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12223

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.
 - (8) Use of steam tables, logarithmic, Mollier's chart is permitted.

Marks

1. Attempt any FIVE :

10

- (a) Compare indoor & outdoor substation on the basis of following points :
 - (i) Installation cost
 - (ii) Lightning protection
- (b) State the functions of three phase distribution transformer.
- (c) Differentiate between 11 kV & 33 kV substations on the basis of
 - (i) Location
 - (ii) Application
- (d) State the meaning of System Earthing.



- (e) Justify the use of Earth Mat in 132 kV substation.
- (f) List any two advantages of GIS substation.
- (g) State the reason behind higher cost of GIS substation compared to ordinary conventional substation.

2. Attempt any THREE :

12

- (a) Describe general safety rules to be followed to minimize the risk of electrical hazards in substation.
- (b) Justify the use of CT & PT in 11 kV substation.
- (c) List out accessories used in 33 kV substation and state function of each.
- (d) Describe procedure to undertake safe preventive maintenance in 132 kV substation.

3. Attempt any THREE :

12

- (a) Justify the following factors governing the selection of the site of the Electrical substation :
 - (i) Type of substation
 - (ii) Atmospheric pollution
- (b) State any four advantages of routine maintenance of 11 kV substation.
- (c) Describe the procedure to perform voltage breakdown test on transformer oil.
- (d) State the meaning and functions of PLCC used in 132 kV/33 kV substation.

- 4. Attempt any THREE :** **12**
- (a) Describe any four important safety practices followed during breakdown maintenance in 11 kV 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) Write the name of relevant fire fighting equipment used in case of power transformer fire and justify its use.
 - (d) List any four important safety practices followed during routine maintenance of GIS substation.
 - (e) Elaborate the causes of fire in GIS substation.
- 5. Attempt any TWO :** **12**
- (a) Describe the procedure to measure the insulation resistance of distribution transformer using neat labelled diagram.
 - (b) Draw neat labelled single line diagram of 33 kV substation and describe the functions of circuit breaker and isolator.
 - (c) Describe the causes of hot spot formation in transformer and state the methods of identification.
- 6. Attempt any TWO :** **12**
- (a) Illustrate the procedure to carry out preventive maintenance of 33 kV/11 kV air break circuit breaker.
 - (b) Describe “Safety practices” followed during breakdown maintenance of 132 kV substation.
 - (c) Describe the importance of partial discharge monitoring system for the GIS substation.
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