

Code No: 156CM

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B. Tech III Year II Semester Examinations, August/September - 2021****POWER SYSTEM PROTECTION  
(Electrical and Electronics Engineering)****Time: 3 Hours****Max. Marks: 75****Answer any five questions  
All questions carry equal marks**

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- 1.a) What are the advantages of static relays over electromagnetic relays?  
 b) The current rating of an overcurrent relay is 5A. The relay has a plug settings of 150% and the time setting (TMS) of 0.4. The CT ratio is 400/5. Determine the operating time of the relay for a fault current of 6000A. At TMS=1, operating time at various PSM are given in the below table. [7+8]

PSM	2	4	5	8	10	20
Operating time in seconds	10	5	4	3	2.8	2.4

- 2.a) Explain the concept of primary and back up protection.  
 b) List and explain the essential qualities of a protective relay. [7+8]
3. With a neat circuit diagram, explain directional earth fault relay. [15]
4. Explain the working principle, torque equation and operating characteristics of impedance relay. [15]
5. Explain about percentage differential protection of transformers. [15]
6. Explain the negative sequence protection of an alternator against unbalanced loads. [15]
7. Explain the working of static directional relay with a neat circuit diagram. [15]
- 8.a) With neat sketches, explain the recovery rate theory of arc interruption in a circuit breaker.  
 b) Explain the phenomenon of current chopping in a circuit breaker. [8+7]

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