Code No: 117HX **R13**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year I Semester Examinations, April/May - 2018

SWITCH GEAR AND PROTECTION

(Electrical and Electronics Engineering)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a)	Define Arc voltage, restriking voltage and recovery voltage.	[2]
b)	What do you mean by resistance switching?	[3]
c)	Define relay. List out classification of relays.	[2]
d)	What is distance realy? Mention the applications of distance relays.	[3]
e)	Define Differential Protection.	[2]
f)	Mention the different types of faults occur in generator.	[3]
g)	Differentiate unit type protection and non- unit type protection.	[2]
h)	What are the effects of ungrounded neutral on system performance?	[3]
i)	What is insulation coordination?	[2]
j)	What are the causes of over voltages arising on a power system?	[3]

PART-B

(50 Marks)

2.a) What is the role of circuit breakers in substations? Explain the specifications of circuit breakers.

b) In a system of 132kV, the line to ground capacitance is 0.03μF and the inductance is 7H. Determine the voltage appearing across the pole of a Circuit Breaker. If a magnetizing current of 8 ampes (instantaneous value) is interrupted, determine also the value of resistance to be used across the contacts to eliminate the restriking voltage. [5+5]

OR

3.a) What are the different types of circuit breakers when the arc quenching medium is the criterion? Mention the voltage for which a particular range of circuit breaker is recommended.

b) Explain the operation and applications of Vaccum Circuit Breakers. [5+5]

4.a) Discuss the construction and operation of attracted armature relay

b) Explain the Operation principle and characteristics of MHO and off set MHO relay. [5+5]

OR

5.a) Explain the operation of directional over current relay with a neat circuit diagram.

b) Explain the Impedance relay by means of its characteristic on R-X plane. [5+5]

6.a) Explain briefly about stator fault protection in generator
b) How do you protect transformer against incipient faults? [5+5]

OR

7.a) Explain the percentage differential protection scheme used for transformers.
b) A 3 – phase, 2 pole, 33 KV, 8000 KVA alternator has neutral earthed through a resistance of 4 ohms. The machine has current balance protection which operates up on out of balance current exceed 20 % of full load. Determine % of winding protected against earth fault. [5+5]

8.a) Explain the principle of operation of a Translay Relay protection for feeders
b) Explain with the aid of circuit and phasor diagrams the function of a Peter-son coil in a 3-phase system. What are permissible practical deviations from resonance in the tuning of the Peterson coil? [5+5]

OR

9.a) Explain 3-zone distance protection of a transmission line
b) Explain with diagram the high impedance bus bar differential protection scheme. [5+5]

10.a) Differentiate between a surge diverter and a surge absorber with sketch.
b) Explain the working of valve type lightning arrester. [5+5]

OR

11.a) Explain about Zinc-oxide lighting arrestor.
b) Explain Volt-Time characteristics of surge arrester with neat sketch. [5+5]

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