Sub Code:KEE101

Paper Id: 120101 Roll No:

B TECH
(SEM-I) THEORY EXAMINATION 2019-20
BASIC ELECTRICAL ENGG.

Time: 3 Hours *Total Marks: 100*

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

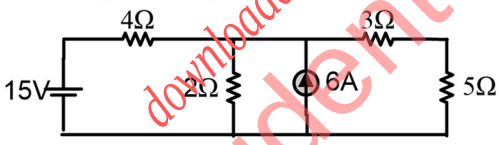
SECTION A

1. Attempt *all* questions in brief. 2 x 10 = 20

Qno.	Question	Marks	CO
a.	What do you understand by unilateral and bilateral elements? Give examples.	2	1
b.	What is the utility of superposition theorem?	2	1
c.	Determine the form factor of AC current i= 200 Sin (157 t + π/6).	2	2
d.	Explain the term "Dynamic Impedence" in AC circuits	2	2
e.	How MMF is related to Reluctance. Explain	2	3
f.	Define voltage regulation of a transformer.	2	3
g.	Why commutator is needed?	2	4
h.	Give the expression of speed in terms of poles and frequency of supply.	2	4
i.	Write full form of (i) MCB (ii) MCCB (iii) ELCB (iv) SFU.	2	5
j.	What are the factors that affect the battery capacity?	2	5

SECTION B

2. Attempt any *three* of the following: 10 x 3 = 30

Qno.	Question	Marks	CO
a.	Determine the current flowing through 5 ohms resistance in the network shown below (fig-1) using Thevenin's theorem.  Fig (1)	10	1
b.	The instantaneous values of two alternating voltages are represented by $V_1 = 60$ Sin θ and $V_2 =$ Sin (θ- π/3). Derive expressions for the instantaneous values of (i) the sum and (ii) the difference of these voltages.	10	2
c.	Explain different types of Magnetic materials with examples.	10	3
d.	Derive the expression of torque for dc motor. Also discuss the applications of it.	10	4
e.	An alkaline cell is discharged at a steady current of 4 A for 12 hours, the average terminal voltage being 1.2 V. To restore it to original state of voltage, a steady current of 3 A for 20 hours is required, the average terminal voltage being 1.44 V. Calculate the ampere-hour and watt-hour efficiencies in this particular case.	10	5

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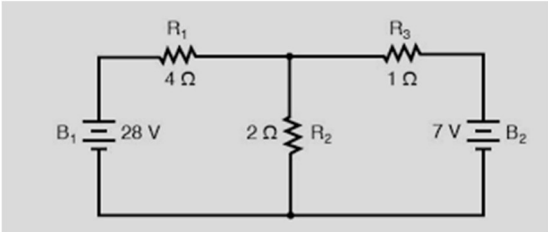
SECTION C

3. Attempt any *one* part of the following: 10 x 1 = 10

Qno.	Question	Marks	CO
a.	Using superposition, find the current flowing through 2 ohm resistance in following circuit (fig-2).  Fig (2)	10	1
b.	Derive an expression of delta to star and star to delta transformation with example and satisfy the condition of both expressions.	10	1

4. Attempt any *one* part of the following: 10 x 1 = 10

Qno.	Question	Marks	CO
a.	Derive an expression of resonance frequency in series resonance circuit. If the bandwidth of a resonant circuit is 10 KHz and the lower half power frequency is 120 KHz, find out the value of the upper half power frequency and the quality factor of the circuit.	10	2
b.	Derive the relationship between line and phase current & voltage for a star connected 3-phase balanced system. A balanced delta connected load of (12 + j 9) Ω/ phase is connected to 3-phase 400 V supply. Calculate line current, power factor and power drawn by it.	10	2

5. Attempt any *one* part of the following: 10 x 1 = 10

Qno.	Question	Marks	CO
a.	Draw and explain the no load and full load phasor diagrams for a single phase transformer.	10	3
b.	(i) Explain single phase Auto transformer and give its application. (ii) In a 25 KVA, 2000/200 V transformer, the constant and variable losses are 350 W and 400 W respectively. Calculate the efficiency on unity power factor at (i) full load and (ii) half load.	10	3

6. Attempt any *one* part of the following: 10 x 1 = 10

Qno.	Question	Marks	CO
a.	Draw the slip-torque characteristics of three phase induction motor. A 3-phase, 50 Hz induction motor has 6 poles and operates with a slip of 5 % at a certain load. Determine (i) the speed of the rotor with respect to the stator (ii) the frequency of rotor current (iii) the speed of the rotor magnetic field with respect to rotor.	10	4
b.	(i) Describe any one method of starting single phase induction motor with neat diagram. (ii) Why Synchronous motor is not self starting?	10	4

7. Attempt any *one* part of the following: 10 x 1 = 10

Qno.	Question	Marks	CO
a.	Explain the requirement of earthing for electrical equipment. What is the difference between neutral and earthing	10	5
b.	Name the various cables used in electrical system based on insulation. Explain any two. What are the features of good conductor in electrical circuit	10	5