

315334

25226

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 answer 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) List out any four causes of faults in electrical power system.
 - b) Define fusing factor. What should be the value of fusing factor while selecting fuse for protection purpose.
 - c) Name any four fundamental qualities requirements for protection relay.
 - d) State any two advantages of micro-processor based digital relay.
 - e) List out any four faults that occurs in alternator.
 - f) state the application of pilot wire protection scheme.
 - g) State the location where buchholz relay is installed in the protection of transformer.

P.T.O.

- 2. Attempt any THREE of the following: 12**
- a) With the help of suitable diagram state the importance of back-up protection.
 - b) Using neat sketch explain the construction of HRC fuse.
 - c) Define basic relay terminology-
 - i) Relay time,
 - ii) Pick-up current,
 - iii) PSM,
 - iv) TSM.
 - d) State the working of differential protection scheme provided for busbar.
- 3. Attempt any THREE of the following: 12**
- a) State and explain different methods used for arc extinction in circuit breaker.
 - b) Distinguish between circuit breaker and isolator. (Any four points)
 - c) State the specification of CT and PT as protective transformers.
 - d) With neat sketch state the importance of single phasing preventer.
- 4. Attempt any THREE of the following: 12**
- a) Two generators of 11 kV, 3 ϕ , 3000 kVA having reactance of 15% operates in parallel. The generator supply power to transmission line through 6000 kVA transformer of ratio 11/22 kV and leakage reactance of 5%. Calculate fault current and fault MVA on H.T. side of the transformer.
 - b) Draw neat circuit diagram of the following:
 - i) Feeder reactor,
 - ii) Generator reactor.
 - c) Compare fuse and MCCB on:
 - i) size,
 - ii) cost,
 - iii) reliability,
 - iv) replacement strategy.

- d) Explain the principle of time graded protection of feeders using IDMT over current relays.
- e) Draw neat labelled sketch of Buchholz relay.

5. Attempt any TWO of the following:

12

- a) Related to vacuum circuit breaker:
 - i) Draw neat sketch of VCB,
 - ii) List out any two advantages and two disadvantages of VCB
 - iii) Write any four important constructional features of VCB.
- b) With the help of block diagram state the sequence of operation for micro-processor based over current protection.
- c) A 3ϕ , 33/6.6 kV star-delta transformer is protected by Merz-Price circulating current system. If the CTs on low voltage side have a ratio of 300/5, determine the ratio of CTs on the high voltage side.

Draw a neat circuit diagram and indicate the given values of appropriate places.

6. Attempt any TWO of the following:

12

- a) State any two application of each type of relay:
 - i) Static relay,
 - ii) Induction relay,
 - iii) MHO relay.
- b)
 - i) Define differential relay.
 - ii) With a neat sketch explain the operation of voltage balanced differential relay.
- c)
 - i) List out different faults taking place in induction motor.
 - ii) Suggest protection for:
 - 1) Small HP motors and
 - 2) High HP motors for short circuit faults.