R13

Code No: 117CU

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech IV Year I Semester Examinations, April/May - 2018
ELECTRICAL ESTIMATION AND COSTING
(Electrical and Electronics Engineering)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A **(25 Marks)**

1.a) What is the purpose of neutral and earth wires in a three phase distribution system?[2]
b) State reasons why fuses are provided on the line wire and never on the neutral wire?[3]
c) For wiring a motor circuit, what is the minimum size of aluminum conductor cable that can be used? [2]
d) 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 lagging. Calculate the current supplied to the motor? [3]
e) What is the purpose of cross arm? Give different types of cross arms. [2]
f) State different factors determining the size of H.T power cables. [3]
g) Give the arrangement of earth pits used for a distribution substation. [2]
h) Compare outdoor substations with indoor substations. [3]
i) What is meant by luminous intensity? Name and define the units of these quantities.[2]
j) State the meaning of the following terms:
i) maintenance factor ii) coefficient of utilization. [3]

PART-B

(50 Marks)

2. Explain by means of a neat sketch how (a) underground (b) overhead, service connections are provided to consumer from low voltage overhead distribution system. What modifications would you suggest if the supplier's distribution system is underground? [10]

OR

3. Draw a diagram of three phase four wire supply feeding three lighting fuse boards and one power board supplying three phase loads. If the line to neutral voltage is 240 V, what will be voltage between lines? [10]

4. A large factory having a total installed load of 400 KW is given 11 KV, 3 phase supply. It contains a number of 415V, 3 phase induction motors of large rating. Describe the layout of the necessary apparatus between the high voltage terminals and 50 KW, 415 V, three phase slip ring induction motor, with suitable diagrams. [10]

OR

5. A factory 70 m × 14 m is equipped with a total installed power load of 96 KW consisting of the following: (a) Line shafting of two 18 KW, 415 V, 3 ϕ, 50Hz, slipring motors. (b) Individual machine drives of four 12 KW, 415 V, 3 ϕ, 50 Hz, slipring motors, and one 12 KW, 415 V, 3 ϕ, 50Hz squirrel cage motors.
Assume 0.85 p.f and 80% efficiency for the motors.
Draw the installation plan approximately to scale indicating the assumed position of motors. Mark on the plan the electrical distribution you propose. Prepare a schedule of material you would use and its approximate cost. [10]

6. Estimate the material requirement for a 1 Km, 415/240 V, three phase line with four wires starting from the substation to feed a load of 50 KW. Take the span between two poles as 50 m. The size of the conductor is ACSR 6/1 × 2.59 mm. [10]

OR

7. Design 11 KV 3 core underground cable feeder for 500 KVA transformer. The length of the proposed feeder is 500 meters up to substation. Estimate the material required. [10]

8. Estimate the quantity of material required for erection of a 200 KVA pole- mounting substation. [10]

OR

9. Estimate the material requirement for the installation of a 400 KVA, 11 KV/415V foundation mounted outdoor substation. [10]

10. A room 40 m × 15 m is to be illuminated by 80 W fluorescent lamps, mounted 3 m above the working plane on which an average illuminance of 180 lux is required. Using a maintenance factor of 0.8 and a utilization factor of 0.5, design and sketch a suitable layout, and estimate the cost of material and labour required for the installation to be carried out. The 80W fluorescent lamp has an output of 4500 lumens. [10]

OR

11. Explain with the aid of a circuit diagram, the operation of a sodium vapour lamp. [10]

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