Electrical Design Estimating and Costing VTU Question Paper Set 2017

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10EE81

Eighth Semester B.E. Degree Examination, Dec.2016/Jan.2017
Electrical Design Estimating and Costing

Time: 3 hrs. Max. Marks:100

Note: ***1. Answer FIVE full questions, selecting at least TWO questions from each part.***
2. Assume suitable data wherever necessary.

PART – A

1 a. Define estimating and state its purpose. **(06 Marks)**

b. Describe the important factors which an estimator should know for preparing an internal wiring estimation. **(08 Marks)**

c. Explain how is the quantity of materials required for internal wiring determined. **(06 Marks)**

2 a. Mention any twelve general rules required to be followed for internal wiring. **(06 Marks)**

b. Estimate the quantity of materials required for wiring a newly constructed residential building, the plan of which is as shown in Fig.Q.2(b). Assume the details of load. All dimensions are in metres. **(14 Marks)**

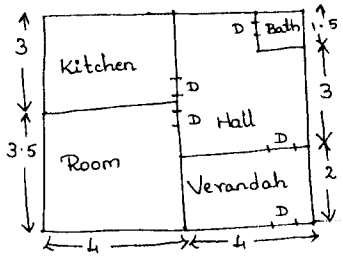

Fig.Q.2(b)

3 a. Explain how costing of electrical wiring installation is chosen for commercial buildings. **(04 Marks)**

b. The plan of a ground floor of a three storeyed hostel building in a polytechnic is shown in Fig.Q.3(b). The number of lights and fans to be installed are also indicated. The first and second floors are similar in plan. In each room one no. 5A socket outlet has to be provided. Prepare an estimate for the quantity of materials only for deciding the cable size and also determine the number of sub-circuits in each floor. **(16 Marks)**

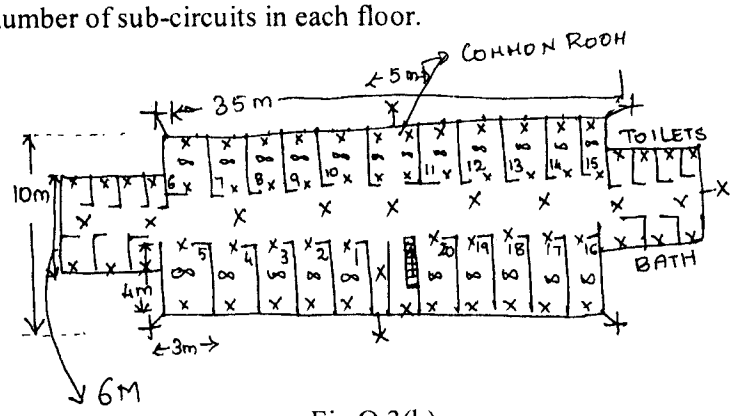

Fig.Q.3(b)

4 a. What are the factors to be checked while inspection of internal wiring installations? **(06 Marks)**

b. Mention the reasons for excess recording of energy consumption by energy meter. **(06 Marks)**

c. A farmer requires to connect a 3-phase, 37 kW, 415V, 50Hz motor to a 3-phase, 4-wire, 415V, 50Hz overhead line. The distance of the service line from the farmer structure having motor is 15m. **(08 Marks)**

PART – B

5 a. Mention any ten considerations regarding motor installation wiring. Also explain how ratings of fuses are determined. **(08 Marks)**

b. Estimate the quantity of materials required for an agricultural pump set of 5.0 kW, 3 phase, 415V motor. The layout of pump shed is as shown in Fig.Q.5(b). **(12 Marks)**

