Electrical Design, Estimating and Costing VTU CBCS Question Paper Set 2018

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10EE81

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)**

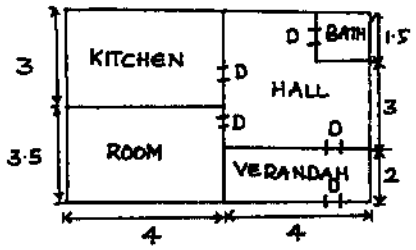

Fig. Q2 (b)

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)**

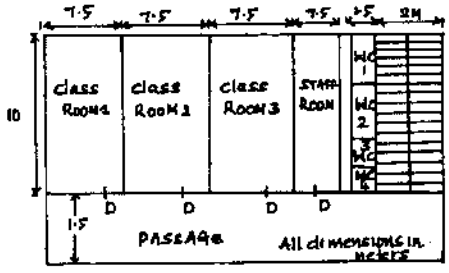

Fig. Q3 (b)

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)**

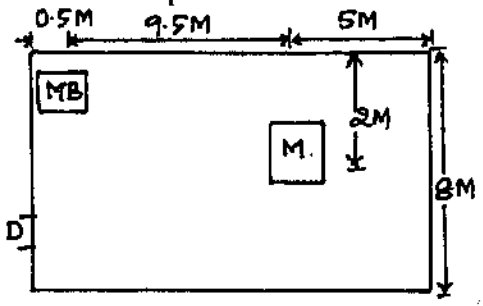

Fig. Q5 (b)

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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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)**

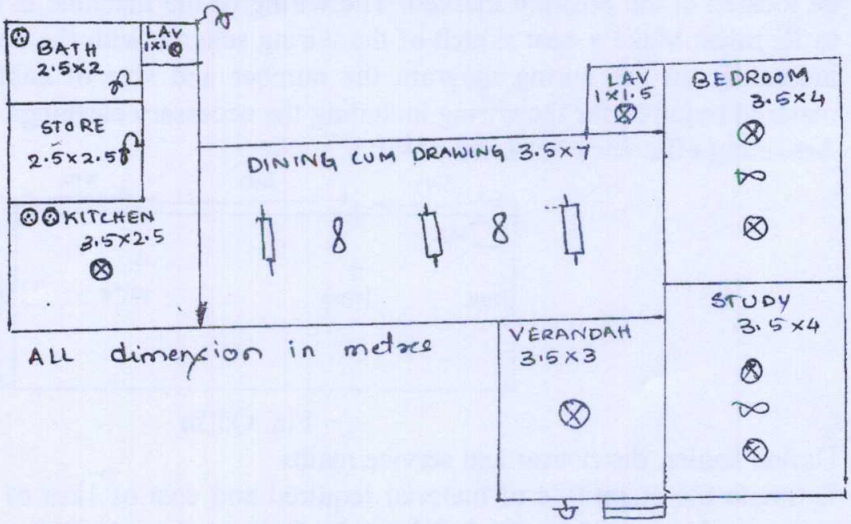

Fig. Q2 (b)

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)**

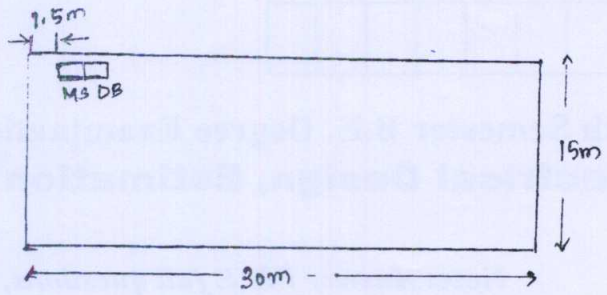

Fig. Q3(b)

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)**

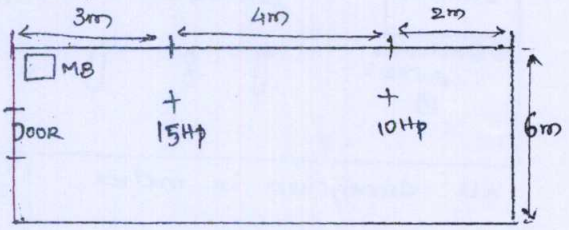

Fig. Q5(b)

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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10EE81

