4.	a)	A 4 pole dc shunt motor has lap connected armature winding. The flux per pole is 30 mWb. The number of armature conductors is 250. When connected to 230 V dc supply, it draws an armature current of 40 A. Calculate the back e.m.f. and the speed with which motor is running. Assume armature resistance is 0.6 Ω.	6	L3	4	
	b)	Derive the emf equation of a 1-phase Transformer.	8	L2	3	
	c)	Explain the principle of operation of three phase Synchronous Generator.	6	L2	4	
5.	a)	A single phase 25kVA 1000/2000V, 50Hz, single phase transformer has maximum efficiency of 98% at full load upf. Determine its efficiency at (i) 3/4th full load, upf. (ii) 1/4th full load, 0.8 pf.	6	L3	3	
	b)	With a neat diagram explain the constructional features of core type single phase transformer.	6	L2	3	
	c)	With the aid of neat diagram explain different rotor construction in a Synchronous generator.	8	L3	4	
6.	a)	Why DC series motors are suitable for electric traction and cranes?	6	L2	4	
	b)	The no-load current of a 50 kVA 235/470V, 50H_2 transformer is 5A at 0.25 power factor. The number of turns on primary is 200. Calculate (i) maximum value of flux in the core (ii) number of turns in secondary winding iii) Full load secondary current.	8	L3	3	
	c)	List the applications of Transformer, DC machine and Synchronous machine.	6	L2	4	
7.	a)	What is the necessity of starter in Induction motor? What are the different types of Induction motor? Explain.	8	L2	5	1
	b)	What is earthing? Explain its necessity; with a neat schematic diagram explain any one type of earthing in an electrical installation.	8	L2	5	1
	c)	The active power input to a 415V, 50Hz, 6 pole 3-phases Induction motor running at 970rpm is 41kW. The input power factor is 0.9. Calculate line current and slip.	4	L2	5	1
8.	a)	Explain the Safety precautions and rules in handling electrical appliances.	8	L2	5	
	b)	Explain the terms related to Induction machine. (i) Slip of Induction machine (ii) frequency of rotor currents	8	L2	5	
	c)	Distinguish between fuse, MCB and a relay.	4	L2	5	

BT* Bloom's Taxonomy, L* Level; CO* Course Outcome; PO* Program Outcome

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NMAM INSTITUTE OF TECHNOLOGY, NITTE

(An Autonomous Institution affiliated to VTU, Belagavi)

First / Second Semester B.E. (Credit System) Degree Examinations

Make up / Supplementary Examinations – September 2021

20EE104 / 17EE105 – BASIC ELECTRICAL ENGINEERING

Duration: 3 Hours

Max. Marks: 100

*Note: 1) Answer any **Five full** questions.*
2) Assume Missing Data Suitably.

		Marks	BT*	CO*	PO*
a)	Establish a relationship between voltage and current in a single phase RL series circuit. Draw phasor diagram and waveforms of voltage & current.	8	L*2	2	1,2
b)	With the aid of neat diagram explain generation of single phase alternating emf.	6	L2	1	1,2
c)	Determine the equivalent resistance between terminal AB of the network shown in Fig. Q1(b)				

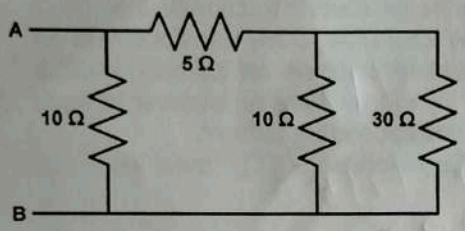

Fig.Q1(b)

a)	Using mesh analysis, find voltage drop across 20 ohm resistor and the power consumed by it for the circuit shown in Fig. Q2(a).	6	L2	1	1,2

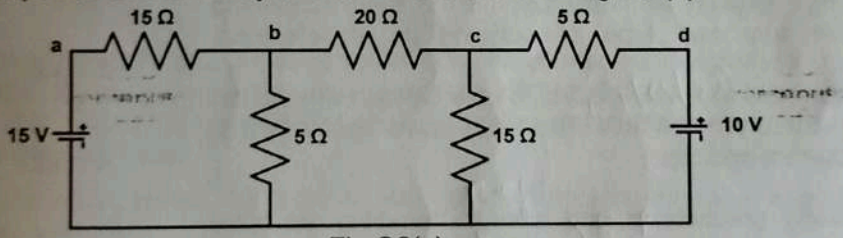

Fig.Q2(a)

b)	An adjustable resistor R in series with a capacitance of 25μF draws a current of 0.8A, when connected across 50Hz supply. Calculate (i) Value of resistor so that the voltage across the capacitor is half the supply voltage (ii) total power dissipated (iii) power factor of the circuit.	8	L2	1	1
c)	Draw Impedance Triangle for R-L, R-C, R-L-C series single phase a.c. circuit.	6	L3	2	1,2
a)	With relevant circuit and phasor diagram show that two wattmeters are sufficient to measure three phase power in a balanced system.	6	L2	2	1,2
b)	A series R-C circuit dissipates 1kW at 0.3 power factor leading when connected to a 240V, 50Hz sinusoidal supply. Calculate the (i) kVA rating (ii) supply current (iii) kVAR rating (iv) capacitance .	8	L2	2	1,2
c)	Define the terms: RMS value, average value, form factor and peak factor of sinusoidal varying quantities.	6	L3	2	1,2
		6	L2	1	1,2

P.T.O.