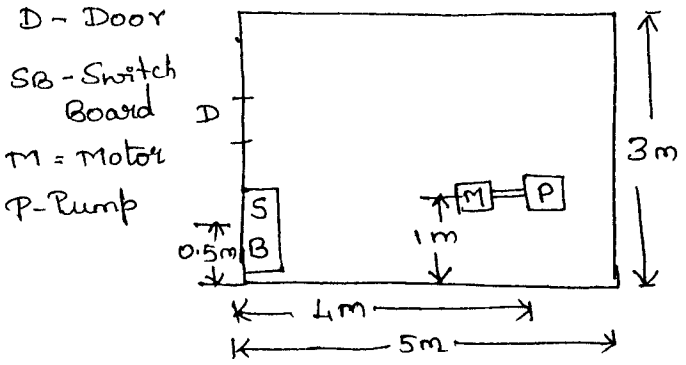

Fig.Q.5(b)

6 a. Explain with a block diagram how electrical energy is conveyed in a typical AC electrical power supply system. **(08 Marks)**

b. A pole for an overhead 11kV, 3-phase, 50Hz line is required to be earthed and a stay is to be provided. Make a neat sketch showing how it should be done. Prepare a list of materials required. **(12 Marks)**

7 a. What are the various types of insulators used in construction of distribution over head lines? **(08 Marks)**

b. A 1km long overhead distribution line of 415 volts, 3-phase, 50Hz is to be erected along a straight route from 100kVA, 11/0.433 kV pole-mounting substation. The line is to be laid with 6/1 × 3.00mm ACSR conductor on RCC poles of a metre length. Make a list of material required for the line the span between adjacent poles is 50 metres. **(12 Marks)**

8 a. What are the advantages and disadvantages of outdoor substation over indoor substations? **(08 Marks)**

b. Estimate the quantity of material for erection of a 250KVA pole-mounted substation. **(12 Marks)**

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10EE81

Eighth Semester B.E. Degree Examination, June/July 2016
Electrical Design, Estimation and Costing

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Define estimating and state its purpose. State the important factors which an estimator should know for preparing an internal wiring estimate. **(08 Marks)**

b. Explain : (i) Contingencies (ii) Overhead charges and (iii) Profit. **(06 Marks)**

c. Mention the different modes of tendering and explain them. **(06 Marks)**

2 a. Explain the sequence to be followed for preparing the estimate of residential wiring. **(06 Marks)**

b. The accompanying sketch shows the plan of an officer's quarter. Its to be wired up as an AEH installation. The heating load is two outlets of 1kW each in the kitchen and one outlet of 2kW in the bath. The existing supply pole is 20 mtrs away from the house. Use conduit wiring system for the calculations.

i) Mention the type of service mains proposed
ii) Show the wiring plan in the sketch supplied
iii) Calculate the total load consumption
iv) Calculate the length of the wire
v) Calculate the length of conduit required. **(14 Marks)**

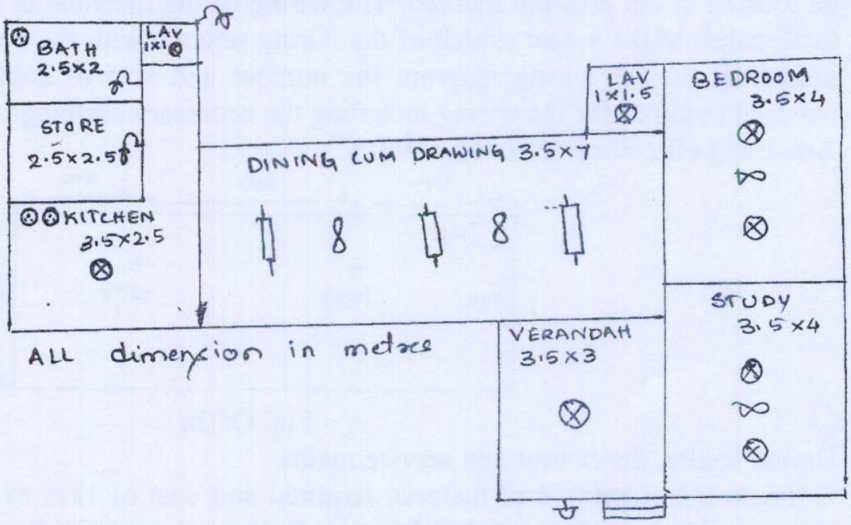

Fig. Q2 (b)

