Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**PDDC SEMESTER V– EXAMINATION – SUMMER 2017**

**Subject Code: X50902** **Date: 02/05/2017**

**Subject Name: Elements of Electrical Design**

**Time: 02.30PM to 05.00PM** **Total Marks: 70**

**Instructions:**

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

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|---|---|---|---|
| **Q.1** | **(a)** | Prepare winding layout for a three phase a.c. machine having 24 armature slots, 4 pole double layer lap winding. | **07** |
| | **(b)** | With suitable diagram explain power and control circuit of star delta starter. | **07** |
| **Q.2** | **(a)** | What is Carter's coefficient? How does it help in estimation of mmf in case of a slotted armature? What are the expressions to be used for estimation? | **07** |
| | **(b)** | Explain how resistor sections can be calculated for the starter of a d.c. shunt motor. | **07** |
| | | **OR** | |
| | **(b)** | Find resistance of each of the 6 sections of a starter for a 400 V , DC series motor used for cranes. Motor resistance is 0.35 ohm, max permissible starting current is 105 amp. Assume magnetization curve to be a straight line passing through origin. | **07** |
| **Q.3** | **(a)** | Explain four basic equations used in the design of electromagnet. | **07** |
| | **(b)** | Determine required MMF for air gap of a machine having core length =0.32m,including 4 ducts of 10 mm each, pole arc=0.19m, slot pitch =65.4 mm slot opening = 5 mm , air gap length 5 mm , flux per pole = 52 mwb, carter's coeff. Is 0.18 for opening/gap =1 and it is 0.28 for opening/gap =2. | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | Explain the design procedure of flat faced armature type small circular magnet. | **07** |
| | **(b)** | Define and explain following terms clearly:<br>(1) Dummy coil<br>(2) Back and front pitch<br>(3) Single layer and double layer winding. | **07** |
| **Q.4** | | Design a battery charging transformer of 200 VA , 12 V rating supplied from 230 V single phase mains. Assume all required data necessary and mention your assumption clearly. | **14** |
| | | **OR** | |
| **Q.4** | **(a)** | Explain how design procedure of a welding transformer is different from that of normal transformer. | **07** |
| | **(b)** | What is electric load? Giving examples classify different types of load. | **07** |
| **Q.5** | **(a)** | What are types of electric wiring? Explain any two in detail. | **07** |
| | **(b)** | Explain the design procedure of electrification of a small industrial shade having a load of about 80 kW and shade area of 1000 square meters. | **07** |
| | | **OR** | |
| **Q.5** | **(a)** | Discuss the factors that should be considered while selecting the type of a wiring system. | **07** |
| | **(b)** | Explain how a flood lighting scheme for a cricket stadium can be designed? | **07** |

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