Eighth Semester B.E. Degree Examination, June/July 2017
Electrical Design Estimation and Costing

Time: 3 hrs. Max. Marks:100

Note: 1. ***Answer FIVE full questions, selecting at least TWO questions from each part.***
2. ***Use of Wire table is permitted.***

PART – A

1 a. Write the necessity of estimating and costing. **(06 Marks)**

b. Explain the following:
(i) Comparitive statement (ii) Contigencies **(06 Marks)**

c. Write any four rules of Indian electricity. **(08 Marks)**

2 a. Write the general rules to be consider for wiring system. **(06 Marks)**

b. Fig. Q2 (b) shows the plan of residential building which has to be wire up with casing capping wiring system calculate the following:
(i) Show the wiring plan.
(ii) Propose load calculation.
(iii) Find the length of wire for wiring.
(iv) List the materials and find the total cost. **(14 Marks)**

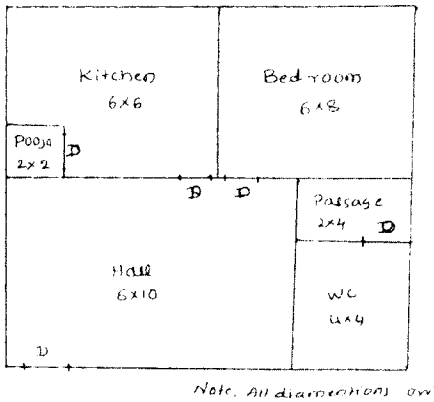

Fig. Q2 (b)

3 a. Differentiate residential and commercial electrification. **(06 Marks)**

b. Ground floor plan of school is shown in Fig. Q3 (b) which has same plan for floor 1 and 2. Rig up with conduit wiring system and calculate
(i) Draw the wiring layout for lighting system using 3φ supply.
(ii) Propose lighting load.
(iii) Material required for the wiring system. **(14 Marks)**

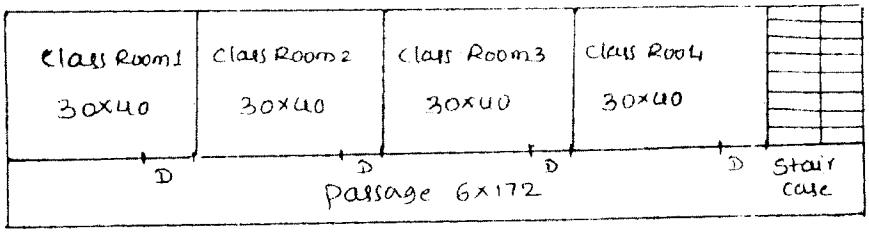

Fig. Q3 (b)

4 a. What are the different types of service connection, list advantages and disadvantages? **(06 Marks)**

b. What are the reasons for excess reading of energy consumption by energy meter? **(06 Marks)**

c. Prepare material required for overhead service, connection to home of 2 kW load at 240 V, 50 Hz supply. The supply is to be given from 20 meter away from the home. Assume diversity factor as 1.66 and future load as 100%. **(08 Marks)**

PART – B

5 a. Write the important consideration regarding motor installation wiring. **(08 Marks)**

b. A 15 HP, 415 V, 3 phase, 50 Hz induction motor is to be installed in a workshop. The plan of which is shown in Fig. Q5 (b). Draw layout of the wiring and estimate quantity of material required. Assume efficiency of motor as 85% and power factor as 0.8. **(12 Marks)**

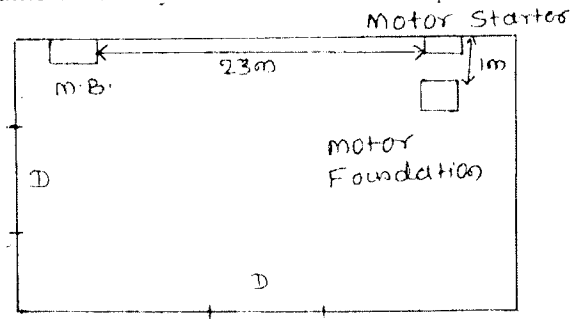

Fig. Q5 (b)

6 a. Write the main components of overhead lines. **(08 Marks)**

b. A pole for an over head 11 KV, 3 ϕ, 50 Hz line is required to be earthed and stay is to be provided make a neat sketch how it should be done. Prepare list of materials required. **(12 Marks)**

7 a. Explain testing and commissioning of over head distribution line. **(08 Marks)**

b. An overhead 3ϕ, 415 V distributor is to be laid along a straight route 300 m long. The end supports are terminal poles with 50 m span in between. Prepare list of material for laying distributor. The following data may used:

Conductor : ACSR $\frac{6}{1} \times 2.11$ mm for phase, nutral and street light.

