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**[5667]-107**

**F.E. (Engg.) (All Branches) EXAMINATION, 2019**

**BASIC ELECTRICAL ENGINEERING**

**(2015 PATTERN)**

**Time : Two Hours**

**Maximum Marks : 50**

**N.B. :—** (i) Answer Q. 1 or Q. 2, Q. 3 or Q. 4, Q. 5 or Q. 6 and Q. 7 or Q. 8.

(ii) Neat diagrams must be drawn wherever necessary.

(iii) Figures to the right indicate full marks.

(iv) Use of Non-Programmable Scientific Calculators is allowed.

(v) Assume suitable data, if necessary.

1. (a) Define resistivity and state its unit. Also state the factors on which it depends. [6]
- (b) Iron ring with mean diameter 20 cm and having area of cross-section  $10 \text{ cm}^2$  is uniformly wound with 500 turns. The current flowing through the coil is 2 A and relative permeability of iron is 2000. [6]

Calculate :

- (i) mmf
- (ii) reluctance
- (iii) flux and
- (iv) inductance of the coil.

P.T.O.

Or

2. (a) Compare dynamically and mutually induced emf. [6]
- (b) The current flowing at the instant of switching 240 V, 60 W lamp is 2 A when connected to 240 V DC supply. The TCR of lamp filament at 20°C is 0.005 per °C. Find working temperature and current of lamp. [6]

3. (a) Define the following terms : [6]
- Sinusoidal waveform, cycle, instantaneous value, frequency, form factor and peak factor.
- (b) Draw the circuit diagram to conduct the direct loading test on 1 kVA, 230/115 V, 50 Hz, 1-ph transformer. Show the proper ranges of meters with justifications. Also write down formula for voltage regulation and efficiency. [7]

Or

4. (a) Derive the expression of rms value of alternating current in terms of its peak value by analytical method. [6]
- (b) A 30 kVA, 2200/220 V, 1-ph, 50 Hz transformer have resistances 0.15  $\Omega$  and 0.015  $\Omega$  of HV and LV winding respectively. Find :
- (i) HV and LV winding current
- (ii)  $\eta$  at full load and pf 0.8 lag if iron losses are 75% of full load copper losses. [7]

5. (a) Draw the impedance and admittance triangle ? State their components along with their units. [6]

(b) The power consumed by 3-ph star connected load is 12000 W at  $\text{pf} = 0.8$  lag, when connected to 3-ph, 400 V, 50 Hz ac supply. Find circuit parameters. [6]

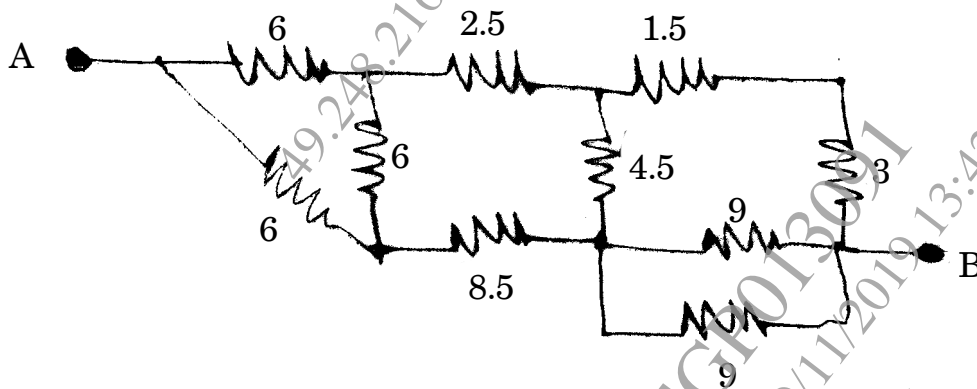
Or

6. (a) Derive the expression for power, when voltage  $v = V_m \sin \omega t$  is applied across R-C series circuit. Draw the circuit diagram and phasor diagram. [6]

(b) Define active, reactive and apparent power. Write their equations and state their units. Also draw the power triangle. [6]

7. (a) State and explain KCL and KVL. [6]

(b) Find resistance between A and B for the network shown in Fig. below. All resistances are in  $\Omega$ . [7]



Or

8. (a) Derive the equations to convert Delta connected resistive circuit into equivalent star circuit. [6]
- (b) State Superposition Theorem and write down the steps to find current through AB for network shown in Fig. below. [7]

