INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad -500 043

ELECTRICAL AND ELECTRONICS ENGINEERING

TUTORIAL QUESTION BANK

Course Name	:	**PRINCIPLES OF ELECTRICAL ENGINEERING**
Course Code	:	**A40215**
Class	:	II B. Tech II Semester
Branch	:	Electrical and communication Engineering
Year	:	2015 – 2016
Course Faculty	:	K.Lingaswamy Reddy , G.harikrishna, S Swathi, Assistant Professor

OBJECTIVES

This course it is aimed to introduce the students the principles and applications of control systems in everyday life. The basic concepts of block diagram reduction, time analysis solutions to time invariant systems and also deals with the different aspects of stability analysis of systems in frequency domain and time domain

QUESTION BANK ON SHORTANSWER QUESTIONS

GROUP-I

S.No	QUESTION	BLOOMS TAXONOMY LEVEL	PROGRAM OUTCOME
UNIT –I **TRANSIENTS**			
1	What is transient response of circuit?	Remember	1
2	What is the significance of initial conditions in a step response of Series R-L and R-C circuit	Remember	1
3	What is mean by steady state condition?	Remember	1
4	Explain initial conditions in a network?	Remember	1
5	Explain initial conditions of basic passive elements?	Understood	1
6	What is the significance of initial conditions in a step response of r-l and r-	Understood	1
7	What is meant by step response of circuit?	Understood	1
8	What is meant by driven circuit and un-driven circuit?	Understood	1
9	Define time constant?	Understood	1
10	Define 1) Rise time 2) Peak time	Understood	1
UNIT-II **TWO PORT NETWORKS**			
1	Define two port networks?	Remember	2
2	Define z parameters.	Remember	2
3	Why Z parameters are called open circuit impedance parameters.	Remember	2
4	Define ABCD parameters.	Remember	2
5	Define Y parameters.	Remember	2
6	Define H parameters	Remember	2
7	What are symmetrical networks?	Remember	2

8	What is condition of symmetry for Z parameters?	Remember	2
9	What is condition of symmetry for Y parameters?	Remember	2
10	What is condition of symmetry for ABCD parameters?	Remember	2
	UNIT-III FILTERS		
1	Define cut-off frequency of a filter.	Remember	3
2	What are desirable characteristics of filter?	Remember	3
3	Define filter	Remember	3
4	What is constant –k section?	Remember	3
5	Write Application of filters.	Remember	3
6	Define Neper?	Remember	3
7	Define stop band.	Remember	3
8	Define pass band.	Remember	3
9	Define attenuation band	Remember	3
10	Define low pass filter.	Remember	3
11	Write the formuale for characteristic impedance for T- section	Remember	3
12	Define high pass filter.	Remember	3
13	Define band pass filter.	Remember	3
14	Define band elimination filter.	Remember	3
15	Define characteristic impedance.	Remember	3
16	Draw π and T filter networks for low pass filter.	Remember	3
17	Draw π and T filter networks for high pass filter.	Remember	3
18	What are main components of the filter?	Remember	3
19	Explain about constant-K filter.	Remember	3
20	Derive design equations of band pass filter?	Remember	3
21	Write the formuale for characteristic impedance for π- section	Remember	3
22	What are different types of filters?	Remember	3
23	What is proto type section?	Remember	3
24	Derive design equations of band stop filter?	Remember	3
25	What is composite filter?	Understood	3
26	What is m-derived half section?	Understood	3
	UNIT-IV DC MACHINES		
1	State Fleming's Right Hand Rule.	Remember	4
2	State Fleming's Left Hand Rule	Remember	4
3	What is the basic principle of a dc generator?	Remember	4
4	What are the basic parts of a dc generator?	Remember	4
5	Write down the emf equation of a dc generator	Remember	4
6	What are the different types of dc generators?	Remember	4
7	Draw the circuit diagram of any two types of DC generators.	Remember	4
8	What is back emf in d.c. motor?	Remember	4
9	List out the different types of DC motor.	Remember	4
10	Write down the torque equation of a D.C motor.	Remember	4
	UNIT-V Transformers and their performance		
1	Mention the difference between core and shell type transformers.	Evaluate	5
2	What is the purpose of laminating the core in a transformer?	Analyze	5
3	Give the emf equation of a transformer and define each term.	Remember	5
4	Does transformer draw any current when secondary is open? Why?	Understand	5
5	Define voltage regulation of a transformer.	Evaluate	5
6	What are the applications of step-up & step-down transformer?	Evaluate	5

