	c)	Two identical coils A and B of 1000 turns each lie in parallel planes such that 80% of the flux produced by one coil links with the other. A current of 5 A flowing in coil A, produces a flux of 0.05 m Wb in it. (i) Calculate mutual inductance. (ii) If the current in coil A changes from +12 A to -12 A in 0.02 seconds, calculate emf induced in coil B. (iii) self-inductances of coil A and coil B (iv) co-efficient of coupling.	08	L2
5.	a)	In a single-phase transformer, show that the maximum efficiency occurs when iron losses are equal to copper losses.	06	L1
	b)	Explain the characteristics of d.c.series motor.	10	L2
	c)	A 100 kVA transformer has a primary voltage of 2000 volts at 50 Hz. The number of primary turns are 200 and secondary turns are 40. Neglecting losses, calculate (i) No load secondary e.m.f (ii) full load primary and secondary current.	04	L2
6.	a)	Write a notes on Fleming's rules.	04	L1
	b)	A single phase 25 kVA 1000/2000 V, 50 Hz transformer has a maximum efficiency of 98% at full load UPF. Determine its efficiency at (i) ¾ full load upf (ii)1/2 full load 0.8 p.f.	08	L2
	c)	A 16 pole star connected alternator has 144 slots and 10 conductors per slot. The flux per pole is 30 mWb and the speed is 375 rpm. Find the frequency, the phase and line emf's	08	L1
		Unit – III		
7.	a)	With neat graph, briefly explain the torque-slip characteristics of 3-phase induction motor.	06	L1
	b)	Compare the fuse and MCB	04	L1
	c)	A 10 pole, three phase alternator is coupled to an engine running at 720 RPM. It supplies an induction motor which has a full load speed of 1150 RPM. Find the % slip and the number of poles of the motor.	06	L2
	d)	Explicate why slip is never zero in an Induction Motor	04	L1
8.	a)	With a neat diagram, enumerate concealed conduit wiring.	06	L1
	b)	A 5 hp, 400V, three phase, 50 Hz induction motor is working at full load with an efficiency of 90% at a power factor of 0.866. Determine power input to the induction motor and line current.	07	L2
	c)	Give a wiring scheme for a staircase where the lamp has to be controlled from two different places.	07	L1

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)

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

April - May 2019

18EE104 – BASIC ELECTRICAL ENGINEERING

on: 3 Hours | Max. Marks: 100

e: *Answer **Five full** questions choosing **Two full** questions from **Unit – I** and **Unit – II** each and **One full** question from **Unit – III.***

		Marks	BT*	CO*	PO*
	Unit – I				
a)	State the following (i) current (ii) Potential difference (iii) Resistivity (iv) Phase (v) Time period (vi) EMF	06	L*1	1	1,2
b)	Two resistors connected in parallel across 100 V D.C supply take 10 A from the supply. The power dissipated in one resistor is 600 W. What is the current drawn when they are connected in series across the same supply?	06	L2	1	1,2
c)	An inductive coil, having resistance of 8 Ω and inductance of 80 mH, is connected in series with a capacitance of 100 μF across 200 V, 50 Hz supply. Calculate, (i) the current, (ii) the power factor, and (iii) the voltage drops in the coil and capacitance respectively.	08	L3	2	1,2
a)	An inductive load is connected in parallel with a capacitance C of 12.5 μF. The input voltage to the circuit is 100 V at 31.8 Hz. The phase angle between the two branch currents is 120°, and the current through the inductive load is 0.5 A. Find the current supplied by the source, and also the values of resistance and inductance of the inductive load..	06	L3	2	1,2
b)	In a series circuit consist of two elements, the current and voltage are given by $i(t) = 20\sqrt{2}\sin(100\pi t + 30^o)\ A$ and $v(t) = 200\sqrt{2}\sin(100\pi t - 30^o)\ V$. Find the circuit elements, power factor and power dissipated in the circuit.	06	L2	2	1,2
c)	With a neat figure, write a note on generation of alternating voltage.	08	L1	1	1,2
a)	From the definitions, derive the equation for RMS and average values of a sinusoidal alternating quantity. Also show that form factor is a constant value.	10	L1	1	1,2
b)	A delta connected balanced three-phase load is supplied from a 3 phase 400V supply. The line current is 15 A and power taken by the load is 10 kW, find Impedance of each branch. If the same impedances are connected in star, find line current, p.f and power consumed.	10	L2	2	1,2
	Unit – II				
a)	Write a note on losses present in a transformer.	04	L1	3	1,2
b)	The resistance of the armature of a 25 hp, 240 V shunt motor is 0.083 Ω. When connected to a 240 V supply the armature develops a back emf of 232.8 V. Determine: (i) armature current; (ii) armature current when connected across same power supply while stationary; (iii) back emf when armature current is 110 A.	08	L2	4	1,2

P.T.O.

