Enrollment No: _____   Exam Seat No:_____

C.U.SHAH UNIVERSITY
Summer Examination-2017

Subject Name: Power System Protection

Subject Code: 4TE07PSP1   **Branch: B.Tech (Electrical)**

Semester: 7   **Date: 29/03/2017**   **Time: 02:30 To 05:30**   **Marks: 70**

Instructions:
  (1) Use of Programmable calculator & any other electronic instrument is prohibited.
  (2) Instructions written on main answer book are strictly to be obeyed.
  (3) Draw neat diagrams and figures (if necessary) at right places.
  (4) Assume suitable data if needed.

Q-1   **Attempt the following questions:**   **(14)**

  a)   Define the term: Carrier current protection
  b)   Define the term: Time Setting multiplier
  c)   Define the term: Plug setting multiplier
  d)   Define the term: Arc phenomenon
  e)   Define the term: Translay effect in Relay
  f)   Define the term: Gauss effect in relay
  g)   What is the purpose of back up protection?
          (a) To increase the speed
          (b) To increase the reach
          (c) To guard against failure of primary
          (d) To leave no blind spot
  h)   On what factor does the operating speed of the relay depend upon?
          (a) Rate of flux built up
          (b) Armature core air gap
          (c) Spring tension
          (d) All of these
  i)   The relay used for the feeder protection is:
          a) Under-voltage relay
          b) Translay relay
          c) Thermal relay
          d) Buchholz relay
  j)   Which component ensures the safety of the line from damage?
          (a) Relay
          (b) Circuit breaker
          (c) Bus bar
          (d) Current transformer
  k)   A differential relay measures the vector difference between
          (a) two currents
          (b) two voltages
          (c) two or more similar quantities

(d) none of above

l) A transmission line is protected by
(a) inrush protection
(b) distance protection
(c) time graded and current graded over current protection
(d) both (b) and (c)

m) Braking current is a _____ value?
(a) RMS
(b) average
(c) maximum
(d) any of the above

n) The reflection co-efficient at the short circuited end of a transmission line is
(a) zero   (b) +1
(c) -1   (d) none of the above

Attempt any four questions from Q-2 to Q-8

Q-2		**Attempt all questions**	**(14)**
	(a)	Explain the Induction Impedance type relay with help of sketch.	**(05)**
	(b)	Write short note on Current graded protection scheme.	**(05)**
	(c)	Draw the schematic diagram of carrier current protection in transmission line.	**(04)**
Q-3		**Attempt all questions**	**(14)**
	(a)	Explain the characteristics of restriking voltage in over voltage fault protection.	**(05)**
	(b)	Write a short note on current differential protection.	**(05)**
	(c)	Write short note on directional static overcurent relay.	**(04)**
Q-4		**Attempt all questions**	**(14)**
	(a)	Explain the block diagram of numerical relay.	**(07)**
	(b)	Explain the distance protection scheme with help of sketch.	**(07)**
Q-5		**Attempt all questions**	**(14)**
	(a)	What is meant by insulation co-ordination?	**(04)**
	(b)	How can choice between Impedance type relay and MHO type relay	**(05)**
	(c)	What are the requirements of a ground wire for protecting power conductors against direct lightning stroke?	**(05)**
Q-6		**Attempt all questions**	**(14)**
	(a)	A 150 MVA, 132/66 kV, DY-11, 3-phase transformer is to be protected against short circuit. An instantaneous overcurrent relay is used to protect it. The magnetising inrush current of the transformer is 10 times the rated current. The setting range is 400 – 2000% of 1A in steps of 50%. The CT ratio is 1000/1 A. Suggest the setting of a relay.	**(07)**
	(b)	What is Peterson coil? What protective functions are performed by this device?	**(07)**
Q-7		**Attempt all questions**	**(14)**
	(a)	Explain stability test for transformers.	**(07)**
	(b)	Describe the phenomenon of lightning.	**(07)**
Q-8		**Attempt all questions**	**(14)**
	(a)	Write short note on transformer protection.	**(07)**
	(b)	What is necessity of protecting electrical equipment against traveling waves?	**(07)**