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Printed Page: 1 of 3

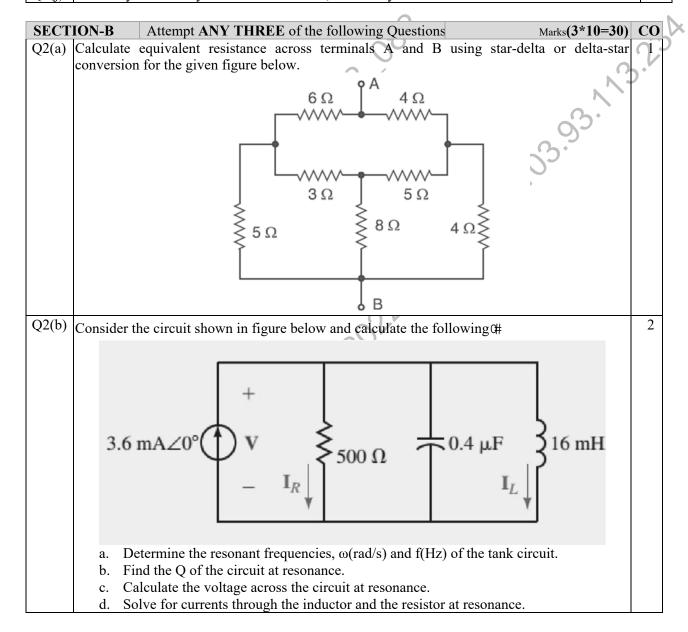
BTECH (SEM II) THEORY EXAMINATION 2021-22 BASIC ELECTRICAL ENGINEERING

Time: 3 Hours Total Marks: 100

Notes:

- Attempt all Sections and Assume any missing data.
- Appropriate marks are allotted to each question, answer accordingly.

SECT	ION-A Attempt All of the following Questions in brief	Marks (10*2=20)	CO				
Q1(a)	Q1(a) Draw the V-I characteristics for ideal voltage source and ideal current source.						
Q1(b)	Why is linearity important in circuits?		1				
Q1(c)	Why do we represent A.C. by sinusoidal waveform?		2				
Q1(d)	d) Why the average power consumed in purely inductive circuit is zero?						
Q1(e)) What is the nature of load for negative voltage regulation in the transformer?						
Q1(f)	Draw the phasor diagram for an ideal transformer on no load.						
Q1(g)	What is the generated EMF in D.C. generator?						
Q1(h)) Why synchronous motor is doubly excited?						
Q1(i)	What are the common problems that occur during electrical installation	ons?	5				
Q1(j)	Write any two battery characteristics. Also, define any one.		5				

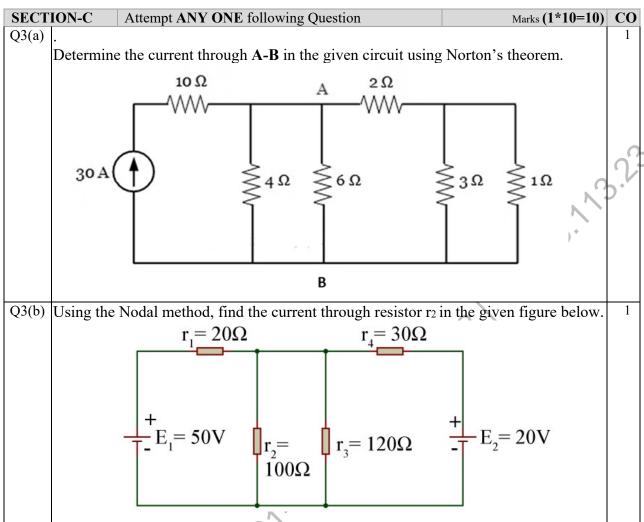




Printed Page: 2 of 3
Subject Code: KEE201T
Roll No:

BTECH (SEM II) THEORY EXAMINATION 2021-22 BASIC ELECTRICAL ENGINEERING

Q2(c)	State the significance of the regulation of transformer. A 4kVA, 200/400 V, 50 Hz, single phase transformer has equivalent resistance referred to primary as 0.15 Ω. Calculate, (i) The total copper losses on full load (ii) The efficiency while supplying full load at 0.9 power factor lagging (iii) The efficiency while supplying half load at 0.8 power factor leading. Assume total iron losses equal to 60 W.	
Q2(d)	What are the factors affecting speed of a DC motor? Compare lap and wave type armature winding.	4
Q2(e)	Draw and explain the characteristics of a battery. Calculate the backup of a battery of 150AH connected to load of 150 watts, and the supply voltage is 12V.	5



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SECT	ION-C	Attempt ANY ONE following Question	Marks (1*10=10)	CO
Q4(a)	Derive mathematically dynamic impedance (Z _D) offered by RLC parallel circuit under		C parallel circuit under	2
	resonance	. Also, draw its phasor diagram.		
Q4(b)	Two coils having resistance 5 Ω and 10 Ω and inductances 0.04 H and 0.05 H respectively		2	
	are connected in parallel across a 200 V, 50 Hz supply.			
	Calculate:			
	i. C	onductance, susceptance and admittance of each coil.		
	ii. T	otal current drawn by the circuit and its power factor.		
	iii. P	ower absorbed by the circuit.		



				Printed Page: 3 of 3						
			Subject Code: KEE201T							
Roll No:										

BTECH (SEM II) THEORY EXAMINATION 2021-22 BASIC ELECTRICAL ENGINEERING

SECT	ION-C	Attempt ANY ONE following Question	Marks (1*10=10)	CO				
		ne purpose of an equivalent circuit of a transformer?		3				
	equivalent	circuit of a transformer as referred to the primary with al	l necessary parameters.					
Q5(b)	A 20kVA, 2000V/200V, single-phase, 50 Hz transformer has a primary resistance of							
	$1.5~\Omega$ and	reactance of 2 Ω . The secondary resistance and reactance	ctance are $0.015~\Omega$ and					
	0.02 Ω re	spectively. The no load current of transformer is 1	A at 0.2 power factor.					
	Determine	2: 2:	-					
	(i) Equiva	lent resistance, reactance and impedance referred to	primary					
	(ii) Supply	y current	-					
	(iii) Total copper loss							
	Draw app	roximate equivalent circuit.						

SECT	ION-C	Attempt ANY ONE following Question	Marks (1*10=10)	CO
Q6(a)	Derive an	expression for torque in DC motor. A 230V DC ser	ies motor draws a 50A	4
	current. A	armature and series field winding resistances ar	e 0.2Ω and 0.1Ω ,	
	respective	ly. Calculate (i) brush voltage and (ii) back EMF.		
Q6(b)	Why is an	induction motor called a generalized transformer?	Compare the induction	4
	motor wit	n the transformer.		

illotel Wit	in the transferment						
SECTION-C	Attempt ANY ONE following Question	Marks (1*10=10)	CO				
	ou calculate energy consumption per kWh? Calculate the	ne electricity bill amount	7 5				
	year, if the following devices are used as specified.						
	(A) 3 Bulbs of 40W for 6 hours per day						
	e lights of 50W for 8 hours per day						
	rate of electricity is Rs. 7.50 per unit.	and trye trying of wines	5				
	ne construction, rating, specific applications of at less used in electrical installations.	ast two types of wires	3				
and cable	s used in electrical histaliations.						
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