

17416

15116

3 Hours / 100 Marks

Seat No.

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- Instructions* – (1) All Questions are *Compulsory*.
 (2) Answer each next main Question on a new page.
 (3) Illustrate your answers with neat sketches wherever necessary.
 (4) Figures to the right indicate full marks.
 (5) Assume suitable data, if necessary.
 (6) Use of Non-programmable Electronic Pocket Calculator is permissible.
 (7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.
 (8) Use of Steam tables, logarithmic, Mollier's chart is permitted.

Marks

1. **Attempt any TEN of the following:** **20**
- a) Define electrical installation.
- b) State the meaning of following symbol.
- $$\frac{2N - 220V}{2 \times 50\text{mm}^2 + 1 \times 25\text{mm}^2}$$
- c) Draw the IS symbols for following:
- (i) combined switch and socket outlet
- (ii) bracket fan
- d) State the types of overhead service connection.
- e) State the meaning of:
- (i) MCB
- (ii) ELCB

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- f) Write any two rules for residential electrification installation.
- g) Write any four examples for commercial installation.
- h) Write functions of:
 - (i) main switch
 - (ii) bus-bar
- i) State any two factors on which the size of bus bar chamber depends.
- j) Draw the single line diagram showing motor circuit wiring with all necessary equipments.
- k) Name the starters used for following motors:
 - (i) induction motors of high rating
 - (ii) D.C. series motor
- l) Define:
 - (i) contract
 - (ii) tender

2. Attempt any FOUR of the following:**16**

- a) List different methods of wiring in electrical installation.
- b) Define the following:
 - (i) security deposit
 - (ii) earnest money deposit
- c) Two light point, one ceiling fan are to be wired with three switches on a single switch board. Draw the following:
 - (i) wiring diagram in looping in system
 - (ii) single line diagram
- d) With the help of diagram explain underground service connection.
- e) Compare overhead service connection and underground service connection on the basis of appearance, life, initial cost, safety.
- f) List the material required for 11KVHT service consumer.

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3. Attempt any FOUR of the following:

- State any four general requirements of electrical installation. Explain any one.
- State the procedure for deciding the no. of sub circuits in residential installation with suitable example.
- Study the following single line representation shown in Fig. No. 1 and answer the following:
 - Identify the method of wiring system
 - Identify the two symbols and give its meaning
 - State how many wire are required in between parts D & F.
 - Calculate the total length of wire.

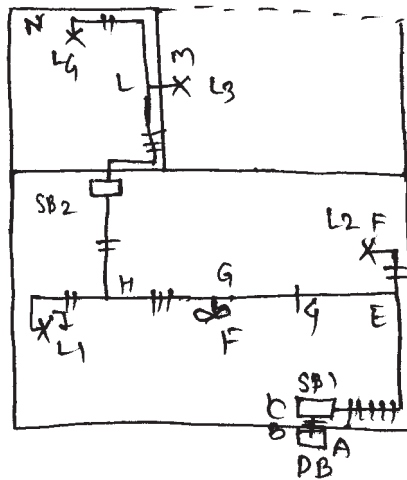


Fig. No. 1

- State the sequence to be followed for preparation of estimate for commercial electrical installation.
- Draw a neat labelled diagram of plate earthing.
- A 3 ϕ 3-wire connection is to be given to a premises in which an electric motor of 50 H.P. is to be installed. 40 meters of wire ran from the main switch is required for this purpose. Determine the size of the wire to be used if the available voltage is 400 V.

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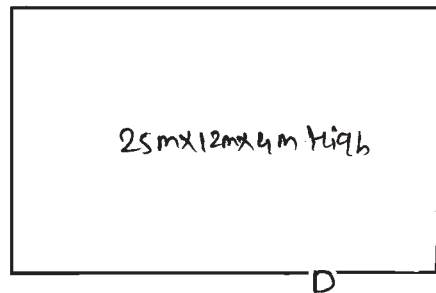
Marks

4. Attempt any FOUR of the following: 16

- a) State the purpose of earthing. Also give two different methods to reduce earth resistance.
- b) State different design consideration for residential installation.
- c) State and explain design consideration in industrial installation.
- d) With suitable example explain tender notice.
- e) Write the detailed for submission and opening of a tender document.
- f) Explain how comparative statements are useful for selection of contractors.

