

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

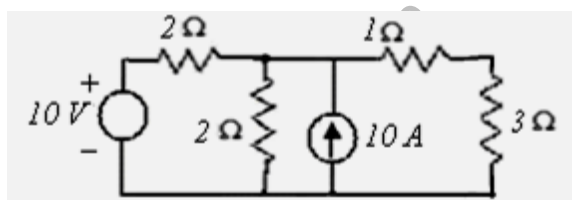
- Define unilateral and bi-lateral elements.
- What are the advantages of three phase system over the single phase system?
- Why the series resonance is called the voltage resonance?
- What do you understand by an acceptor and rejector circuit?
- Why damping torque is necessary for an analog type instruments?
- What do you know about phase sequence in a three phase supply system?
- How hysteresis loss can be minimised in a transformer?
- Write the function of commutator in a DC generator.
- Name any two motors, which can be used for purpose of constant speed.
- Why condenser is necessary to be connected in ceiling fan?

SECTION – B

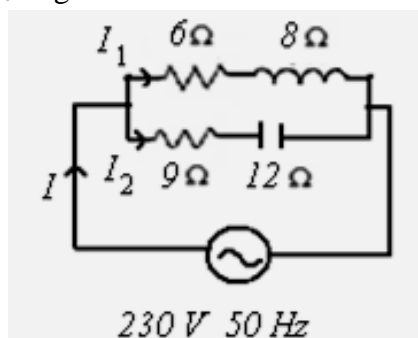
2. Attempt any five parts of the following questions:

5 x 10 = 50

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



- For the parallel circuit shown in figure, calculate the following;
 - Current through each branch
 - Total current drawn and power factor of complete circuit.
 - Equivalent impedance of the circuit.
 - Draw phasor diagram



- 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?
- A Series R-L-C circuit consists of a resistance of 10Ω an inductance of $0.1H$ and a capacitance of $8\mu f$. Determine;
 - the resonance frequency,
 - the Q factor of the circuit at resonance,
 - Band width
 - the half power frequencies

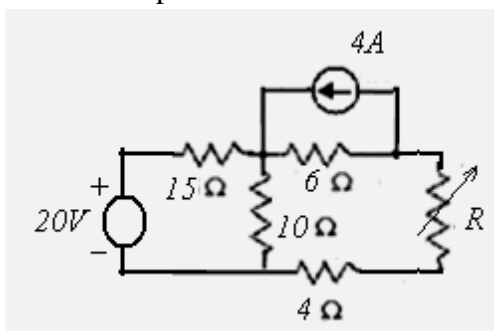
- (e) What are the power losses in a transformer? Define efficiency and obtain the condition for a transformer, when it operates at its maximum efficiency.
- (f) Explain construction and working of attraction type moving iron instrument. List the advantages and disadvantages of these instruments.
- (g) 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;
- Circuit power factor
 - Total active and reactive power.
 - Line current drawn by the circuit.
 - 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.