'I' Scheme

Sample Question Paper

Program Name : **Electrical Engineering Program Group**

Program Code : **EE/EP/EU**

Semester : **Third**

22328

Course Title : **Electrical Materials and Wiring Practice**

Max. Marks : **70** **Time: 3 Hrs.**

Instructions:

(1) All questions are compulsory.
(2) Illustrate your answers with neat sketches wherever necessary.
(3) Figures to the right indicate full marks.
(4) Sub-questions in a main question carry equal marks.
(5) Assume suitable data if necessary.
(6) Preferably, write the answers in sequential order.

Q.1 Attempt any Five of the following. **10 Marks**

a) Explain the need for following safety rules while working in electrical installations.
b) Draw the labeled hysteresis loop for an electromagnetic material.
c) Write any two properties of electrical insulating materials.
d) State the need for thermal classification of electrical insulating materials.
e) Explain in brief dielectric failure of cables.
f) Write the names of any four components used in electrical wiring.
g) Define earthing related to electrical wiring systems.

Q.2 Attempt any Three of the following. **12 Marks**

a) Write any four of the IE rules to be followed in respect of safety while working on electrical installation systems.
b) Explain the suitability of aluminum as a conductor with respect to its electrical and mechanical properties.
c) Explain the electrical, mechanical and thermal properties of mica that make it useful as an electrical insulating material.
d) A residential unit has a sanctioned load connection of 3.5 kW. Determine the ratings of the main incoming cable/conductor, main switch and the ELCB.

Q.3) Attempt any Three of the following. **12 Marks**

a) Explain the use of the following tools in carrying out electrical wiring installations, i) Nose pliers, ii) Test lamps, iii) Crimping tools and iv) Cutter.
b) State two applications along with the insulation class and its temperature for the following materials: i) Bakelite sheets and ii) PVC.
c) Explain with neat labeled diagram the godown wiring system for lighting with one pilot room and two subsequent store rooms.
d) Explain the uses of safety rubber hand gloves and rubber mats in electrical engineering.

Q.4) Attempt any Three of the following. **12 Marks**

a) Explain the use of the following components in electrical wiring systems and give specifications of each; i) one MCB and ii) one ELCB.
b) Explain with justification two uses of each of the following as electrical conductors:

i) silver and ii) lead – tin alloy.

c) Explain with justification with reference to properties the use of CRGO silicon steel in electromagnetic machines.

d) Explain any four of the various points to be kept in view while laying a given cable along a given route.

e) A residential bungalow has a total connected load of 5 kW. Explain with a labeled sketch the earthing system suitable for it giving the dimensions of its components.

Q.5) Attempt any Two of the following. 12 Marks

a) Describe in terms of their magnetic behavior the following materials:
i) ferromagnetic materials, ii) paramagnetic materials and iii) diamagnetic materials.

b) Explain four reasons for failure of each gaseous and solid dielectric materials used in electrical engineering applications.

c) Explain with a neat circuit diagram the procedure to measure the earthing resistance for an electrical installation using plate earthing. Sketch the expected resistance variation for a good earthing system.

Q.6) Attempt any Two of the following. 12 Marks

a) Explain the criteria to be considered while installing an earthing system for an electrical installation.

b) Write two examples and two applications for each example of the following class of insulation materials i) Class Y, ii) Class F and iii) Class H.

c) Compare the casing/capping system of electrical wiring and the concealed system of electrical wiring. Suggest one of them for a 5 room bungalow given justification.

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Max. Marks : **70** **Time: 3 Hrs.**

Instructions:

(1) All questions are compulsory.
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(5) Assume suitable data if necessary.
(6) Preferably, write the answers in sequential order.

Q.1 Attempt any Five of the following. **10 Marks**

a) Define safety related to electrical wiring works.
b) Write any two properties of a good electrical insulation material.
c) Define magnetostriction and name any one material exhibiting it.
d) Define dielectric failure of electrical insulating materials.
e) Name one gaseous and one liquid electrical insulation material.
f) Draw a labeled circuit diagram of a one lamp control circuit using one switch.
g) Explain the need for earthing of electrical installations.

