

22633

23124

3 Hours / 70 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 FIVE of the following :

10

- (a) State the typical earth resistance values of 11, 33, 132 and 400 kV substation.
- (b) State the need of pole mounted distribution substation.
- (c) Illustrate the function of isolator switch.
- (d) List out any four protective devices needed in 132/33 kV substation.
- (e) List the precaution taken while carrying out routine maintenance of batteries in substation.
- (f) State the need of gas insulated substation.
- (g) Why SF₆ gas is used as an electrical insulating medium in Gas Insulated substation ?



- 2. Attempt any THREE of the following :** **12**
- (a) Explain any four general safety rules to be followed to minimize the risk of electrical hazards in substation.
 - (b) Describe the procedure to measure insulation resistance for pole mounted substation.
 - (c) Distinguish between System Earthing and Equipment Earthing.
 - (d) Explain working and need of Capacitor Voltage Transformer (CVT) with neat sketch.
- 3. Attempt any THREE of the following :** **12**
- (a) Explain the factors governing the selection of site for the substation.
 - (b) State the function and rating of
 - (i) 3 phase distribution transformer
 - (ii) Lightning Arrester
 - (iii) Bus bar
 - (iv) DO fuse for 11 kV substation
 - (c) Draw schematic (single line) diagram of a 33 kV/11 kV substation and enlist any eight equipments of it.
 - (d) Explain with neat sketch functioning of (i) Wave trap (ii) PLCC.
- 4. Attempt any THREE of the following :** **12**
- (a) Describe the construction and working of swing out (Drop out) fuse.
 - (b) Explain any four methods of improving earth resistance.
 - (c) Describe the procedure followed to undertake breakdown maintenance of dry type power transformer.
 - (d) List precaution to be taken while carrying out preventive maintenance of Gas Insulated Substation.
 - (e) Define partial discharge and explain its effect on performance of GIS.

5. Attempt any TWO of the following : 12

- (a) Prepare a schedule to carry out the routine, preventive & Breakdown maintenance of 11 kV pole mounted substation.
- (b) With neat labelled diagram, illustrate standard procedure to be carried out of Break Down Voltage (BDV) test on power transformer oil.
- (c) Solve the following :
 - (i) Differentiate between mat earthing and plate earthing
 - (ii) List the merits of mast protection.

6. Attempt any TWO of the following : 12

- (a) Explain the Fire-fighting equipment used for the different situation in the 33 kV/11 kV substation.
 - (b) Describe the causes of hot spot formation in transformer and state the methods of identification.
 - (c) Draw single line diagram of 132 kV GIS substation and write advantages and disadvantages of GIS over conventional substation.
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