Total No. of Questions—**8**] [Total No. of Printed Pages—**4**

Seat No.	

[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 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 20ºC is 0.005 per ºC. 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 Ω and 0.015 Ω of HV and LV winding respectively. Find :

(*i*) HV and LV winding current.

(*ii*) η 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 pf = 0.8 lag, when connected to 3-ph, 400 V, 50 Hz ac supply. Find circuit parameters. [6]

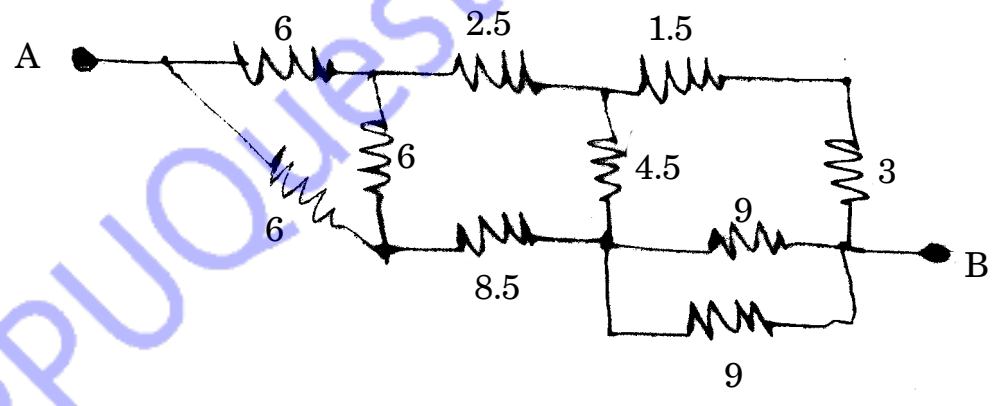
Or

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 Ω. [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]