Earth wire: GI wire, 8 SWG, 1 kg / 10 m weight.

L.T.cable : 4-core, 60 mm^2, 1100 V grade.

Distance of first terminal pole from the substation is 12 m. **(12 Marks)**

8 a. Write different types of substation. **(06 Marks)**

b. Write the material required for 33/11 KV outdoor substation and draw key diagram with one input and 6 output lines. **(14 Marks)**

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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)**

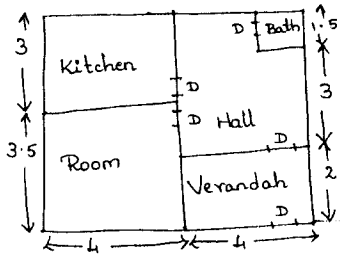

Fig.Q.2(b)

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)**

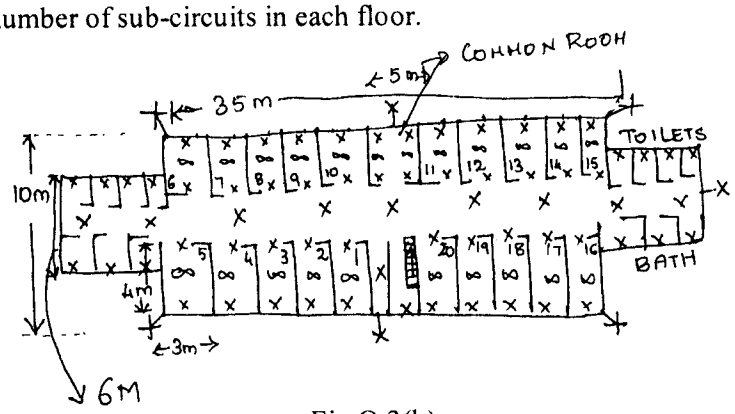

Fig.Q.3(b)

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)**

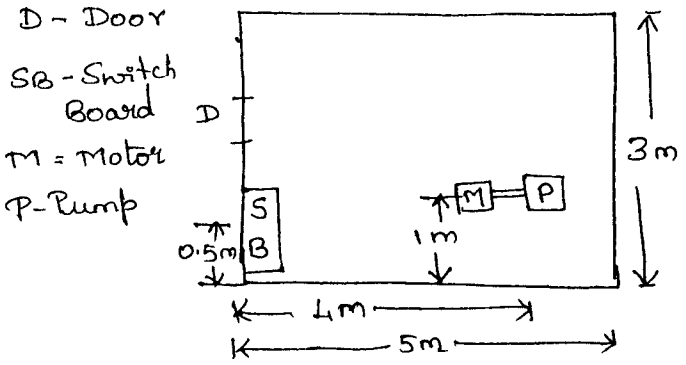

Fig.Q.5(b)

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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Eighth Semester B.E. Degree Examination, Dec.2017/Jan.2018
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. Explain the purpose of estimation and costing. **(06 Marks)**

b. Explain the functions of purchase department. **(08 Marks)**

c. Explain different modes of tendering. **(06 Marks)**

2 a. What are the general rules governing for wiring of residential installation? **(06 Marks)**

b. The Fig. Q2 (b) shows the plan of a low income group government quarters. Draw the single line diagram for lighting and heating circuits on the sketch. Calculate total load, length and size of the wire by taking safety factor of 2. **(14 Marks)**

