22524

12223

3 Hours / 70 Marks Seat No. | | | | | | | | |

Instructions – (1) All Questions are *Compulsory.*

(2) Illustrate your answers with neat sketches wherever necessary.

(3) Figures to the right indicate full marks.

(4) Assume suitable data, if necessary.

(5) Use of Non-programmable Electronic Pocket Calculator is permissible.

(6) 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 any four abnormal conditions in power system.

b) State the need of back-up protection where it is used.

c) State the terms

i) Recovery Voltage

ii) Rate of Rise of Recovery voltage (RRRV) in circuit breaker

d) State the terms

i) Plug setting multiplier and

ii) Time setting multiplier, in relay system.

e) List any four faults occured in transformer.

f) List protection and schemes for transmission line.

g) State any four faults occured in 3-phase induction motor.

Marks

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

a) With the help of suitable diagram explain the concept of protection zones.

b) With the help of neat diagram explain arc extinction phenomenon for high resistance current interruption.

c) With the help of suitable diagram explain working of Thermal relay.

d) A 3-phase 11kv/132kv delta-star connected power transformer is protected by differential protection. CTS on LV side have current ratio of 500/5. What must be the current ratio of CTS, on HV side and how should they be connected.

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

a) Calcualate fault MVA at point F as shown in Figure No. 1. use following data:

G -	11 kv, 20 MVA, 12%
T_1 -	11/33 kv, 25 MVA, 12%
Transmission Line -	33 kv, 14%
T_2 -	33/6.6 kv, 20 MVA, 10%
M -	6.6 kv, 180 MVA, 08%

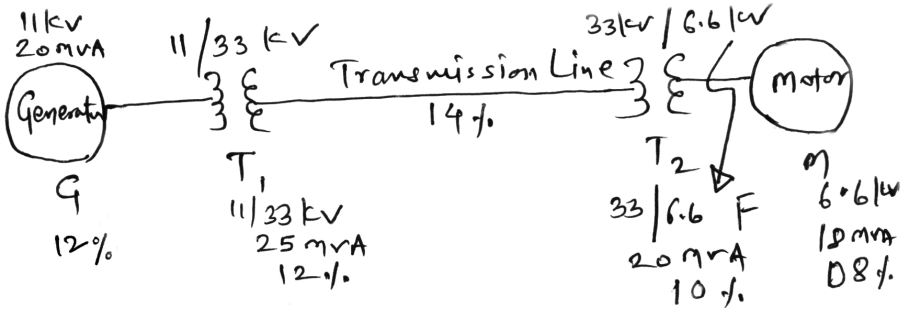

Fig. No. 1.

b) With the help of neat diagram explain the working of H.R.C. fuse. State their any two demerits.

c) With the help of neat sketch explain time/current characteristic of over current relay.

d) A 3-phase 20MVA, 11 KV alternators neutral point is earthed through a resistance of 5Ω. The relay is set to operate when there is an out of balance current of 1.5A. The CTs have a ratio of 1000/5. What is the percentage of winding protected ?

Marks

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

a) Compare SF6 and vacuum Circuit Breaker on the basis of arcing time, recovery voltage, fault clearing time and RRRV.

b) With help of neat diagram explain working principle of distance relay.

c) Draw a neat sketch of 'Buchholz relay' state their two demerits.

d) In case of transmission line explain pilot wire protection. When it is used.

e) With the help of neat diagram explain differential bus-bar protection.

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

a) With the help of neat sketch explain the working of minimum oil circuit breaker. State their two merits.

b) With the help of block diagram explain the sequence of operation of directional relay.

c) A 3-phase transformer is connected in delta/star having line voltage ratio of 0.6/11kv and protective transformer on the 0.6 KV side have a current ratio of 500/5. Calculate the ratio of the protective transformers on 11 KV side. Draw a neat circuit diagram and indicate the given values at appropriate places.

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

a) State the comparsion on any four points between Air insulated and Gas insulated switchgear. Sate any two factors for the selection of LT CB.

b) State the terms related to protective relaying
   i) Selectivity
   ii) Speed
   iii) Sensitivity
   iv) Reliability
   v) Simplicity
   vi) Economy

c) State any two causes and remedies of the fault in case of 3-phase induction motor. With the help of neat diagram explain single phase preventer in case of 3-phase induction motor.
