

17416

21314

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.

Marks

1. Attempt any **TEN** of the following: **20**
- a) Define the term ‘Tender’.
 - b) State I. E. Rule No. 90.
 - c) State the purpose of following in conduit wiring.
 - i) Lock nut
 - ii) Conduit box.
 - d) List the name of various components of service connection.
 - e) Name the starters used for following motors.
 - i) 20HP 3-phase squirrel cage I. M.
 - ii) DC series motor.
 - f) List any four examples of commercial electrical installation.

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- g) Draw the IS symbols for the following used in layout diagram.
 - i) Isolator
 - ii) Intermediate switch.
- h) State the function of stay insulator and service pole.
 - i) Define the following:
 - i) Residential load
 - ii) Industrial load.
 - j) State two factors deciding size of conduit.
- k) State the function of following in motor wiring circuit.
 - i) Main switch
 - ii) Motor switch
- l) List the types of engineering contracts.

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

- a) State any four rules related to lighting loads followed in an electrical installation.
- b) With reference to execution of work explain the following:
 - i) Administrative approval.
 - ii) Technical sanctions.
- c) List any four wiring accessories and its function.
- d) Differentiate between overhead service connection and underground service connection on the basis of maintenance cost, safety, appearance and labour cost.
- e) Draw and label multiline diagram and single line diagram for 2 lamp, 2 fan and one 5 Amp socket connected to single phase, 230V, 50Hz AC supply.
- f) List the materials required to provide O. H. service connection.

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Marks**3. Attempt any FOUR of the following:****16**

- a) Explain the meaning of following terms.
- MCB
 - Socket outlet of plug.
 - Neutral
 - Fuse-link.
- b) Residential installation wiring consists of following load / outlets.
- Light points 4 numbers : 60 watts each.
Light points 3 numbers : 100 watts each.
Fan points 4 numbers : 60 watts each.
5A socket outlet 6 numbers : 60 watts each.
15A socket outlet 4 numbers : 1000 watts each.
- Find:
- total connected lighting load in a house.
 - total connected power load in a house.
 - current rating of iron clad main switch.
 - suggested value of current rating of iron clad main switch.
- c) What is busbar ? Draw the diagram showing the arrangement of busbar, switch fuse unit in a busbar chamber and explain it.
- d) Explain the principles of circuit design in lighting and power circuits.
- e) Compare electrification of residential installation and electrification of commercial installation on the basis of load capacity, type of supply, initial cost and type of load used.
- f) A 3-phase, 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 run from the main switch is required for this purpose. Determine the size of the wire to be used if the supply voltage is 400 volts. Assume power factor to be 0.8.

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Marks**4. Attempt any FOUR of the following:****16**

- a) Draw neat labelled sketch of plate earthing.
- b) Draw wiring diagram and schematic diagram for control of two lights, one fan by their individual switches.
- c) An office $30\text{m} \times 15\text{m}$ is illuminated by twin 60w tubes of lumens output 6000 lumens. (Total) The lamp being mounted at a height of 3m from work place the average illumination required is 280 Lux. Calculate number of lamps required to be fitted in the office assuming coefficient of utilization to be 0.6 and depreciation factor to be 0.8.
- d) Draw and label wiring diagram for 3-phase induction motor connected to supply with star-delta starter.
- e) State the rating of lamps (In candesent type), (Fluorescent type), Fan (ceiling fan) and socket outlet points used in residential installation.
- f) Write the procedure to prepare a design for commercial electrical installation.

5. Attempt any TWO of the following:**16**

- a) Calculate the total load, no. of lighting and power sub circuit and draw single line diagram showing the position of switches and fitting for following data.
Power points 10 numbers each of 1000W,
Plug points 20 numbers each of 100W.
Light points 30 numbers each of 40W.
Fan point 30 numbers each of 60W.
It is supplied from a 3-phase 400V, 4-wire, 50Hz AC supply.

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- b) i) State four rules of industrial wiring.
- ii) State points considered to decide size, type, path and mounting of cable used for connecting power machines.
- c) Prepare a complete estimate to install a 3-phase, 400V, 50Hz, 3H.P. Induction motor have to be used for grinding purpose in a small scale type workshop having room size of 3m × 3m. Assume necessary data required for this estimation and draw installation plan and wiring diagram.

6. Attempt any TWO of the following:**16**

- a) i) Prepare a tender notice with details for supply of 3-phase, 250KVA, 11KV/400V transformer to your industry.
- ii) Explain earnest money and security deposit.
- b) A 1H.P. 3-Phase 415V motor, 5HP 3-Phase 415V motor, ½ HP 1-Phase 230V motor, 3HP 3-Phase 415V motor are proposed to be connected to ac supply. Calculate full load current, starting current, rating of main switch and selection of rating of cable.
- c) Explain the following:
 - i) Concept of motor wiring circuit and single line diagram.
 - ii) Proper method of earthing for industrial installation.

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