Seat No: _____ Enrollment No: _____

PARUL UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

B.Tech. Summer 2018 - 19 Examination

Semester: 8 **Date: 29/04/2019**
Subject Code: 03106452 **Time: 10:30 am to 01:00 pm**
Subject Name: Power System Protection **Total Marks: 60**

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 Objective Type Questions - (All are compulsory) (Each of one mark) **(15)**

1. Which type of backup protection scheme is widely used in the field?
(a) Relay backup (b) Breaker backup (c) Remote backup (d) None
2. Distance relay is the best example of
(a) Unit protection scheme (b) Non-Unit protection scheme
(c) Independent protection scheme (d) None
3. Blind spot is a point in zones of protection where
(a) Partial protection is available (b) Complete protection is available
(c) No protection is available (d) None
4. For the protection of inter-turn fault in transformer, the relay preferred is
(a) Over current relay (b) Buchholz relay (c) Differential relay (d) None
5. The reverse power protection is applied for
(a) Over speeding (b) Excitation failure (c) Turbine failure (d) Stator earth fault
6. Distance relays are widely used for the protection of ----------.
(a) Long EHV and UHV transmission lines (b) Distribution feeders
(c)Induction motors (d) None
7. Which of the following protections is not applied to small induction motor----------?
(a) Differential Protection (b) Overcurrent protection
(c) Short circuit protection (d) Thermal overload protection
8. In case of bus bar fault, the bus zone relay must----------.
(a) Trip all the breaker (b) Give an alarm for bus fault
(c) Trip one breaker connected to the bus (d) Trip some breakers connected to bus
9. The operating time of definite minimum time relay----------.
(a) Varies with reference to current (b) is independent of current magnitude
(c) is dependent of current magnitude (d) none
10. The overcurrent relays are widely used as PRIs up to ----------.
(a) 11KV (b) 132 KV (c) 400 KV (d) All of these
11. What is the location of buchholz relay in transformer?
12. Write the equation for PSM.
13. The purpose of the restraining coil in a biased differential relay is_____.
14. The function of auxiliary relay is _____.
15.The sensitivity of protective relay should be_____.

Q.2 Answer the following questions. (Attempt any three) **(15)**

(A) What do you mean by differential protection? Why differential protection is called unit-protection?

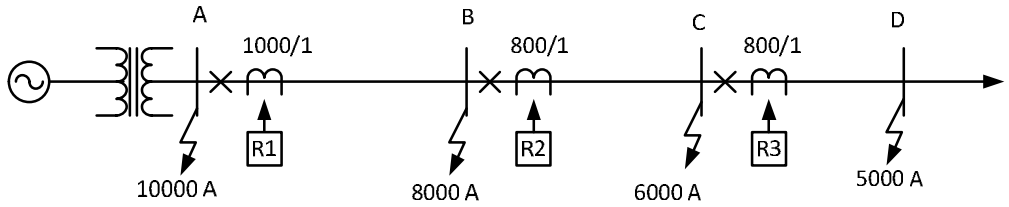
(B) What is Buchholz relay? Which equipment is protected by it? For what types of fault is it employed? Discuss its working principle.

(C) Classify the busbar protection scheme. Also discuss about advantage and disadvantage.

(D) Explain the following terms (1) minimum fusing current (2) rated current (3) fusing factor (4) prospective current (5) cut off current

Q.3 (A) While setting the pick-up value, the minimum fault current at the end of the adjoining feeder needs to be consider; but while setting the TMS the maximum fault current at the beginning of the next section needs to be considered. Explain. **(07)**

(B) Below figure shows a single line diagram of a portion of a radial distribution system. The PS of R3 = 75% of CT secondary. The TDS of R3 = 0.1. Determine the setting of the relays R1 and R2. The normal range of PS is 50-200 % of 1 A in seven equal steps, whereas the TDS setting range is 0.1 to 1 in steps of 0.05. **(08)**



OR

B) A three-phase 11 kV/132kV delta-star connected power transformer is protected by differential protection. The CT on LV side has a current ratio of 500/5. What must be the current ratio on HV side and how should they be connected? **(08)**

Q.4 A) What causes over speeding? Explain the remedial action that needs to be taken to prevent over-speeding. **(07)**

OR

A) Explain numerical relays with suitable block diagram. Also give the advantages, disadvantages and applications. **(07)**

B) What are the various abnormal operating conditions from supply side to which an induction motor is likely to be subjected? **(08)**