

22633

23242

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) Define tower footing resistance of steel structure and write its significance in protection.
- (b) Write any four advantages of neutral grounding.
- (c) Illustrate the function of capacitor bank and station transformer in a 33 kV / 11 kV substation.
- (d) List the precaution taken while carrying out routine maintenance of batteries in substation.
- (e) Suggest the suitable method of neutral grounding in 132 kV/33 kV substation with its any two specific reasons.
- (f) Enlist any four advantages of Gas Insulated Substation (GIS).
- (g) Distinguish between Air Insulated Substation (AIS) and Gas Insulated Substation (GIS).



- 2. Attempt any THREE of the following :** **12**
- (a) List out any four Personal Protective Equipments (PPEs) used while entering the substation with their respective application.
  - (b) Describe the construction and working of swing out (Drop out) fuse.
  - (c) State the procedure followed to undertake breakdown maintenance of dry type power transformer.
  - (d) Explain working and need of Capacitor Voltage Transformer (CVT) with neat sketch.
- 3. Attempt any THREE of the following :** **12**
- (a) State purpose of circuit breaker, isolator and earthing switch. Explain their operational co-ordination in substation.
  - (b) State any four advantages of routine maintenance of 11 kV substation.
  - (c) Explain any four firefighting equipment used in a 33 kV substation.
  - (d) Explain with neat sketch functioning of (i) Wave trap (ii) PLCC.
- 4. Attempt any THREE of the following :** **12**
- (a) Illustrate the standard procedure to measure insulation resistance for pole mounted substation.
  - (b) Determine the rating of LA, CT, PT and DO fuse for mounting of 500 kVA, 11 kV/0.4 kV plinth mounted substation.
  - (c) Illustrate standard procedure to be carried out of Break Down Voltage (BDV) test on power transformer oil.
  - (d) Illustrate the causes of fire in gas insulated substation and list firefighting equipment mainly used based on the reason of fire.
  - (e) Define partial discharge and explain its effect on performance of GIS.

**5. Attempt any TWO of the following :****12**

- (a) Prepare a tabular form to show maintenance schedule of a power transformer above 1000 kVA capacity.
- (b) Illustrate the procedure to carry out preventive maintenance of 33/11 kV air break circuit breaker.
- (c) Describe the causes of hot spot formation in transformer and state the methods of identification.

**6. Attempt any TWO of the following :****12**

- (a)
    - (i) Differentiate between mat earthing and plate earthing.
    - (ii) List the merits of mast protection
  - (b) Draw and explain single line diagram of 132 kV/33 kV substation indicating major equipments.
  - (c) Illustrate visual, minor and major maintenance plan of Gas Insulated Substation (GIS).
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