C 46682 (Pages 2) Name.....

Reg. No.....

EIGHTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION, JUNE 2008

EE 04 801—ELECTRICAL SYSTEM DESIGN AND ESTIMATION

(2004 admissions)

Time : Three Hours Maximum :100 Marks

Answer **all** *questions.*

1. (a) Draw a schematic diagram and wiring diagram is multiline representation for an alarm circuit having two bells. Each bell will ring only when its respective button is pressed. The bells are to be operated from a 12 V battery.

   (b) Discuss the various considerations governing diversity factor for different types of loads.

   (c) Explain with the aid of a circuit diagram, the operation of a sodium vapour lamp.

   (d) Explain briefly the forms :

   (i) Maintenance factor.

   (ii) Coefficient of utilisation.

   (e) Explain how the ratings of cables and fuses are decided for motor installation.

   (f) A 240V, 37.3 kW direct current motor is working at full load and at 85% efficiency. The hoo cere cable supplying the motor is 110m long. Calculate the current through the cable.

   (g) Prepare the single line diagram of a pole mounted substation indicating the various protective devices installed on the HT and LT sides. State the function of each device.

   (h) Explain briefly the various types of earthing used in substations.

   (8 × 5 = 40 marks)

2. (a) Explain in detail the various types of service connections.

   Or

   (b) Draw a neat sketch of the layout of wiring from the supplies pole to the distribution board of a consumer taking single phase supply, showing the meter, main switch and the distribution board. State briefly the purpose of each of those.

3. (a) A shop 16m × 10 m is illuminated with 200 W inland escent lamps. If a coefficient of utilisation of 0.68 and maintenance factor of 0.75 are selected, and an illumination of 260 lax is required at the work place, calculate the number of luminaries required. Estimate the cost of material required and labour 1 for this installation. Take the mounting height as 2m.

   Or

Turn over

(b) Briefly explain about flood lighting and street lighting along with their design considerations.

4. (a) A small workshop has to be equipped with the following machinery : —

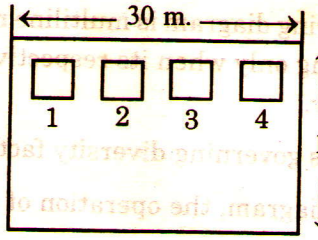
(i) One 5 hp, 400V, 3ϕ motor.

(ii) One 3 hp, 400 V, 3ϕ motor.

(iii) One ½ hp, 230V, 1ϕ motor.

(iv) One 1 hp, 400 V, 3ϕ motor.

The position of the machines are shown in a floor plan as in fig below :



Draw the wiring diagram for electrical connection starting from main switch. Determine the quantity of material required and cost of the same for the power distribution arrangement. For illuminating the workshop area, 32 inland escent lamps are proposed to be used. Sketch the proposed arrangement of lamps. Draw the wiring diagram and estimate the quantity of material required (Assume any necessary data)

Or

(b) What is the necessity of stand-by generators for lifts and the protection scheme for that ?

5. (a) An 11 KV/415 V, 300 KVA substation is to be installed in a density populated area. What type of substation will you select ? Make an estimate of the quantity of material required. Assume that the supply is taken from an overhead line running near it. The LT panel consists of an incoming line with OCB, and five outgoing lines with Switch fuse units of 11 No, 200 A, 2 Nos. 100 A and 2 Nos. 63 A respectively.

Or

(b) Explain in detail about shielding of electrical system.

(4 × 15 = 60 marks)