3 a. What is bus bar? Draw the diagram showing the arrangement of bus bar and switch fuse unit in a bus bar chamber. **(04 Marks)**

b. An office hall 30m × 15m × 3m is to be illuminated by 40 nos twin 40 watts tube light fitting. Number of lamp fitted along the width and length are 4 and 10 respectively. Single phase 230V, 50Hz a.c supply is available at the centre of one of the 30m long wall. Assuming PVC conduit type of wiring calculate (i) Total connected load (ii) Number of sub-circuits (iii) Size of cable. iv) Ratings of switch board and Distribution board (v) Also show the wiring diagram of 1 sub-circuit. **(16 Marks)**

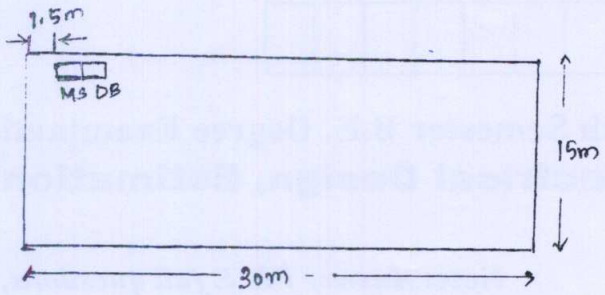

Fig. Q3(b)

4 a. Name the various tests required to be performed before connecting new installation to supply. Explain how is the polarity tested. **(07 Marks)**

b. What are the methods of installation of service lines? Mention the various methods used for the installation of overhead lines. **(06 Marks)**

c. A single storeyed house is to be provided with service connection from nearby pole situated 20 meters away from building receiving point. The supply is given at 1ϕ, 230V, 50Hz. Prepare list of material with specification. Assume total load connected in the house is 3200W. **(07 Marks)**

PART – B

5 a. Explain the determination of input power, size of conduit, distribution board, main switch and starter. **(06 Marks)**

b. Two ac, 3phase, 415V, 50Hz squirrel cage motors are to be installed in a workshop. The rated outputs of the motors and their locations are as shown in the Fig. Q5(b) γ - Δ starters supplied with each motor are to be installed on the wall. The supply company's meter will be located at the position marked. The wiring of the machine is to be carried out according to IE rules. Make a neat sketch of the wiring scheme with the help of a single line diagram indicating on the wiring diagram the number and size of cables used. Prepare a list of material required for the wiring including the necessary earthings. Assuming efficiency 85% and pf = 0.8. **(14 Marks)**

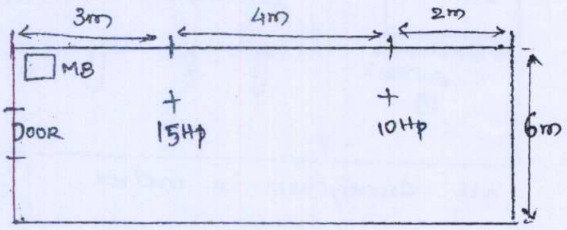

Fig. Q5(b)

6 a. Define feeder, distributor and service mains. **(06 Marks)**

b. Estimate the quantity's of material required and cost of 1km of overhead 11kV 50Hz line using steel pole of 11meter height and ACSR conductor of 6/1 × 2.59 mm with an average span of 120m. **(14 Marks)**

7 a. Explain the procedure for the estimation of H.T lines for the distribution line. **(08 Marks)**

b. Estimate the cost of LT lines extension from T.C to 3I.P sheds of 5Hp each at a distance of 500m from TC. Assume a span of 65M and 7.5M poles. **(12 Marks)**

8 a. What is the purpose of providing the substation earthings systems? **(04 Marks)**

b. Estimate the quantity of material required for the augmentation of 33kV grid substation of 500KVA to 1000KVA, 33/11kV grid substation. **(16 Marks)**

