1. 100kVA – 0.02pu.
Transformer 2. 75KVA – 0.03pu.
Transformer 3. 50KVA – 0.025pu.

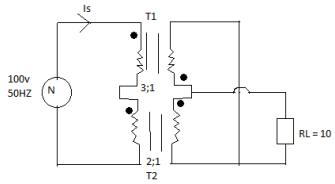
(a) 300KVA. (b) 150KVA. (c) 225KVA. (d) 190KVA.

Q.9- A 3-phase alternator with line voltage 200∫3 is to be synchronized with infinite bus.The maximum value of RMS voltage across synchronizing switch will be.

(a) 600 volts. (b)400√3 volts. (c)400 volts. (d)300 volts.

Q.10-consider the transformation T_1 & T_2 which are idea & single phase. The current drawn from the source(I_s) in the given configuration will be.

Turns ratio for T_1 = 3:1
Turns ratio for T_2 =2:1



(a) 0.4A (b) 1A (c) 5A (d) 4A

Q.11- A dc shunt motor draws an amative current of 5 Amps under normal rooted conditions and it is during a constant power load. If both the failed flux and armature terminal voltage are halved, then the ampere current will be.

(a) 5A (b) 10A (c) 2.5A (d) 1.25A

Q.12- The corona loss on a particular transmission system at 50HZ is 1kw per phase per km. the corona loss of the system at 25 hz will be.

(a) 1kw/phase/km. (b) 0.5kw/phase/km.
(c) 0.66kw/phase/km. (d) None of the above

Q.13- Which of the following power versus load angle diagram is correct to maintain the transient satiating of the cylinder

(a) Only I (b) Only i & ii (c) Only iii & iv (d) Only iv

Q.14- For a single line to ground fault for an unloaded generator in one phase. If $x_d = x_2 = 0.25$pu and $x_0 = 0.15$pu and $x_n = 0.05$pu. For initial pre fault voltage of 1pu. The magnitude of fault current will be.

(a) 3.75pu. (b)1.54pu. (c)1.43pu. (d) 1.25pu.

Q.15- A 3-phase transformer rated for 33kv/6.6kv is connected and protecting current transformer on the low voltage side have a ratio of 400/5. The ratio of the current transforms on H.V side is.

(a) 80:5 (b) $80/\sqrt{3}:5$ (c) $80:5\sqrt{3}$ (d) $80:5/\sqrt{3}$

Q.16- Which of the following statement is correct.

S_1 :- load flow is used for power system planning.

S_2 :- load flow is basically a transient state solution of power system.

S_3 :- load flow is basically a steady state solution and it gives initial condition of the system for studying the transient behavior of the system.

S_4 :- choosing one of the buses as a slack bus makes model admittance matrix non singular this makes it easy to handle.

S_5 :- choosing one the buses as slack bus balances the power dosses and thus modal admittance matrix become singular i.e easy to handle.

(a) Only S_5 & S_1 are correct. (b) Only S_2 & S_4 are correct.

(c) Only S_5 & S_3 & S_2 are correct. (d) S_1 & S_3 & S_4 are correct.

Q.17- The open loop transfer function of a unity feedback system is :

$$\frac{20(s+1)}{s2(s+2)(s+4)}$$

What is the error constant for unit ramp input ?

(a) ∞ (b) 0 (c)2.5 (d) 5

Q.18- A unit feedback system is characterized by an open loop transfer function ,

$$G(s)\frac{100}{s(s+10)}$$

Find w_n & settling time t_s if damping ratio , E = 0.5

(a)100 , 0.8 sec. (b) 10 rad/sec, 0.8 sec.

(c)5 rad/sec,0.36 sec. (d) 7 rad/sec, 0.5 sec.

Q.19- A unity feedback system is characterized by an open loop transfer function,

$$G(s)\frac{K(s2+1)}{s(s+1)(s+2)}$$

. The system is stable for :

(a) K > -1 (b) K > -2 (c) K < -1 (d) K < -2.

Q.20- For the root locus parttern of a system whose forward path transfer function is,

$$G(s) = \frac{K}{s(s+2)(s+3)},$$

the breakaway point is :

(a) -2.549 (b) -0.784 (c)-1.85 (d) -3.52

Q.21- If D_1, D_2 are two diagonal matrices, then

(a) $D_1 D_2 = D_2 D_1$ (b) $D_1 D_2$ is a Diagonal matrix

(c) Both of the above (d) $D_1 D_2$ may or may not defined

Q.22- If $A = \begin{bmatrix} 1 & 2 \\ 4 & -3 \end{bmatrix}$, then $A^2 + 4A - 5I$ equal to

(a) $\begin{bmatrix} 8 & 4 \\ 8 & 0 \end{bmatrix}$ (b) $\begin{bmatrix} 0 & -4 \\ 8 & 8 \end{bmatrix}$ (c) $\begin{bmatrix} 2 & 1 \\ 2 & 0 \end{bmatrix}$ (d) $\begin{bmatrix} 1 & 1 \\ 1 & 0 \end{bmatrix}$

Q.23- If tow square are chosen at random on a chess board the probability that they have side in common is

(a) 1/9 (b) 2/7 (c) 1/18 (d) none

Q.24- An I.F. of the differential equation $(1-x^2)\frac{dy}{dx} - xy = 1$ is

(a) $-x$ (b) $\frac{x}{1-x^2}$ (c) $\sqrt{1-x^2}$ (d) $\frac{1}{2}\log_e(1-x^2)$

Q.25- A garrison of 3000 men has provision for 25 days, when given at the rate of 900g per head. At the end of 11 days, a reinforcement arrives and it was found that now the provision will be last 10 days more, when given at the rate of 840 g per head. The strength of reinforcement is

(a) 1200 men (b) 1500 men (c) 1600 men (d) 1800 men

Q.26- Out of the given alternatives, choose the one which can be substituted for the given words or sentences.

Too much official formality

(a) delayed (b) officiousness (c) formality (d) red tapism

Q.27- The following questions comprise two word each that have a certain relationship between them, followed by four lettered pair of word. Select the lettered pair that has the relationship as the original pair of words.

i) shrub : prune

(a) beard : shave (b) hair : trim

(c) lawn: mow (d) wool : shear

Q.28- A group of labourers promise to do a piece of work in 12 days, but 5 of them do not turn up. If the rest of the group do the work in 18 days, find the original number of men.

(a) 15 (b) 25 (c) 35 (d) 45

Q.29- Hari (H), Gita(G), Irfan(I) and Saira(S) are siblings(i.e., brothers and sisters). All were born on Ist January. The are difference between any two successive siblings (that is born one after another) is less than 3 year. Given the following facts:

I. Hari's age + Gita's age > Irfan's age + Saira's age

II. The age difference between Gita ans Saira os 1 year. However, Gita is not the oldest and Saira is not the youngest.

III. There are no twins.

In what order were they born (oldest first)?

(a) HSIG (b) SGHI (c) IGSH (d) IHSG

Q.30- Given digits 2,2,3,3,3,4,4,4,4 how many distinct 4 digit numbers greater than 3000 can be formed?

(a) 50 (b) 51 (c) 52 (d) 54