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10EE81

Eighth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Electrical Design, Estimating and Costing

Time: 3 hrs.

Max. Marks:100

- Note:** 1. Answer any FIVE full questions, selecting atleast TWO questions from each part.
 2. Missing data may be assumed suitably.

Use the below data for wire size selection for all problems when required.

| Wire Area (mm ²) | # and Diameter (mm) | Current Rating (Amperes) |
|------------------------------|---------------------|--------------------------|
| 1.0 | 1 / 1.12 | 05 |
| 2.5 | 3 / 1.06 | 15 |
| 4.0 | 7 / 0.737 | 20 |
| 6.0 | 7/1.06 | 28 |
| 10.0 | 7/1.40 | 43 |
| 25.0 | 19/1.12 | 74 |
| 50.0 | 19/1.83 | 160 |

Table – 1 : Wire Size Selection chart.

PART – A

- State and explain any four IE Act rules that are most important. (06 Marks)
 - State the purpose of an estimate and costing. (06 Marks)
 - Briefly explain any four guidelines for tendering. (08 Marks)
- Explain the main features of residential electrification. Explain the different circuits involved, the maximum rating of each circuit and how the number of sub-circuits are calculated. (06 Marks)
 - Provide a detailed estimate for Hall shown in Fig.Q2(b). Show a neat single line diagram with all required equipments. Use buried conduit type of wiring. Provide a detailed list of materials and show the position of the lights, fans and switch boards. (14 Marks)

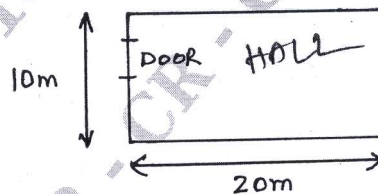


Fig.Q2(b)

- Briefly explain the main differences between commercial and residential electrification. (06 Marks)
 - A floor of a 3 story hostel is shown in Fig.Q3(b). Each room is required to have two lights and a 60 W fan. The Bathrooms have two heaters each. Calculate the total current, sub-circuits and show a neat single line diagram with the wiring connections. Clearly show the total power, no. of sub-circuits, cable size, position of the lights, fans and provide a list of materials. (14 Marks)

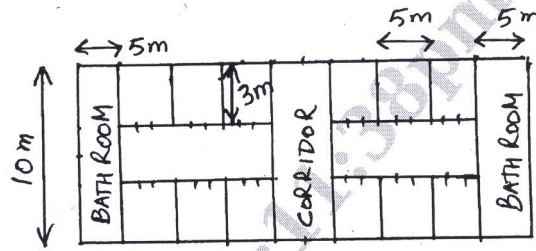


Fig.Q3(b)

- 4 a. Explain the two methods of testing insulation resistance. State the positions of the MCB, fuses, and other appliances during the test. (06 Marks)
- b. Explain what is a service connection and their types. (06 Marks)
- c. Estimate the installation of an underground service line to a building that requires 3 kW, 1 ϕ . Draw a neat sketch showing all required materials. The service pole is 10 m away. (08 Marks)

PART - B

- 5 a. List out the important considerations regarding power circuit motor wiring. Draw a neat single line diagram neatly labeled. (08 Marks)
- b. Calculate the input power, current and estimate to complete the wiring of the workshop shown in Fig.Q5(b). Provide a neat circuit diagram and detailed list of materials. Use $\eta = 85\%$, $pf = 85\%$. The motor is a 3 ϕ , 415 V, 10 kW induction motor. (12 Marks)

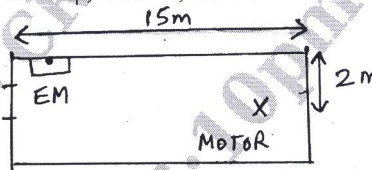


Fig.Q5(b)

- 6 a. Describe in detail all the parts of an overhead transmission tower. Draw a neat diagram neatly labeled. (08 Marks)
- b. A pole for OH 11 kV, 3- ϕ , 50 Hz line is required to be earthed and a star is to be provided. Make a neat sketch showing how it should be done. Prepare list of material required of same. (12 Marks)
- 7 a. Describe the testing and commissioning of overhead distribution lines. (06 Marks)
- b. An overhead distribution line of 415 V, 50 Hz is to be erected. Line length is 300m and end supports are terminated structures. The span between adjustment poles is 50m. Draw a neat sketch of the terminal pole with proper labels. Provide a list or all materials used. Use the following information: ϕ wires - 4 SWG Cu, Neutral 8 SWG Cu, Earth 8 SWG GI. (14 Marks)
- 8 a. Describe the different classifications of sub-stations and state the reasons for choosing them. (08 Marks)
- b. A 37 kW connection is to be given to a field at 415 V, 3 ϕ , 50 Hz. The input is 11 kV overhead distribution line 20 m away. A pole mounted sub-station is to be used. The load is a motor with $\eta = 0.85$ and $pf = 0.80$. Make a detailed sketch with proper labels showing the arrangement of all required items and make a list of all items used. (12 Marks)