	b)	Three equal impedances each having a resistance of 25Ω and reactance of 40Ω are connected in star to a 400V, 3 phase, 50 Hz system. Calculate (i) the line current, (ii) power factor and (iii) power consumed.	06	L3	2
	c)	Two wattmeter are being used to measure power consumed by a balanced load of 30A at power factor 0.8 lagging being supplied by a three phase, 3 wire 440V supply. Calculate (i) power consumed, (ii) reading of wattmeter W_1 and (iii) reading of wattmeter W_2.	06	L3	2
		Unit – II			
4.	a)	A coil of 1000 turns is wound on a ring of silicon steel, having a mean diameter of 10 cm and relative permeability of 1200. Its cross sectional area is 12 cm^2. When a current of 5 A flows through the coil, find (i) the flux in the core (ii) the inductance of the coil and (iii) the induced emf if the flux falls to zero in 20 ms.	06	L1	3
	b)	A single phase transformer is connected to a 230 V 50 Hz supply. The net cross-sectional area of the core is 60 cm^2. The number of turns in the primary is 500 and in the secondary is 100. Determine (i) transformation ratio, (ii) e.m.f induced in the secondary winding and (iii) maximum value of the flux density in the core.	06	L3	3
	c)	With neat diagram explain constructional details of DC generator.	08	L1	4
5.	a)	In 25 kVA, 2000/200 V transformer, the iron and full load copper losses are 350 W and 400 W respectively. Calculate the efficiency at UPF (i) at half load and (ii) at $^3/_4$th full load.	08	L3	3
	b)	Derive the torque equation of DC motor.	06	L1	4
	c)	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.	06	L3	4
6.	a)	With neat diagram explain the working principle of transformer.	06	L1	3
	b)	Derive an expression for generated e.m.f in synchronous generator.	06	L1	4
	c)	A 3 phase, 6 pole star connected synchronous generator has 48 slots and 12 conductors per slot on the armature. If the rotor rotates at 1200 rpm and the flux per pole is 0.3 Webber, calculate the e.m.f induced in the armature. The coils are full pitched and the winding factor is 0.95.	08	L3	4
		Unit – III			
7.	a)	Explain the working principle of three phase induction motor.	08	L1	5
	b)	With neat sketch explain pipe earthing of electrical system.	08	L1	5
	c)	List out the precautions used against electric shock.	04	L1	5
8.	a)	Explain the working principle of single phase induction motor.	07	L1	5
	b)	Draw the wiring diagram and working table of three way control of lamps.	06	L1	5
	c)	If a six pole induction motor supplied from a three phase 50 Hz supply has a rotor frequency of 2.3 Hz. Calculate (i) the percentage slip and (ii) the speed of the motor.	07	L3	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 – July 2019

18EE104/17EE105 – BASIC ELECTRICAL ENGINEERING

tion: 3 Hours | Max. Marks: 100

te: 1) Answer ***Five full*** *questions choosing* ***Two full*** *questions from* ***Unit– I*** *and* ***Unit – II each*** *and* ***One full*** *question from* ***Unit – III.***

2) *Missing data may be assumed suitably.*

		Marks	BT*	CO*	PO*
	Unit – I				
a)	State and explain ohms law. Mention its limitations.	06	L*1	1	1,2
b)	A resistance of 10 Ω is connected in series with the two resistances each of 15 Ω arranged in parallel. What resistance must be shunted across this parallel combination so that the total current taken will be 2 A from 15 V supply for the circuit.	06	L3	1	1,2
c)	Two impedances Z_1=(10+j5) Ω and Z_2=(8+j6)Ω are connected in parallel across a 220V, 50Hz supply. Find the total current, branch current and power factor of the circuit. Draw the vector diagram.	08	L3	2	1,2
a)	Define the term RMS value of alternating voltage. Derive an expression for the same for sinusoidally varing voltage.	06	L1	2	1,2
b)	A resistance of 20 Ω, an inductance of 20 mH and a capacitance of 150 μF are connected in series across 200V, 50Hz supply. Calculate (i) the current, (ii) the phase difference between current and the supply voltage, (iii) power consumed. Also draw the vector diagram.	06	L3	2	1,2
c)	Determine the voltage V in the circuit shown in fig 2c using nodal analysis.				

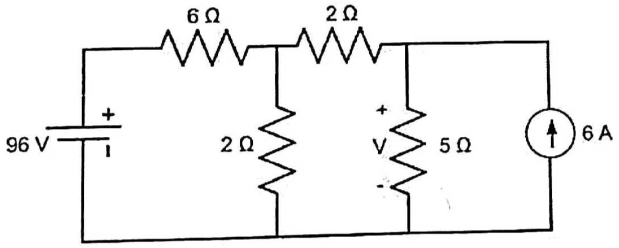

Fig 2c

		08	L3	1	1,2
a)	Find the current through various resistors of the network shown in fig 3a using mesh analysis.				

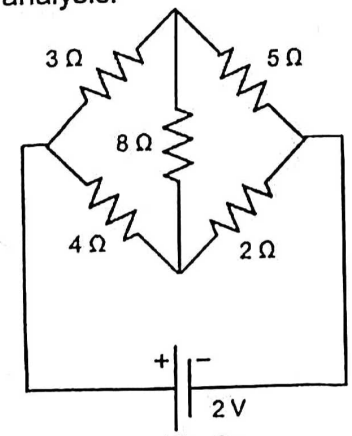

Fig 3a

		08	L3	1	1,2

P.T.O.