Q.2 Attempt any Three of the following. **12 Marks**

a) Explain the need to follow safety rules while carrying out electrical wiring installation works and write any two rules in this respect.
b) Explain the suitability of copper as an electrical conductor with reference to its mechanical and electrical properties.
c) Explain the electrical and thermal properties of transformer oil that make it suitable as an electrical insulating medium.
d) Write down along with their functions the names of four accessories/components of electrical wiring installations.

Q.3) Attempt any Three of the following. **12 Marks**

a) Describe the use of the following tools in carrying out electrical wiring installations,
i) Pliers, ii) Screw driver sets, iii) Crimping tools and iv) Test lamp made for 400 V.
b) Describe with reasons the failure of porcelain insulators.
c) Explain with neat labeled circuit diagram the staircase wiring in which a lamp is controlled from two different locations.
d) Explain the use of the following safety accessories:
i) rubber hand gloves ii) rubber mats and iii) rubber foot wear.

Q.4) Attempt any Three of the following. **12 Marks**

a) Explain the use of the following wiring components and write typical specifications of each; i) one MCB and ii) one RCB.
b) Explain with justification two uses of each of the following as electrical conductors:
i) brass and ii) lead – tin alloy.

c) Draw labeled sketches of the hysteresis loops for hard steel and any alloyed steel.
d) Describe with sketches the laying of underground cables by the drawing in method.
e) Explain with labeled sketch the working of the earthing system provided using a GI plate for an independent bungalow.

Q.5) Attempt any Two of the following. 12 Marks

a) Compare the properties of copper and aluminum as good conductors of electricity on any six points.
b) Write two examples and two applications for each example for the insulating materials in the following classes:
i) class Y, ii) class B and iii) class F.
c) Describe using neat circuit diagrams the measurement of earth resistance for a factory installation. Explain with graphical sketch the variation of the earth resistance with respect to the distance from the earth electrode.

Q.6) Attempt any Two of the following. 12 Marks

a) Explain the criteria to be kept in view while deciding the earthing system for an electrical installation.
b) Write two examples and two applications for each example of the following class of insulation materials i) Class A, ii) Class E and iii) Class H.
c) Describe with sketches the procedure of carrying out the work of cable jointing for a single core multi strand cable.

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Sample Test Paper

Program Name : **Electrical Engineering Program Group**

Program Code : **EE/EP/EU**

Semester : **Third**

22328

Course Title : **Electrical Materials and Wiring Practice**

Max. Marks : **20** **Time: 1 Hour**

Instructions:

(1) All questions are compulsory.
(2) Illustrate your answers with neat sketches wherever necessary.
(3) Figures to the right indicate full marks.
(4) Sub-questions in a main question carry equal marks.
(5) Assume suitable data if necessary.
(6) Preferably, write the answers in sequential order.

Q.1 Attempt any FOUR. **08 Marks**

a. Define safety related to electrical wiring works.
b. Explain two properties of copper as a conductor in electrical engineering.
c. Write four properties of a good electrical insulating material.
d. Explain the use of the ELCB.
e. Draw a labelled sketch of the hysteresis loop for an electromagnetic material.
f. Name any two insulating materials used in electrical engineering.

Q.2 Attempt any THREE. **12 Marks**

a. Explain with circuit diagram the making of the test lamp circuit suitable for 400 V lines using 230 V incandescent lamps.
b. Explain the reasons for preferring aluminium as conductor in electrical circuits.
c. Write down any two classes of insulation along with the temperature and three examples for each class.
d. State the application/use of the following accessories in electrical engineering works: tester, rubber hand gloves, ceiling roses and crimping tool.
e. Explain significance of the mechanical and thermal properties of insulating materials.