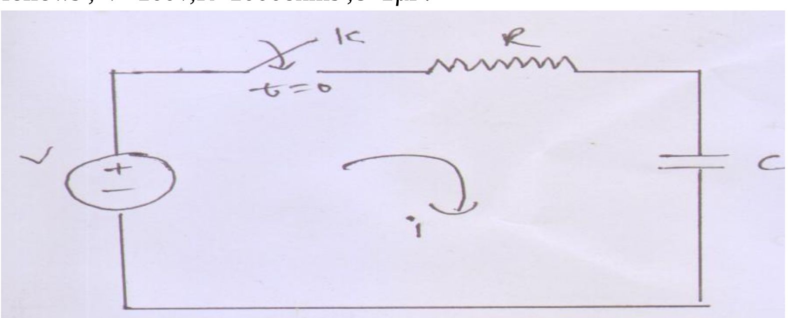
7	How transformers are classified according to their construction?	Evaluate	5
8	Define transformation ratio.	Evaluate	5
9	Define voltage regulation of a transformer.	Evaluate	5
10	Explain mutual induction principle	Evaluate	5

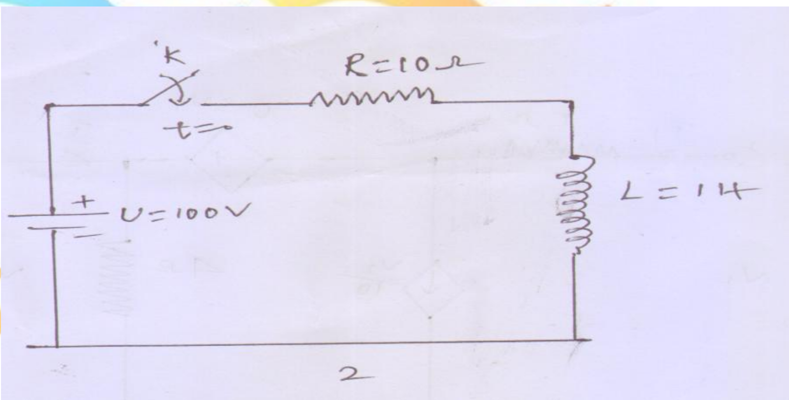
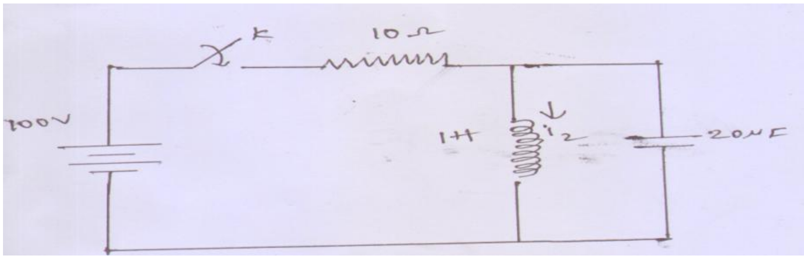
GROUP-II (LONG ANSWER TYPE QUESTIONS)

