CS/B.TECH(AUE)/SEM-6/AUE-601/2012

2012

AUTOMOTIVE ELECTRICAL SYSTEMS & ELECTRONICS

Time Allotted : 3 Hours Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :

$10 \times 1 = 10$

i) The armature of a DC machine is made of silicon steel lamination to

a) reduce hysteresis loss only

b) reduce eddy current loss only

c) increase permeability

d) reduce both hysteresis and eddy current loss.

ii) In case of horn, the number of vibrations per second determines the

a) frequency of the sound

b) pitch of the sound

c) loud warning signal

d) all of these.

iii) The direction of DC shunt motor can be reversed by interchanging

a) supply terminals

b) both armature terminals and field terminals

c) either of armature or field terminals

d) none of these.

iv) The commutator of DC machine is made of

a) Carbon 'b) Aluminium

c) Copper d) Stainless steel.

v) Example of first category switch in a car is

a) Cut-out b) Ignition

c) Radio d) (b) & (c) both.

vi) Main saferty part of a 3-point starter is

a) Hold-on magnet

b) Starting resistance

c) Control arm

d) Overload relay coil.

vii) The basic operation of the cut-out relay depends on

a) movement of wheel

b) opening or closing contact point

c) current through the relay coil (shunt & series coil

both)

d) engine capacity.

viii) Operation of Electronic Ignition system depends on

a) Capacitive discharge principle

b) Movement of flywheel

c) Current flow in input coil

d) None of these.

ix) In a stepper motor the stator has 6 poles which are at

phase difference of 60 degree and the rotor has

8 poles which are at a phase difference of 45 degree.

So how many pulses are required per one revolution ?

a) 6 b) 12

c) 24 d) 30.

x) For constant supply voltage what are the effects of inserting a series resistance in the field circuit of a DC shunt motor ?

a) Speed will decrease and torque will decrease

b) Speed will decrease and torque will increase

c) Speed will increase and torque will decrease

d) Speed will increase and torque will increase.

xi) Stepper motor is useful for

a) Horn b) Wiper system

c) Speedometer d) Ignition system.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. Draw and explain the characteristic of a *dc* shunt generator (on-load & no-load).

3. Describe the working principle of Speedometer.

4. Write a short note about lighting relay.

5. Explain Wiper system of a vehicle.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

6. a) A 250 V shunt motor giving 14.92 kW at 1000 rpm takes an armature current of 75 A. The armature resistance is 0.25 ohm and the load torque remain constant. If the flux is reduced by 20% of its normal value before the speed changes, find the instantaneous value of the armature current and the torque.

Determine the final value of the armature current and

speed.

b) Derive the e.m.f. equation of a d.c. generator.

c) With power flow diagram explain how an electrical energy is converted into the mechanical energy in case of DC motor. 6 + 4 + 5

7. a) What is electronic ignition system ? With proper circuit diagram describe the working principle of Electronic Ignition System (EIS).

b) With proper circuit diagram give the brief description about HORN. 1 + 8 + 6

8. a) With proper circuit diagram give the brief description about 3-point starter.

b) Armature reaction is creating a loss in DC machine. Is it true ? Explain.

c) Why YOKE is useful in case of DC machine ? 8 + 5 + 2

9. Write short notes on any *three* of the following : 3 × 5

a) Head light reflector

b) Stepper motor

c) Cut-out Relay

d) Transfer function of closed loop system

e) Altitude Sensor.

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