

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII (NEW) EXAMINATION – WINTER 2021****Subject Code:3170920****Date:29/12/2021****Subject Name:Industrial Electrical Systems****Time:10:30 AM TO 01:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

| | | MARKS |
|---|--|--------------|
| Q.1 | (a) State any four general rules for residential installation. | 03 |
| | (b) Explain different types of electrical wiring system. | 04 |
| | A three occupant building has to be electrified independently from a common energy meter. Design the distribution boards with accessories for each resident having 10nos of light circuits, 6 nos of power circuits. | 07 |
| Q.2 | (a) Define: industrial automation. State its need and importance. | 03 |
| | (b) Classify electric elevators. | 04 |
| | (c) Develop a block diagram of PLC with basic components and its functions. | 07 |
| OR | | |
| Q.3 | (c) Build architecture of SCADA system with neat diagram. | 07 |
| | (a) Define following terms referred to illumination: (a) Space-height ratio (b) Utilization factor (c) Waste light factor | 03 |
| | A room with an area of 6×9 m is illustrated by ten 80-W lamps. The luminous efficiency of the lamp is 80 lumens/W and the coefficient of utilization is 0.65. Find the average illumination. | 04 |
| (b) Describe through illustrations the following types of lighting scheme: (i) Semi-direct (ii) Semi-indirect | 07 | |
| OR | | |
| Q.3 | (a) Define following terms referred to illumination: (a) lumen (b)Candle power (c) Glare | 03 |
| | The flux emitted by 100-W lamp is 1,400 lumens placed in a frosted globe of 40 cm diameter and gives uniform brightness of 250 milli-lumens/m ² in all directions. Calculate the candle power of the globe and the percentage of light absorbed by the globe. | 04 |
| | (b) Explain Construction and working of compact fluorescent light (CFL). | 07 |
| Q.4 | (a) Define: 1)MCB 2)ELCB 3)MPCB | 03 |
| | (b) Distinguish between LT and HT Motor? Analyze with an example. | 04 |
| | The monthly readings of a consumer's meter are as follows : Maximum demand = 50 kW, Energy consumed = 36,000 kWh Reactive energy = 23,400 kVAR. If the tariff is Rs 80 per kW of maximum demand plus 8 paise per unit plus 0.5 paise per unit for each 1% of power factor below 86%, calculate the monthly bill of the consumer. | 07 |

OR

- Q.4** (a) List out steps to be followed for safety precautions against an electric shock. **03**
- (b) Compare PCC and MCC panels. **04**
- A supply system feeds the following load.(i)a lighting load of 500 kW (ii)a load of 400 kW at 0.707 p.f. lagging (iii) a load of 800 kW at 0.8 p.f. leading.(iv) a load of 500 kW at 0.6 p.f. lagging v)a synchronous motor driving a 540 kW d.c. generator and having overall efficiency of 90%.Evaluate the power factor of synchronous motor so that station Power factor may become unity. **07**
- (c) **Q.5** (a) List out steps for selections of transformer. **03**
- (b) Describe selection procedure of ELCB for industrial dwelling. **04**
- (c) Analyze with an example (a) load calculation and sizing of wire, (b) rating of main switch residential wiring system. **07**

OR

- Q.5** (a) List out different types of UPS. **03**
- (b) Illustrate a single line diagram of indoor substation showing all accessories of the system. **04**
- (c) Distinguish between continuous power, prime power and standby power related with standby generator. **07**