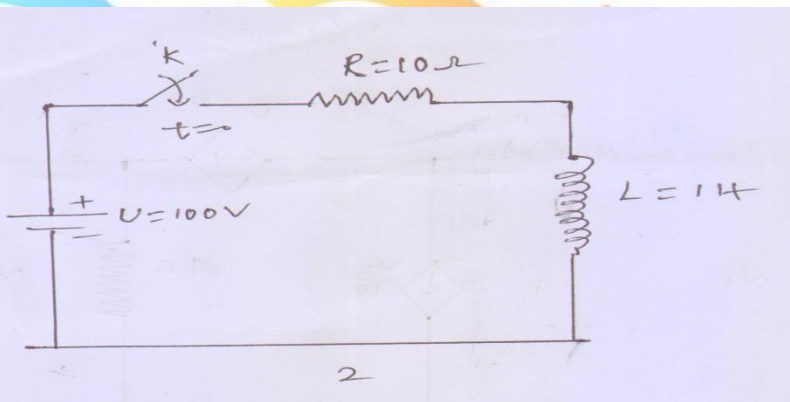
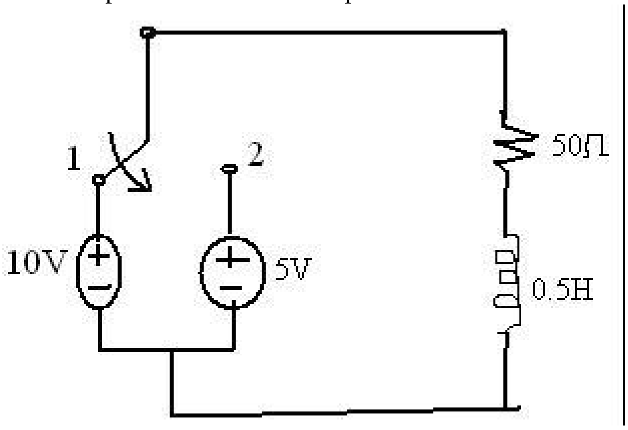
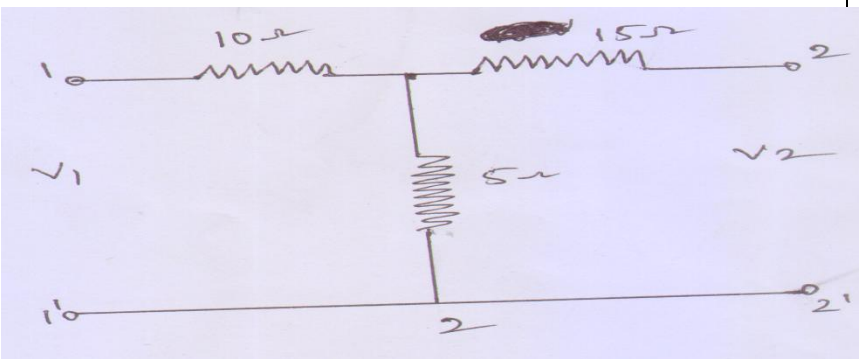
S.No.	QUESTION	BLOOMS TAXONOMY LEVEL	PROGRAM OUTCOME
	UNIT-I TRANSIENTS		
1	Obtain the expression for current i(t) for t>0 in a driven series R-L circuit with dc excitation. Hence obtain expression for vl(t).	Remember	1
2	Derive the expression for current i(t) for t>0 in a un driven series R-L circuit. Draw necessary sketches. Assume D.C excitation.	Remember	1
3	Obtain transient response of source free series R-C circuit?	Remember	1
4	Obtain transient response of source free series R-L circuit?	Remember	1
6	What is meant by step response of circuit?	Evaluate	1
7	What is meant by driven circuit and un-driven circuit?	Evaluate	1
8	Define time constant?	Evaluate	1
9	Explain time constant significance in Series RL circuit?	Evaluate	1
10	Define 1) Rise time 2) Peak time	Evaluate	1
	UNIT-II TWO PORT NETWORKS		
1	Derive the relationship between Y parameters and z parameters.	Remember	2
2	Define h parameters and draw equivalent ckt same.	Evaluate	2
3	What the significance of h parameters.	Evaluate	2
4	What the use of parameters.	Evaluate	2
5	Why is set of ABCD parameters called a set of transmission parameters?	Remember	2
6	Derive condition of symmetry for Z parameters.	Apply	2
7	Derive condition of symmetry for y parameters.	Evaluate	2
8	Derive condition of symmetry for h parameters.	Remember &Evaluate	2
9	Derive condition of symmetry for transmission parameters.	Understand	2
10	Derive condition of reciprocity for z parameters.	Understand	2
UNIT-III FILTERS			
1	What is low pass filter derive expression for cutoff frequency of proto type low pass filter in terms of l and c?	Remember	3
2	Obtain design equations of high pass filter?	Remember	3
3	Draw a circuit of a band stop filter and explain its working with neat reactance curves?	Apply	3
4	For band stop filter show that resonant frequency is the geometric mean of two cut-off frequencies?	Apply	3
5	What are disadvantages of proto type filters?	Apply	3
6	Explain in brief m-derived filter section overcome limitations of proto type filter section?	Apply	3
7	Write notes on termination with m-derived half section?	Apply	3
8	Categorize filters and explain	Apply	3
9	Describe a proto type t section band stop filter. Determine the formula for designing band pass filter?	Apply	3
10	Derive expression for symmetrical t-attenuator	Apply	3