5. Attempt any TWO of the following: 16

- a) The plan of a large hall for use as a tutorial hall for the polytechnic students is given in Fig. No. 2. The room is required to be provided with electrical wiring in batton system. Mark the location of MB, SB and electrical points on the plan of the hall using electrical symbols. Also decide the rating of MS, DB and other important materials and draw single line diagram.

**Fig. No. 2**

- b) The ground floor plan of a double storeyed school building is shown in Fig. No. 3. The roof lights and fans are also indicated on it. First floor is similar to ground floor. In each room 6A socket outlet has to be provided. Calculate the total voltage and decide the roof subckts. Draw the single line diagram showing arrangement of switch boards and DB from E.M. for complete school building. Assume if data required.

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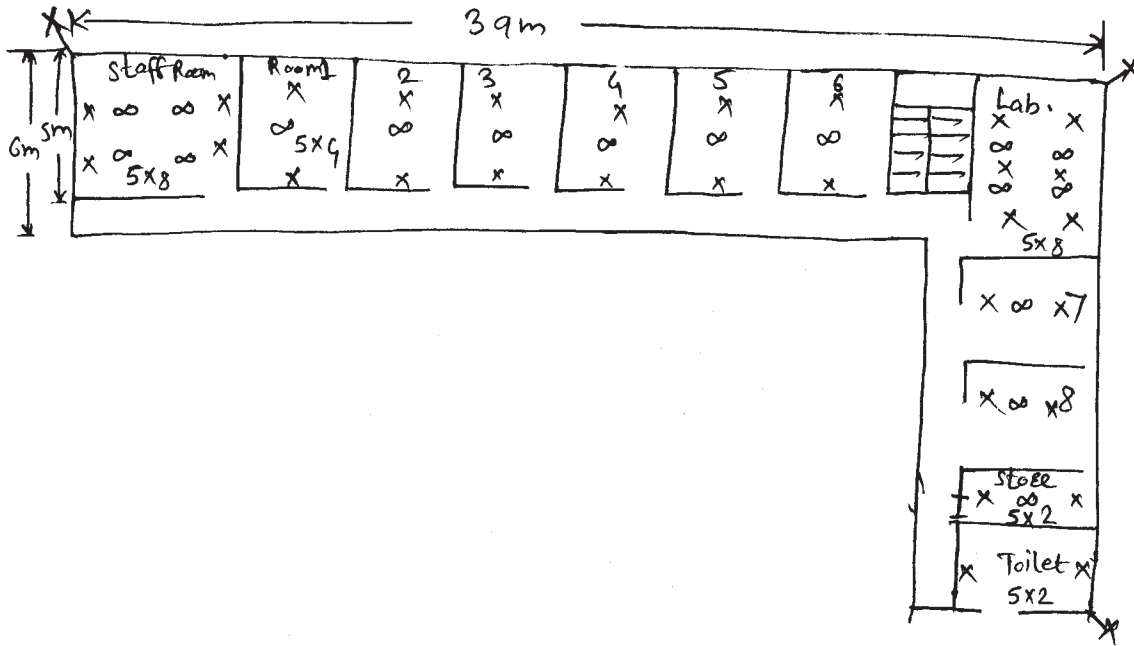
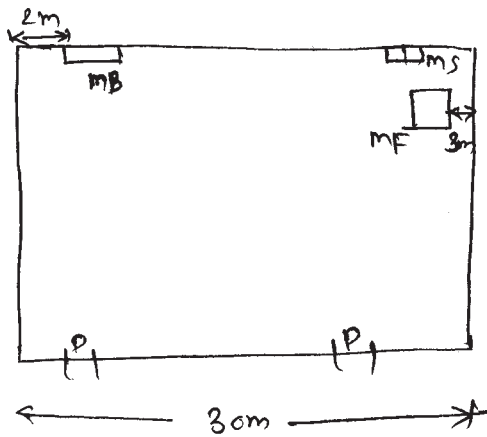


Fig. No. 3

- c) In a workshop, one 15 HP, 400 V, 3 ϕ 50 Hz motor is to be installed. Draw single line diagram showing arrangement of other equipments. Decide the cable size and rating, fuse rating and motor starter with switch. Assume necessary data.