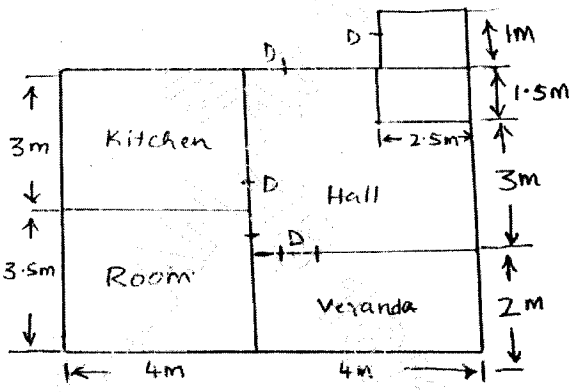

Fig. Q2 (b)

3 a. Explain the design considerations for electrical installation in commercial buildings. **(06 Marks)**

b. Fig. Q3 (b) shows the ground floor plan of a newly constructed double storeyed school building. Show the arrangements of lamps. plug and sockets, fans in the installation plan. Estimate the quantity of the material required and the cost of electrical installation. The first floor having same plan as that of ground floor. **(14 Marks)**

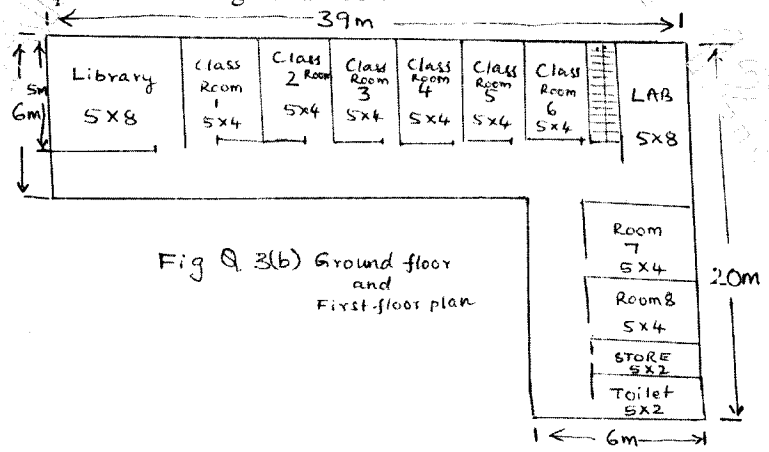

Fig Q 3(b) Ground floor and First floor plan

Fig. Q3 (b)

4 a. Explain the points to be checked while carrying out inspection of wiring installation. **(06 Marks)**

b. Mention the types of tests conducted on wiring installations. Explain the insulation resistance test in detail. **(07 Marks)**

c. Prepare a detailed estimate of cost for overhead service connection to feed power supply to a cashew factory of 10 HP load for a distance of 10 m. **(07 Marks)**

PART – B

5 a. Summarize the important considerations made for motor installation wiring. **(08 Marks)**

b. A 10 HP 415 V, 3 phase, 50 Hz, squirrel cage induction motor is to be installed in a factory the plan of which is shown in Fig. Q5 (b). Show the layout of the wiring and estimate the quantity of material required. The wiring is to be surface conduit. Assume efficiency of motor is 82% and power factor is 0.81 lagging. **(12 Marks)**

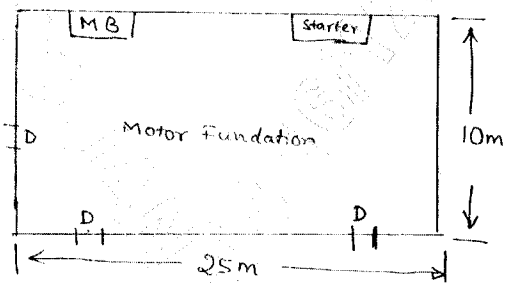

Fig. Q5 (b)

6 a. List the main components of overhead transmission lines. **(08 Marks)**

b. A pole for an 11 KV, 3 phase, 50 Hz overhead line is situated on the bank of the road where there is no front and back for fixing the stay in the ground. This pole is to be earthed and a stay is to be provided. Prepare a list of material required and also the total cost estimation for erection. **(12 Marks)**

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

b. An overhead 11 kV, 50 Hz line has to be erected using 27 kg, 10 meter long steel poles and copper wire of size no. 3/2.642, with average span of 150 metres. Make a list of material required and estimate the cost per kilometer. **(12 Marks)**

8 a. Explain the classification of substation. **(08 Marks)**

b. Estimate the quantity of material and cost for installation of 10 MVA, 33/11KV substation. Also draw the key diagram of the substation. **(12 Marks)**

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