315334

12526

3 Hours / 70 Marks

Seat No.

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 need of current limiting reactors.

   b) State any two differences between fuse and circuit breaker.

   c) State any two differences between Air insulated and gas insulated substation.

   d) State the term sensitivity and reliability as a fundamental quality requirements of protective relay.

   e) State the terms, pick up current and current setting of protective relay.

   f) State any four abnormalities in case of transformer.

   g) State any two imitations of differential protection.

Marks

2.   **Attempt any THREE of the following :**   **12**

a) A 10 mvA, 6.6 kV, 3-phase star-connected alternator having a reactance of 20% is connected through a 5 mVA, 6.6 kV/33 kV transformer of 10% reactance to a transmission line having a resistance and reactance per conductor per kilometer of 0.2 Ω and 1 Ω respectively 50 km along the line, a short circuit occurs between the 3 conductors. Find the current fed to the fault by the   alternator.

b) State the term % reactance. State its importance related to actual value of reactance in ohm. Also state the importance of base kVA.

c) With the help of waveform state the terms arc voltage, restriking voltage and recovery voltage related to arc extinction phenomenon.

d) With the help of neat diagram explain the working of thermal relay.

3.   **Attempt any THREE of the following :**   **12**

a) Explain bus-bar reactors to control the SC current in the power system.

b) Explain the low resistance arc extinction method.

c) Determine the time of operations of a 5A, 3 sec over current relay having a current setting of 125% and a TSM of 0.6 connected to supply circuit through a 400/5 CT when the ckt carries a fault current of 4000A (from Time/PSM curve for the PSM of 8 the time of operation is 3.5 sec)

d) With the help of block diagram explain operation of Directional relay.

Marks

4. Attempt any <u>THREE</u> of the following :   **12**

   a) State the components used in protective system. State the importance of protection zones and backup protection.

   b) With the help of block diagram explain the working of static relay.

   c) With the help of diagram explain earth-fault protection of $3\text{-}\phi$ alternator.

   d) Explain single phasing preventer to protect $3\text{-}\phi$ induction motor.

   e) With the help of diagram explain fault-Bus protection to protect the bus-bar system.

5. Attempt any <u>TWO</u> of the following :   **12**

   a) With the help of neat diagram explain the working of SF_6 CB. State their any four advantages.

   b) With the help of flow chart explain the working of microprocessor based relay. State their any four advantages.

   c) With the help of neat diagram explain the construction and working of a Buchholz relay.

6. Attempt any <u>TWO</u> of the following :   **12**

   a)   i) State any four factor for the selection of CB.

       ii) State RMU and the main components in RMU with their functions.

   b) With the help of neat diagram explain differential protection of alternator. State any two limitations. What do you mean by % differential protection.

   c) With the help of neat diagram explain working of differential pilot wire protection of transmission lines. State any four limitations of this scheme while using in transmission line.

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