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TEE-101

B. Tech. (First Semester)

End Semester EXAMINATION, 2017

(All Branches)

BASIC ELECTRICAL ENGINEERING

Time : Three Hours] [Maximum Marks : 100

Note : (i) This question paper contains two Sections.
(ii) Both Sections are compulsory.

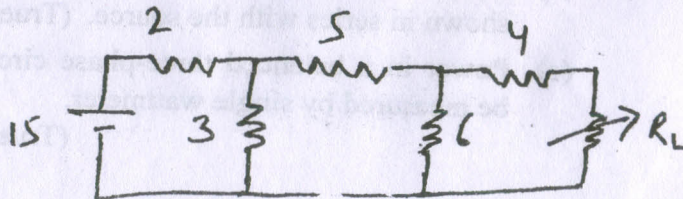
Section—A

1. Write True-False : (1×5=5 Marks)
- (a) Power factor of a purely inductive circuit could be unity. (True/False)
 - (b) Every junction could be called a node and vice versa is not true. (True/False)
 - (c) At unity power factor the active power will always be equal to reactive power. (True/False)
 - (d) Internal resistance of current source is always shown in series with the source. (True/False)
 - (e) Power in a balanced three-phase circuit can be measured by single wattmeter. (True/False)

2. Attempt any *five* parts : (3×5=15 Marks)
- Define KVL and KCL with examples.
 - Prove that power in a three-phase circuit is given by $P = \sqrt{3} V_L I_L \cos \theta$.
 - Draw the B-H curve for the magnetic material. Show the residual magnetism and coercive force thereon.
 - Draw the 3- ϕ star-star connection with labelling of each parameter.
 - Derive the e.m.f. equation of 1- ϕ transformer.
 - Explain independent and dependent voltage sources.
 - How range of an ammeter could be extended ?

Section—B

3. Attempt any *two* parts of choice from (a), (b) and (c). (10×2=20 Marks)
- State Norton's theorem used in d. c. circuits. Give the step procedure to find out the equivalent Thevenin's network.
 - Find the value of load resistance so that it extracts maximum power from the source. Also calculate the power delivered to the load.



- Deduce the expression for the conversion of equivalent star in to delta.
4. Attempt any *two* parts of choice from (a), (b) and (c). (10×2=10 Marks)
- Find out the average value of a purely sinusoidal alternating current wave having maximum amplitude V.
 - A coil of power factor 0.6 is in series with a 100 μ F capacitor. When connected to a 50 Hz supply, the p. d. across the coil is equal to the p. d. across the capacitor. Find the resistance and inductance of the coil.
 - Mention the advantages of three-phase system over single-phase system.
5. Attempt any *two* parts of choice from (a), (b) and (c). (10×2=10 Marks)
- An alternating voltage $80 + j 60$ V is applied to a circuit and the current flowing is $-4 + j10$ A. Find (i) the impedance of the circuit, (ii) the power consumed and (iii) the phase angle.
 - Find out the condition for maximum efficiency in a single-phase transformer.
 - Explain the Hysteresis and Eddy current losses in a single-phase transformer.

6. Attempt any *two* parts of choice from (a), (b) and (c). (10×2=10 Marks)

- (a) Draw the no-load phasor diagram of 1- ϕ transformer and explain the open circuit test of 1- ϕ transformer.
- (b) 3 equal impedances, each consisting of R and L in series are connected in star and are supplied from a 400 V, 50 Hz, 3- ϕ , 3 wire balanced supply. The power input to the load is measured by 2 wattmeter method and they read 3 kW and 1 kW. Determine the value of R and L connected in each phase.
- (c) Explain the principle of operation of a D. C. motor with a neat sketch and also explain its parts in detail.