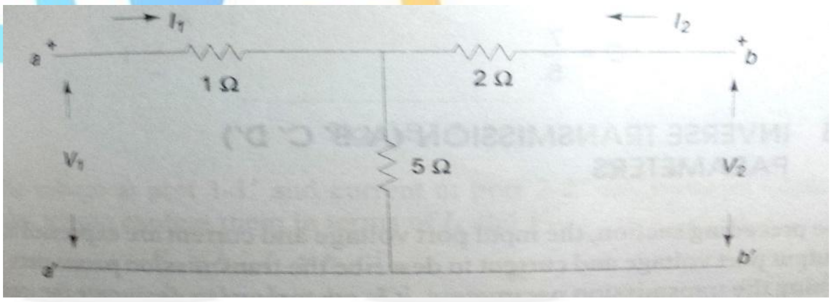
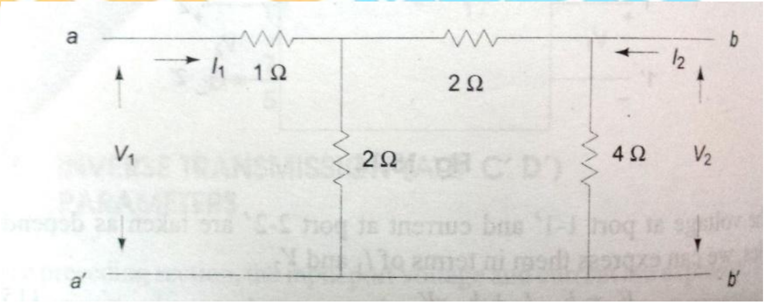
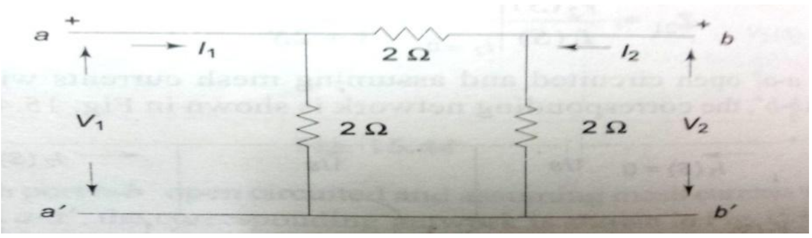
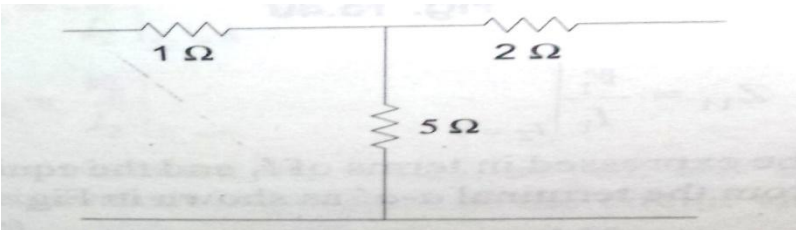
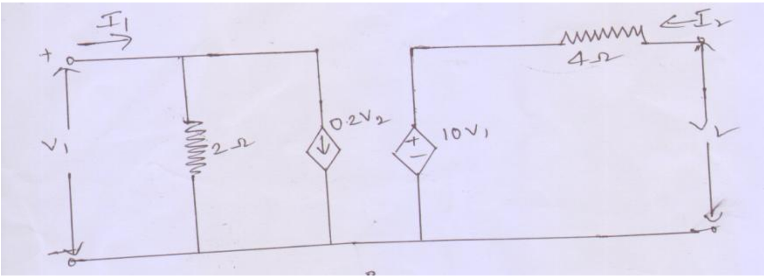
UNIT-IV **DC MACHINES**			
1	Explain the principle of operation of DC generator.	Understood	4
2	Give the classification of DC generator and explain	Remember	4
3	Derive the equation for induced EMF of a DC machine.	Remember	4
4	Derive the torque equation of DC motor.	Apply	4
5	Explain the principle of operation of DC Motor.	Apply	4
6	Give the classification of DC Motor and explain	Apply	4
7	Give the significance of back emf in a DC motor.	Apply	4
8	Explain about Swinburne's test of Dc shunt machine	Apply	4
9	Explain the speed control techniques of DC shunt motor	Apply	4
10	Differentiate between self-excited and separately excited d.c. machines.	Apply	4
UNIT-V **Transformers and their performance**			
1	Describe the construction details of transformer.	Creating &analyse	5
2	Explain the principle of operation of transformer.	Analyse	5
3	Derive the EMF equation of a transformer.	Apply	5
4	Explain the principle of operation of single phase 2-winding transformer.	Evaluate	5
5	Explain the losses in a Transformer	Remember &Evaluate	5
6	Obtain the condition for maximum efficiency of a transformer	Understand	5
7	Explain the OC test of a single phase transformer	Understand	5
8	Obtain the equivalent circuit of a single phase transformer	Understand	5
9	Explain the ON load condition of a transformer	Creating &analyse	5
10	Explain the NO load condition of a transformer	Evaluate	5

