ELECTRICAL TECHNOLOGY

Question Paper 2017 (May)

1. Answer any ten of the following questions:

a) State the unit of reactive power.

See Module: Basic Concepts of Electrical Quantities, Question No. 14 of Short Answer Type Questions.

b) How do you measure electrical energy with the help of a wattmeter and a stop watch?

See Module: Measuring and Testing Instruments, Question No. 14 of Short Answer Type Questions.

c) Kirchoff's laws are applied for a.c. circuit also. (True / False) **[False]**

d) Express the equivalent series impedance of $Z_1 = 3 + 4j$ and $Z_2 = 6 - 8j$ in polar form.

See Module: Basic Concepts of Electrical Quantities, Question No. 12 of Short Answer Type Questions.

e) Ohm's law is not valid for insulators. (True / False) **[False]**

f) What is the value of power factor in purely capacitive circuit?

See Module: A.C. Circuits, Question No. 22 of Short Answer Type Questions.

g) Write down the names of two non-conventional energies.

See Module: Different Sources of Energy, Question No. 3 of Short Answer Type Questions.

h) What is the unit of reluctance in magnetic circuit?

See Module: Electromagnetism, Question No. 19 of Short Answer Type Questions.

i) Write down the relation between m.m.f. magnetic flux and reluctance in magnetic circuit.

See Module: Electromagnetism, Question No. 20 of Short Answer Type Questions.

j) When a megger shows infinite reading and zero reading?

See Module: Measuring and Testing Instruments, Question No. 15 of Short Answer Type Questions.

k) How can you distinguish a MI type instrument from a PMMC type instrument?

See Module: Measuring and Testing Instruments, Question No. 16 of Short Answer Type Questions.

l) If the secondary current of a 500 V / 50 V transformer is 10 ampere, what is the KVA rating of it?

See Module: D.C. Circuits, Question No. 7 of Short Answer Type Questions.

m) Can it possible to start an a.c. motor with the help of four point starter?

See Module: A.C. Circuits, Question No. 23 of Short Answer Type Questions.

n) Write down the expression of active power for a 3-phase a.c. circuit in terms of phase quantities.

See Module: A.C. Circuits, Question No. 24 of Short Answer Type Questions.

o) Write down the full form of ELCB.

See Module: Domestic Power Supply, Question No. 21 of Short Answer Type Questions.

Group-A

2. a) Two coils connected in series have a resistance of 18 ohm and when connected in parallel have a resistance of 4 ohm. Find the resistance of each coil.

b) State and explain Kirchoff's Voltage Law.

See Module: D.C. Circuits, Question No. 9(a) & (b) of Long Answer Type Questions.

3. a) The arms of a Wheatstone Bridge have the following resistance: $AB = 10$ ohm, $BC = 10$ ohm, $CD = 4$ ohm and $DA = 5$ ohm. A 20 ohm resistance is connected across B and D. Calculate the current through it when a 10 V battery having negligible resistance is connected across A and C.

b) Are nuclear energy and wind energy non-conventional energies?

See Module: D.C. Circuits, Question No. 10(a) & (b) of Long Answer Type Questions.

4. a) If $Z1 = 20 + j31.4$ and $Z2 = 6.4\angle 51.34°$, calculate $Z1 - Z2$ and $Z1 - Z2$.

b) Draw power triangle and form that give the expression of power factor.

See Module: D.C. Circuits, Question No. 11(a) & (b) of Long Answer Type Questions.

5. A coil of resistance 10 ohm and inductance 0.1 H is connected in series with a condenser of capacitance 150 μF across a 200 V, 50 Hz supply. Determine – (i) total impedance of the circuit, (ii) current, (iii) power factor, (iv) voltage across the coil, and (v) voltage across the condenser.

See Module: Electromagnetism, Question No. 13(a) of Long Answer Type Questions.

Group-B

6. a) Write down the chemical equations during charging and discharging of lead-acid cell. (M-7)
b) What are the indications of a fully charged storage cell and what are the factors affecting the capacity of such cell?

See Module: Electrical Machines, Question No. 15(a) & (b) of Long Answer Type Questions.

7. a) What are the basic differences between a d.c. generator and an a.c. generator? How can you use a step down transformer as a step up transformer?
b) What do you mean by eddy current loss? How can it be minimized? (2+1)+(1+1)

a) 1st part: See Module: Electrical Power Supply Systems, Question No. 8 of Short Answer Type Questions.

2nd part: See Module: Electrical Machines, Question No. 25 of Short Answer Type Questions.

b) See Module: Electromagnetic Induction, Question No. 5 of Long Answer Type Questions.

8. a) What do you mean by magnetic hysteresis? Draw the hysteresis loop of a ferromagnetic material.
b) An electromagnet has an air gap of 4 mm. and flux density in the gap is 1.3 Wb/m^2. Determine the ampere-turns for the gap. Given $\mu_0 = 4\pi \times 10^{-7}$ H/m.

a) See Module: Electromagnetism, Question No. 3(a) of Long Answer Type Questions.

b) See Module: Electromagnetism, Question No. 13(b) of Long Answer Type Questions.

Group-C

9. Which instrument is used to measure insulation resistance? Draw the connection diagram of it showing different parts for the measurement of such high resistance.

See Module: Measuring and Testing Instruments, Question No. 10 of Long Answer Type Questions.

10. a) State two advantages of MCB over there wirable fuse used in house wiring.
b) Give the idea of house wiring starting from the commencement of supply with block diagram.
c) Write at least one advantage of concealed house wiring.

See Module: Domestic Power Supply, Question No. 16(a), (b) & (c) of Long Answer Type Questions.

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