Unit - II

4. a) A four pole lap-connected 230 V shunt motor has 600 armature conductors. It takes 30 A on full load. The flux per pole is 0.035 Webber. The armature and field resistances are 0.1 Ω and 230 Ω respectively. Contact drop per brush = 1 V. Determine the speed of the motor at full load.
   b) For a single phase transformer operating with 50 Hz frequency, maximum flux is given as 30mWb. The number of primary turns are 500. Determine the primary induced EMF.
   c) List the applications of Transformer, DC machine and Synchronous machine.

5. a) The primary and secondary windings of a 500 KVA transformer have resistances of 0.42 Ω and 0.0019 Ω respectively. The primary and secondary voltages are 11000 V and 400 V respectively and the core losses 2.9 kW, assuming the power factor of the load to be 0.8. Calculate the efficiency on
   (i) full load;
   (ii) half load.
   b) With the aid of diagram explain different rotor construction in a Synchronous generator.
   c) Derive an expression for armature torque for a DC motor.

6. a) Explain the torque characteristics of series and shunt DC motor.
   b) Derive the EMF equation of a Single Phase Transformer.
   c) A 12 pole, 500 rpm star connected alternator has 48 slots, with 15 conductors/slot, the flux per pole is 0.02 wb. Assume distribution factor as unity and winding factor as 0.97. Calculate the line EMF.

Unit – III

7. a) With the aid of phasor diagram explain how rotating magnetic field is produced in 3-phase induction motor?
   b) A three-phase induction motor is wound for four poles and is supplied from a 50 Hz system. Calculate:
   (i) the synchronous speed;
   (ii) the speed of the rotor when the slip is 4 per cent;
   (iii) the rotor frequency when the speed of the rotor is 1000 rpm.
   c) With neat diagram explain the constructional features of three phase Induction motor.

8 a) With a neat schematic explain 2-way and 3-way control of lamps.
   b) What is earthing? Explain any one type of earthing.
   c) What are the factors that must be considered to select the system of wiring for an electrical installation?

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 Semester B.E. (Credit System) Degree Examinations

November - December 2019

19EE104 – BASIC ELECTRICAL ENGINEERING

on: 3 Hours Max. Marks: 100

ote: Answer ***Five full questions choosing Two full questions from Unit – I & Unit – II each and One full question from Unit – III.***

		Marks	CO*
	Unit – I		
a)	Derive the relationship for Average value and RMS value of sinusoidal varying alternating quantity. Mention form factor and peak factor value for sinusoidal voltage.	8	1
b)	Explain the following terms. (i) Power (ii) Energy	4	1
c)	Establish a relationship between voltage and current in a single phase RC series circuit. Draw phasor diagram.	8	2
a)	For the circuit shown in Figure 2a find the current through the resistors using mesh analysis.		

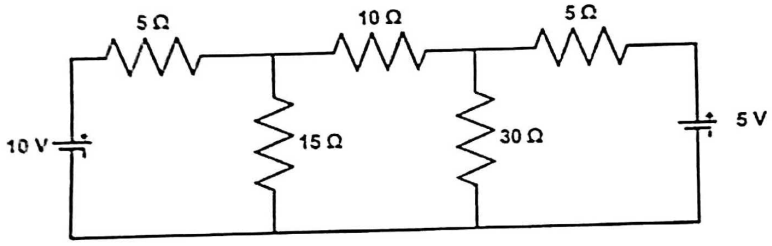

Figure 2a

		8	1
b)	A coil of resistance 10 Ω and inductance 5mH is connected in series with a capacitor of 20μF across a single phase supply of 230V, 50Hz. Calculate (i) impedance of the circuit (ii) current (iii) power consumed. Draw the phasor diagram.	8	2
c)	Define power factor.	4	1
a)	For the circuit shown in Figure 3a find voltage drop across various resistors using nodal analysis.		

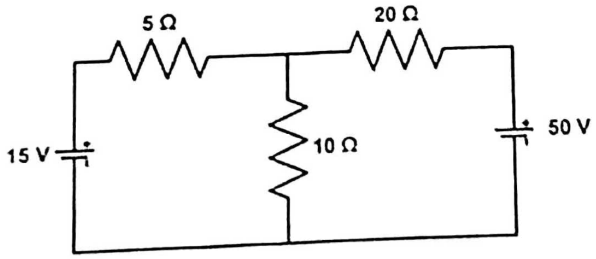

Figure 3a

		6	1
b)	Two impedances Z_1=15+j12Ω and Z_2=8-j5 Ω are connected in parallel. If the potential difference across one of the impedance is 250V, calculate i) total current and branch currents ii) total power and power consumed in each branch iii) overall p.f.	8	2
c)	The input power to a three-phase motor was measured by the two wattmeter method. The readings were 5.2 kW and −1.7 kW, and the line voltage was 400 V. Calculate: (i) the total active power; (ii) the power factor; (iii) the line current.	6	2

P.T.O.