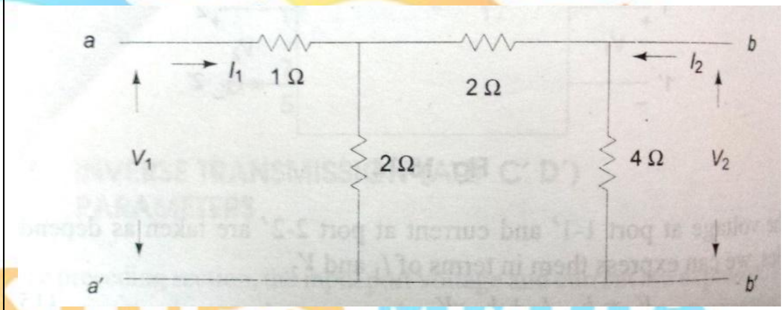
GROUP-III (ANALYTICAL QUESTIONS)

S.No	QUESTION	BLOOMS TAXONOM	PROGRAM OUTCOME
UNIT-I **TRANSIENTS**			
1	In the network shown in figure, switch k is closed at t=0 with the capacitor uncharged .Find the values of i,di/dt,d^2i/dt^2 at t=0+,for elements values as follows ; V=100v,R=1000ohms ,c=1μf . 	Apply	1

<table>
<tr><td>2</td><td>The switch is closed at t=0. Find values of $i, di/dt, d^2i/dt^2$, at t=0+ assume initial current of to be zero.

</td><td>Apply</td><td>1</td></tr>
<tr><td>3</td><td>In the networks shown in figure switch K is closed and a steady state is reached in the network.at t=0,the switch is opened .find an expression for the current in the inductor ,i2(t).

