Enrollment No: _____ Exam Seat No:_____

C. U. SHAH UNIVERSITY
Winter Examination-2022

Subject Name : Power System Protection

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

Semester: 7 **Date: 24/11/2022** **Time: 11:00 To 02:00** **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: Time Setting multiplier
b) Give any two methods of back up protection.

c) Draw inverse, very inverse and extremely inverse characteristics for over current relay.

d) Give only the types of relay test.
e) _____ Protection is most popular for transmission lines.

f) Give the types of test performed on current transformer (CT).
g) Define the term: Plug setting multiplier
h)

Which component ensures the safety of the line from damage?
(a) Relay
(b) Circuit breaker
(c) Bus bar
(d) Current transformer

i) Which types of transformers are used above 66 KV system?

j) The relay used for the feeder protection is:
(a) Under-voltage relay
(b) Translay relay
(c) Thermal relay
(d) Buchholz relay

k) The electromagnetic relay operation occurs when operating torque becomes greater than restraining torque. Determine whether the given statement is TRUE or FALSE.

l) Comparison between FIR and IIR.

m) _____ Relay is a gas operated relay.

n) Give the name of different types of unsymmetrical faults.

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

Q-2		**Attempt all questions**	**(14)**
	A	Discuss the essential qualities of a protection system.	**07**
	B	Draw the basic connection of Trip circuit and explain how it works.	**07**
Q-3		**Attempt all questions**	**(14)**
	A	Draw the construction of Balanced Beam Relay. Explain its operation and give the equation of torque.	**07**
	B	State the various functional circuits in a static relay with the help of block diagram. Explain the function of each block.	**07**
Q-4		**Attempt all questions**	**(14)**
	A	Draw the construction of Directional Relay. Explain the principle of directional relay operation.	**07**
	B	Draw and explain the principle of circulating current Differential (MERZ-PRIZE) protection.	**07**
Q-5		**Attempt all questions**	**(14)**
	A	Give the types of test performed on relays. Explain primary and secondary current injection test.	**07**
	B	Explain the theory of core balance current transformer for earth fault protection.	**07**
Q-6		**Attempt all questions**	**(14)**
	A	Explain how an induction motor is protected from single phasing.	**07**
	B	Write a note on Sampling theorem.	**07**
Q-7		**Attempt all questions**	**(14)**
	A	Give any seven advantages of static relay over electromagnetic relays.	**07**
	B	Give comparison between measuring CT and Protective CT**.**	**07**
Q-8		**Attempt all questions**	**(14)**
	A	What is necessity of protecting electrical equipment against traveling waves?	**07**
	B	What is Peterson coil? What protective functions are performed by this device?	**07**