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Eighth Semester B.E. Degree Examination, June/July 2015
Electrical Design, Estimating & Costing

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. What is estimating and what are the importance of the estimating and costing? **(04 Marks)**

b. Explain the followings: i) Electrical schedules ii) Catalogues iii) Purchase system. iv) Market survey. **(08 Marks)**

c. List out guidelines for inviting tenders. **(08 Marks)**

2 a. List the general rules guide lines for residential installation. **(06 Marks)**

b. Estimating the quantity of materials required for wiring a newly constructed building where plan is as shown in Fig. Q2 (b). Assume the details of the load. All dimensions are in meters. **(14 Marks)**

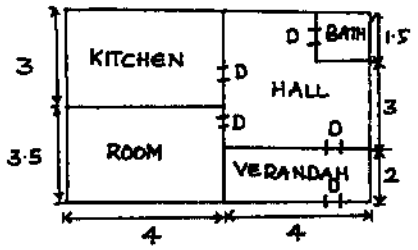

Fig. Q2 (b)

3 a. Explain the determination of load calculation selection of size of service connection and nature of supply. **(06 Marks)**

b. Fig. Q3 (b) shows the plan of ground floor of school building. School building consists at ground floor, 1st floor and 2nd floor having same plan that of ground floor.
Draw single line diagram for ground floor and calculate material required for three floors. **(14 Marks)**

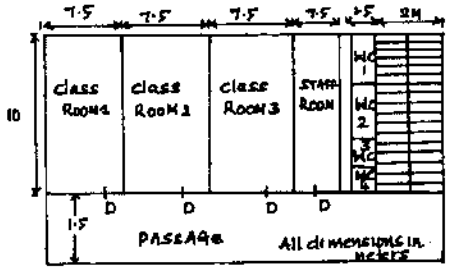

Fig. Q3 (b)

4 a. Write a short note on service lines. **(06 Marks)**

b. Write the reasons for excess recording of energy consumption by energy meter. **(06 Marks)**

c. Find the material required for 1-ϕ overhead service lines of a house located 10 meters away from pole, with following loads:
Lighting = 300 watts, Heating = 2500 watts.
Assume Safety factor = 2. **(08 Marks)**

PART – B

5 a. Explain determination of input power, input current to motors and rating of cables. **(06 Marks)**

b. A 10 H.P. (metric), 415 V, 3ϕ, 50 Hz squirrel cage induction motor is to be installed in a flour mill, the plan of which is shown in Fig. Q5 (b). Show the wiring diagram of the layout and estimate the quantity of materials required and its cost. **(14 Marks)**

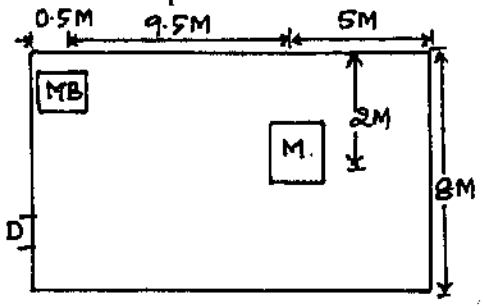

Fig. Q5 (b)

6 a. What are the main requirements of the line supports? Describe factors governing height of pole? **(08 Marks)**

b. Estimate quantity of materials required for adding 132 KV bay at 132 KV grid substations. **(12 Marks)**

7 a. List the points to be considered at the time of erection of overhead lines. **(08 Marks)**

b. A pole for an overhead 11 KV-3 phase, 50 Hz line is required to be earthed (pipe) and a stay is to be provided. Make a neat sketch showing how it should be done. Prepare a list of materials required. **(12 Marks)**

8 a. Write short notes on indoor substation? List advantages and disadvantages of outdoor substation over indoor substation. **(08 Marks)**

b. Estimate the quantity of material required for installation of 132/33 KV substation with main and transfer bus scheme having 2×40 MVA transformers. **(12 Marks)**

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