

GUJARAT TECHNOLOGICAL UNIVERSITY**PDDC - SEMESTER-V. EXAMINATION – SUMMER 2016****Subject Code:X50902****Date:13/05/2016****Subject Name:Elements of Electrical Design****Time:02:30 PM to 05:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Explain the following terms: **07**
(i) Field form factor
(ii) Carter's gap coefficient
(iii) Stacking factor
(iv) Gap contraction factor
- (b) What is meant by magnetization curve? Explain its importance and uses in magnetic circuit **07**

- Q.2** (a) Explain the use of dummy coils and equalizer connections in d.c. armature windings. **07**
- (b) State the four fundamental equations used for the design of a plunger type electromagnet. **07**

OR

- (b) What is choke coil? Explain function of choke coil in tube lights. Also write the design steps for it. **07**

- Q.3** (a) What is welding transformer? State the functions of welding transformer. Explain V-I characteristics of welding transformer. **07**
- (b) Design a single phase transformer's core, windings and window area having an output of 3A at 12V. The primary winding is connected to 230V, 50Hz a.c. supply. Assume efficiency = 90% **07**

OR

- Q.3** (a) Explain the importance of air gap length for variable choke coil. What will be value of inductance and current at zero air gap length? **07**
- (b) Design a suitable 8 section starter for a 20H.P., 250 Volt, 1000 rpm, d.c. shunt motor from the following data: **07**
Maximum starting torque= Full load torque
Armature coil resistance= 0.4 ohm
Full load efficiency= 0.85

- Q.4** (a) Explain the function of field regulator in case of D.C. Shunt Generator and D.C. Shunt motor briefly. **07**
- (b) State and explain various methods for calculating MMF required for teeth in d.c. machine. **07**

OR

- Q.4** (a) What is electrical load? How will you classify electric loads? **07**
- Q.4** (b) What are the factors that should be considered while selecting the types of wiring system. **07**

- Q.5 (a)** Define the following terms used in the design of lighting scheme: **07**
 (i) Luminous flux (ii) Lumens (iii) Illumination (iv) Lux
 (v) Luminous efficiency.
- (b)** Explain the various types of lamps with their features. **07**
- OR**
- Q.5 (a)** Explain the various factors which should be considered in the design of lighting scheme. **07**
- (b)** The plan of a two room office building with verandah is shown in figure Q.5(b) below: **07**

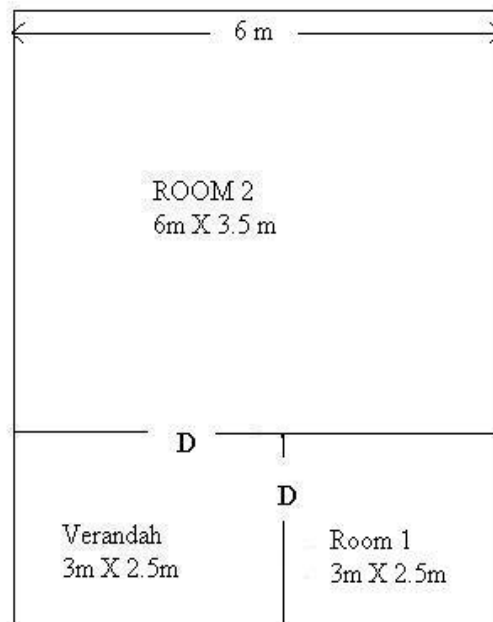


FIGURE Q.5B

The office building is required with electric connections in PVC wiring system suitable for 230V, 50 Hz, single phase A.C. supply. You are required to do the following:

- (i) Mark the suitable location of the electrical points in the office building.
- (ii) Decide the number of sub circuits required.
- (iii) Draw the wiring diagram
- (iv) calculate the length of PVC conduit required.
