

R13

Code No: 117HX

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

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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 $0.03\mu\text{F}$ and the inductance is 7H. Determine the voltage appearing across the pole of a Circuit Breaker. If a magnetizing current of 8 amperes (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 Vacuum 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. [5+5]
 - b) Explain the Impedance relay by means of its characteristic on R-X plane.

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

OR

- 7.a) Explain the percentage differential protection scheme used for transformers. [5+5]
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.

- 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 [5+5]
b) Explain with diagram the high impedance bus bar differential protection scheme.

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

OR

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

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