</td><td>Apply</td><td>1</td></tr>
<tr><td>4</td><td>Find out the Laplace transform of f(t)=e-at for t≥0</td><td>Apply</td><td>1</td></tr>
<tr><td>5</td><td>Find the Laplace transform of damped sine and cosine functions i.e
1) e-atsinwt 2) e-at coswt.</td><td>Apply</td><td>1</td></tr>
<tr><td>6</td><td>For a series RL circuit having R=5 Ohms, L=10 Henry. And voltage applied V=20 Volts.Find the transient current, Voltage across the resistor. Assume initial current through inductor is zero, use differential equation approach.</td><td>Apply</td><td>1</td></tr>
<tr><td>7</td><td>For a series RLC circuit having R=5 Ohms, L=10 Henry and C=10μF. And voltage applied V=20 Volts.Find the transient current, Voltage across the resistor.Assume initial current through inductor is zero and initial voltage across capacitor is zero. Use Laplace transform approach</td><td>Apply</td><td>1</td></tr>
<tr><td>8</td><td>Use differential equation approach and the obtain the expression for current for a series RLC circuit having R=20 Ohms=0.05 H and C=20μF.Assume initial conditions equal to zero</td><td>Apply</td><td>1</td></tr>
</table>

9	Obtain the expression for the current for a series RL Circuit given below Assume zero initial conditions through the inductor 	Apply	1
10	In the figure switch is closed at position 1 at t=0. At t=0.5msec, the switch is moved to position 2. Find the expression for the current in both the conditions 	Apply	1
UNIT-II **TWO PORT NETWORKS**			
1	The parameters of two port network are Z11=20ohms, Z22 =30 ohms, Z12=Z21=10ohm find Y and ABCD parameters of the net work	Apply	2
2	Find the z-parameters for the network shown in figure 	Apply	2

3	Using definitions, find y-parameters of the two port network shown in figure 	Apply	2
4	Find the transmission parameters for the network shown in figure. 	Apply	2
5	Find the Hybrid parameters for the given network. 	Apply	2
6	Find Image parameters of the given network 	Apply	2
7	Using definitions, find y-parameters of the two port network shown in figure 	Apply	2

8	Find transmission parameters and then obtain image parameters for the given network.  	Apply	2
9	Compute the parameters if 2 Two-port networks are connected in series and parallel	Apply	2
10	Compute the parameters if 2 Two-port networks are connected in Cascade	Apply	2
	UNIT-III **FILTERS**		
1	Design a constant –k low pass filter having a cut off frequency 0f 3000hz and nominal impedance of 600 ohms?	Apply	3
2	Design a constant –k high pass filter with a cut-off frequency of 1khz and a nominal impedance of 500 ohms	Apply	3
3	Design a band pass filter having a design impedance of 400 ohms and cut off frequencies of 2khz and 8khz	Apply	3
4	Design a band elimination filter having a design impedance of 500 ohms and cut off frequencies of f1=1khz and f2=6khz	Apply	3
5	Design a low pass filter having cut-off frequencies 2khz to perate with a terminated with load resistance of 500 ohms	Apply	3
6	Design a high pass filter with a cut off frequency of 1 khz with a terminated impedance of 800 ohms	Apply	3
7	Design a high pass filter having a cut-off frequency of 1 khz with a load of 600 ohms	Evaluate	3
	UNIT-IV **DC MACHINES**		
1	Calculate the e.m.f by 4 pole wave wound generator having 65 slots with 12 conductors per slot when driven at 1200 rpm the flux per pole is 0.02 wb.	Apply	4
2	A dynamo has a rated armature current at 250 amps what is the current per path of the armature if the armature winding is lap or wave wound? The machine has 12 poles.	Apply	4
3	A 6 pole lap wound dc generator has 600 conductors on its armature flux per pole is 0.02 wb. Calculate i) The speed at which the generator must be run to generate 300v. ii) What would be the speed if the generated were wavewound?	Apply	4
4	An 8-pole , lap wound armature rotated at 350 rpm is required to generate 260v. the use ful flux per pole is 0.05 wb if the armature has 120 slots, calculate the number of conductors per slot.	Apply	4

