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RETEST EXAMINATION

NOVEMBER–2019

Semester : 3rd (Old)

Subject Code : EI-304

ELEMENTS OF ELECTRICAL ENGINEERING

Full Marks – 70

Time – Three hours

The figures in the margin indicate full marks for the questions.

Instructions :

1. Questions on PART–A are compulsory.
2. Answer any *five* questions from PART–B.

PART – A

Marks – 25

1. Fill in the blanks : 1×10=10

   (a) A semiconductor material in its pure form is called _____ semiconductor.

   (b) The efficiency of a cell is measured in _____.

[Turn over

(c) The unit of reactance is ——

(d) The resistance of wire varies inversely as ——.

(e) Electrical conductivity is measured in ——.

(f) Magnetic field in a DC generator is produced by ——.

(g) The ratio of rms value to average value is called the —— factor.

(h) The fuse wire is made of ———.

(i) The generator operates on the principle of ———induced emf.

(j) The core of transformer is made of ——

2. Write true or false : 1×10=10

(a) Electric potential = work done/charge.

(b) The unit of electrical energy is kWH.

(c) The material for commutator brushes is generally mica.

(d) Kirchhoff's current law is applicable only to junction in a network.

(e) DC voltage has single polarity.

(f) The emf induced in a DC motor opposes the applied voltage.

(g) The standard supply frequency in India is 60 Hz.

(h) The average power absorbed by pure resistive circuit is zero.

(i) DC generator converts mechanical power into electrical power.

(j) Transformer is a rotating device.

3. Choose the correct answer : 1×5=5

(a) When a fourth resistor is connected in series with three, the total resistance

(i) increases

(ii) increases by one-fourth

(iii) decreases

(iv) remains same

(b) In lap winding, the number of brushes is always

(i) double the number of poles

(ii) half the number of poles

(iii) same as the number of poles

(iv) two

(c) The time period of an alternating quantity is 0.02 second. Its frequency will be

(i) 25H (ii) 50Hz

(iii) 100Hz (iv) 0.02Hz

(d) The formula to find I when the value of V and R are known is

(i) I = VR (ii) I = R/V

(iii) I = V/R (iv) None of these

(e) In a parallel R-L-C circuit admittance is defined as the reciprocal of

(i) resistance (ii) reactance

(iii) impedance (iv) susceptance.

PART – B

Marks – 45

Answer any *five* questions.

4. (a) Name four good conductors and four good insulators. 2

(b) Define —work, power and energy with units. 3

(c) State the laws of resistance. 4

5. (a) State and explain Ohm's law 2

(b) A resistance R is connected in series with a parallel combination of 12 ohm and 8 ohm. Calculate R if the total power dissipated in the circuit is 70 watt when the applied voltage is 20 volt. 4

(c) Write the advantages of parallel circuit 3

6. (a) What is back e.m.f of DC motor ? 2

(b) Deduce the emf equations for DC generator. 4

(c) A four pole lap wound armature has 960 conductors and a flux per pole of 20 mwb. Calculate the emf generated when running at 400 rpm. Also find the emf generated if the armature is wave wound. 3

7. (a) Write the differences between primary cell and secondary cell. 2

(b) Explain the chemical action that takes place during charging and discharging of a lead acid cell 4

(c) What are the indications of fully charged battery ? 3

8. (a) Define — time period, frequency, amplitude of an alternating quantities 3

(b) Find the relation between alternating voltage and current when the circuit consists only pure inductance. 6

9. (a) What is a Transformer ? 2

(b) Discuss its purpose, construction and working principles. 2+2+3=7

10. Describe the principle of an induction motor.

A six pole, 50 cycles/sec induction motor is running at 950 rpm.

Find the slip, slip speed and synchronous speed. 9