

**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:**

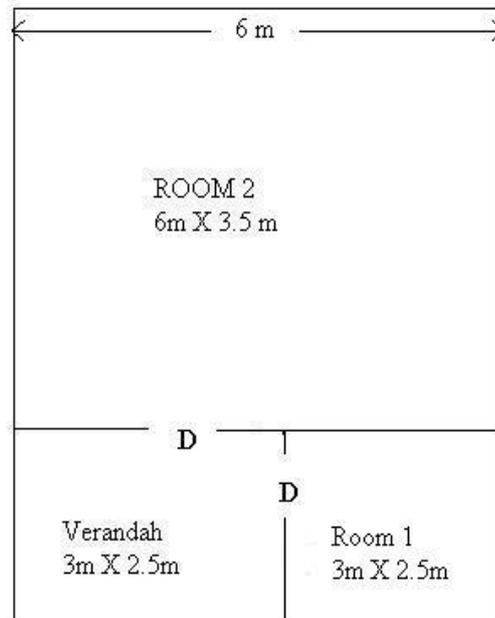
1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- 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.

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