5	The armature of a 6-pole ,600 rpm lap-wound generator has 90 slots, if each coil has 4 turns , calculate the flux per pole is required to generate an e.mf of 288 slots.	Apply	4
6	A 440v Dc shunt generator has Ra=0.25 ohms and Rsh= 220 ohms while delivering a load current of 50 amps ,it has a terminal voltage of 440v determined the generated e.m.f and power developed?	Apply	4
7	A Dc series generator has armature resistance of 0.5 ohms and series field resistance of 0.03 ohms it drives a load of 50 amps. if it has 6 turns/coil and total 540 coils on the armature and is driven at 1500 rpm calculate the terminal voltage at the load. Assume 4-poles, lap type winding, flux pole	Apply	4
8	A30 kw, 300v dc shunt generator has armature and field resistances of 0.05 ohms and 100 ohms respectively. Calculate the total power developed by the armature when it is delivered full load o/p.	Apply	4
9	A compound generator is to supply a load of 250 lamps each rated at 100w,250v. the armature, series and shunt windings have resistances of 0.06 respectively. Determine the generated e.m.f when machine is connected in i) long shunt ii) short shunt. Take drop per brush as 1v	Apply	4
10	A 4-pole lap wound dc shunt generator has a useful flux per pole of 0.07 wb. The armature winding consists of 220 turns, each of 004 ohms resistance. Calculate the terminal voltage when running at 900 rpm if the armature current is 50 amps.	Apply	4
UNIT-V **Transformers and their performance**			
1	A transformer supplied a load of 32A at 415V. If the primary voltage is 3320V,find the following: (a) Secondary volt ampere (b) Primary current (c) Primary volt ampere. Neglect losses and magnetizing current.	Creating &analyse	5
2.	A 125 KVA transformer having primary voltage of 2000V at 50 Hz has 182 primary and 40 secondary turns. Neglecting losses, calculate: i) The full load primary and secondary currents. ii) The no-load secondary induced emf.	Evaluate	5
3	A single phase transformer has 50 primary and 1000 secondary turns. Net cross sectional area of the core is 500 cm2. If the primary winding is connected to 50 Hz supply at 400 V, Calculate the value of Maximum flux density on core and the emf induced in the secondary.	Evaluate	5
4	A transformer with 40 turns on the high voltage winding is used to step down the voltage from 240V to 120V. Find the number of turns in the low voltage winding. Open circuit and short circuit tests on a 5 KVA, 220/400V, 50 Hz, single phase transformer gave the following results: OC Test: 220V, 2A, 100W (lv side) SC Test: 40V, 11.4A, 200W (hv side) Obtain the equivalent circuit.	Analyse	5
5	A single phase 50Hz transformer has 80 turns on the primary winding and 280 in the secondary winding . The voltage applied across the primary winding is 240 V. Calculate (i) the maximum flux density in the core (ii) induced emf in the secondary winding. The net cross sectional area of the core can be taken 200cm2.	Evaluate	5

6	Open Circuit and shrot circuit tests on a single phase transformer gave the following results. V0=200V, I0=0.7A, WO=20W -------------- test from primary side VS =10V, IS =10A, WS =40W ------------- test from primary side. Determine the equivalent circuit referred to primary side.	Evaluate	5
7	A 15kVA 2400-240-V, 60 Hz transformer has a magnetic core of 50-cm2 cross section and a mean length of 66.7 cm. The application of 2400 V causes magnetic field intensity of 450 AT/m (RMS) and a maximum flux density of 1.5 T . Determine i. The turn's ratio ii. The number of turns in each winding iii. The magnetizing current	Understand	5
8	The emf per turn of a 1- φ, 2200/220 V, 50 Hz transformer is approximately 12V. Calculate i) The number of primary and secondary turns, and ii) The net cross-sectional area of core for a maximum flux density of 1.5 T	Remember	5
9	The efficiency of a 400 kva ,single phase transformer is 98.77% when delivering full-load at 0.8 pf lagging and 99.13% at half load at unity power factor calculate i) iron losses and full load copper losses.	Apply	5
10	A 440/110 v transformer has a primary resistance of 0.03 ohms and secondary resistance of 0.02 ohms if iron losses at normal input is 150 watts determine the secondary current at which maximum efficiency will occur and the value of this maximum efficiency at a unity power factor load.	Remember	5

Prepared by:K.Lingaswamy Reddy, G.harikrishna, S Swathi, **Assistant Professor**

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