MB - main Board
 MS - motor switch/starter
 MF - motor foundation.

Fig. No. 4

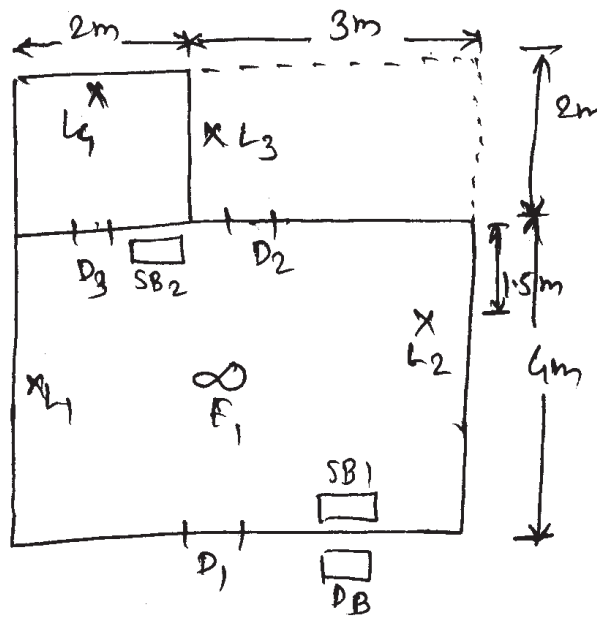
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Marks**6. Attempt the following:****16**

- a) What is industrial load? Write down any four important rules for motor wiring. 4
- b) Attempt any ONE of the following: 12
- (i) Fig. No. 5 shows the plan of a small flat. The position of light and fan points and S.B. have been shown in figure:
- 1) decide the no. of subckts and show these in the plan
 - 2) calculate length of wire and size of wiring for dia. m. with the list of material and cost of labour.

**Fig. No. 5**

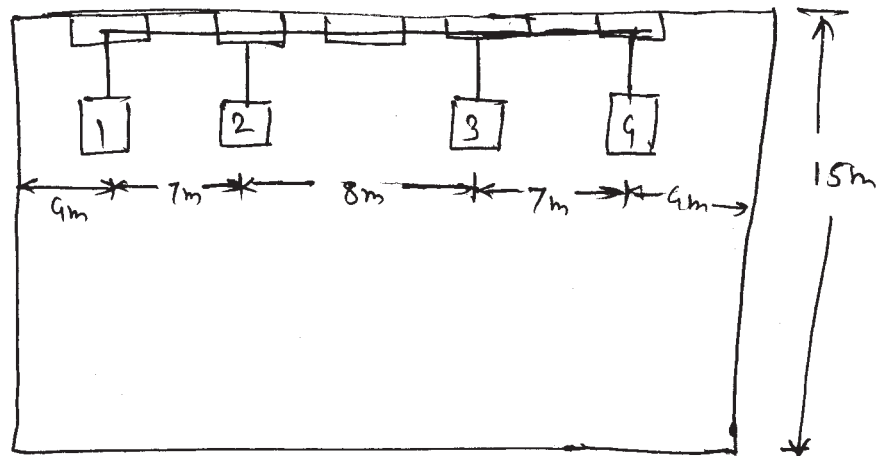
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(ii) A small workshop of size 10 m × 6 m × 4 m high is under construction. It is required to be provided with the following electrical power connections for motors as in Fig. No. 6.

- 1) Draw installation plan showing location of machines, main switch and power D.B.
- 2) Draw single line dia. starting from energy meter
- 3) Prepare material table with estimation.



1 - 5hp, 400v, 3 ϕ motor
 2 - 3hp, 400v, 3 ϕ motor
 3 - 1/2hp, 230v, single phase motor
 4 - 1hp 400v 3 ϕ motor.

Fig. No. 6