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B.TECH.

THEORY EXAMINATION (SEM–II) 2016-17

BASIC ELECTRICAL ENGINEERING

Time : 3 Hours ***Max. Marks : 100***

Note : *Be precise in your answer. In case of numerical problem assume data wherever not provided.*

SECTION – A

1. Explain the following: **10 x 2 = 20**

(a) Define unilateral and bi-lateral elements.

(b) What are the advantages of three phase system over the single phase system?

(c) Why the series resonance is called the voltage resonance?

(d) What do you understand by an accepter and rejector circuit?

(e) Why damping torque in necessary for an analog type instruments?

(f) What do you know about phase sequence in a three phase supply system?

(g) How hysteresis loss can be minimised in a transformer?

(h) Write the function of commutator in a DC generator.

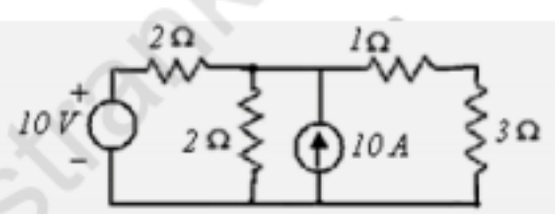
(i) Name any two motors, which can be used for purpose of constant speed.

(j) Why condensor is necessary to be connected in ceiling fan?

SECTION – B

2. Attempt any five parts of the following questions: **5 x 10 = 50**

(a) Find the current in 3 ohm resistance by loop current method and verify the answer by node voltage method.



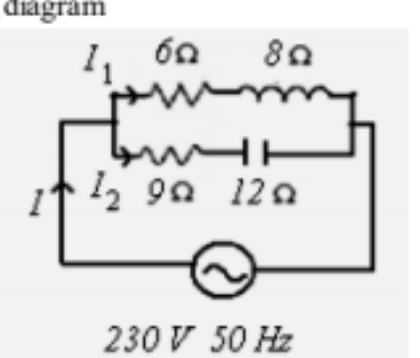
(b) For the parallel circuit shown in figure, calculate the following;

(i) Current through each branch

(ii) Total current drawn and power factor of complete circuit.

(iii) Equivalent impedance of the circuit.

(iv) Draw phasor diagram



(c) Define power factor? What are causes and effects of low power factor? What are the methods to improve the power factor of an ac circuit?

(d) A Series R-L-C circuit consists of a resistance of 10Ω an inductance of 0.1H and a capacitance of 8μf. Determine;

(i) the resonance frequency, (ii) the Q factor of the circuit at resonance,

(iii) Band width (iv) the half power frequencies

(e) What are the power losses in a transformer? Define efficiency and obtain the condition for a transformer, when it operates at its maximum efficiency.

(f) Explain construction and working of attraction type moving iron instrument. List the advantages and disadvantages of these instruments.

(g) A 20 KW, 250V dc shunt machine has armature and field resistances 0.1 ohm and 125 ohm respectively. Calculate the emf developed in armature when running (i) as a generator delivering 20 KW output (ii) as a motor taking 20 KW input.

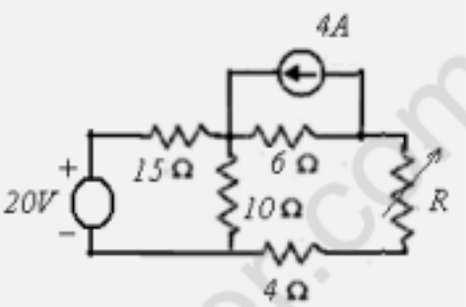
(h) Write the working principle of a three phase induction motor. Draw its torque-slip characteristics and show operating, breaking and generating regions of motor.

SECTION – C

Attempt any two of the following questions: **2 x 15 = 30**

3. (a) State and prove maximum power transfer theorem.

(b) Find the value of resistance R for maximum power transfer in the circuit shown. Also obtain the value of maximum power.



4. (a) Discuss the Quality factor and Bandwidth in detail.

The power of a 400 volts, 3-phase, star connected 3-phase circuit is measured by two-wattmeter method. If the readings of both wattmeter's are found to be 50 kW and 30 kW, then calculate the followings;

(i) Circuit power factor
(ii) Total active and reactive power.
(iii) Line current drawn by the circuit.
(iv) Impedance per phase.

5. (a) A moving coil instrument gives a full scale deflection of 20 mA when a potential difference of 50 mV is applied. Calculate the series resistance to measure 500 V on full scale.

(b) Explain double field revolving theory.

(c) Write applications of three phase synchronous motor.