C 56261–A

Name.....

Reg. No.....

EIGHTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION, JUNE 2009

Electrical

EE 04 801 – ELECTRICAL SYSTEM DESIGN AND ESTIMATION

(2004 Admissions)

Time : Three Hours

Maximum : 100 Marks

1. (a) Two lamps and a fan are to be controlled independently by separate switches. The switches and fan regulators are placed on one switch board. Draw the schematic diagram and the wiring diagram in both joint box and looping-in system of wiring.

   (b) Explain how the polarity of single pole switches is tested.

   (c) A certain incandescent lamp, hangs from the ceiling of a room. The illuminance received on a small horizontal screen lying on a bench 2 m vertically below the lamp is 63.5 lux. Calculate the illuminance at a point when the screen is moved horizontally a distance of 1.5 m along the bench.

   (d) What are the primary purpose of lighting :

      (i) in an office ;

      (ii) in industrial plants.

   (e) Explain the procedure to determine the input current to different types of motors, stating examples.

   (f) A 240 V, 7.46 kW single phase motor is working at full load with an efficiency of 85% and a power factor of 0.75 lag, calculate the current supplied to the motor.

   (g) Estimate the material required for the installation of a 300 kVA foundation mounted outdoor substation.

   (h) What the necessity of substations? Explain the various types of substations.

   (8 × 5 = 40 marks)

2. (a) Explain in detail the various types of internal wiring.

   Or

   (b) Explain by means of a neat sketch how (i) underground ; (ii) overhead service connections are provided to a consumer from low voltage overhead distribution system. What modifications would you suggest if the supplier distribution system is underground?

3. (a) A road 300 m long is required to be illuminated by providing 40 W fluorescent lamps. The width of the road is 4 m. Design street lighting scheme and estimate the material required if the scheme is to be estimated for obtaining minimum level of illumination of 0.6 lux.

Or

(b) Briefly explain the design consideration for a good lighting scheme with suitable examples.

4. (a) A room 18 m × 6 m × 5 m is to be wired in PVC wiring from a single phase 230 V supply. There are two rows of lamps along the length of the room. The number of lamps may be suitably assumed. Each lamp is controlled by an independent switch. The wiring along the wall is 4 m above the ground and the switches are 1.3 m above the ground. Draw the installation plan and determine the quantity of materials required and cost for the material and labour.

Or

(b) Briefly explain the design considerations of electrical installation in Small Industries.

5. (a) An indoor substation 11 kV/415 V, 1500 kVA is installed in the premises of a factory for feeding 3 ϕ and 1 ϕ power for 4 workshops. The substation is fed from an 11 kV overhead feeder running near it. Draw the layout of the substation and prepare a list of important material required.

Or

(b) Explain in detail about the earthing of power system. What is the need for earthing?

(4 × 15 = 60 marks)