B.Tech. SEM -VI Electrical 2014 Course (CBCS) : SUMMER - 2019
SUBJECT: SWITCHGEAR AND PROTECTION

Day: Wednesday | Time: 02.30 PM TO 05.30 PM
Date: 22/05/2019 | **S-2019-2733** | Max. Marks: 60

N.B:

1) All questions are **COMPULSORY.**
2) Figures to the right indicate **FULL** marks.
3) Assume stabile data if necessary.
4) Use of non programmable **CALCULATOR** is allowed.

Q.1 **a)** With neat diagram explain construction and working of SF_6 C.B. **(06)**

b) What are different types of current limiting reactors? State their advantages and disadvantages. **(04)**

OR

Q.1 **a)** Explain various methods of arc extinction in case of circuit breaker. **(06)**

b) With neat diagram explain the working of HRC fuse. **(04)**

Q.2 **a)** Determine the time of 5A over-current relay having plug setting of 150% and TMS = 0.4. The CT ration is 400/5 and the fault current is 6000A. At TMS = 1, the operating time at various PSM are as shown below. **(06)**

PSM	2	4	5	8	10	20
Time of operation (Sec)	10	5	4	3	2.8	4.0

b) Draw and explain the trip circuit of circuit breaker. **(04)**

OR

Q.2 **a)** Explain following with related to over-current protective schemes. **(06)**
i) Time graded system ii) Current graded system

b) Draw and explain the working of directional over current Relay. **(04)**

Q.3 **a)** Explain the phenomenon of over fluxing in transformer and protection against it. **(06)**

b) A3 phase, 66kV/11kV, Star - Delta connected transformer is protected by differential protection. The CTs on LT side have a ratio of 420/5. Determine the CT ratio on HT side also draw the protection scheme. **(04)**

OR

Q.3 **a)** A 3ph, 10MVA, 11kV alternator is provided with restricted earth fault protection. The percentage of winding protected against phase to earth fault is 80%. The relay trips for 20% out of balance current. Calculate the resistance to be added in neutral to ground connection. **(06)**

b) Explain the rotor earth fault protection in case of alternator. **(04)**

Q.4 **a)** Explain the fault bus protection of busbar. **(06)**

b) Explain various effects of arc resistance and power swing on performance of distance relay. **(04)**

OR

Q.4 Draw the block diagram of carrier protection scheme of 3 phase transmission line also explain the function of each block. **(10)**

Q.5 Explain the lightening phenomenon. Also explain the direct and indirect lightening stroke on the power system. **(10)**

OR

Q.5 Explain how lightening arrestor provides protection to the power system against over voltages? Also explain Metal oxide (ZnO) type lightning arrester. **(10)**

Q.6 Describe the classification of bus bars in substations. Also draw the neat diagram of each. **(10)**

OR

Q.6 What are the various equipment used in substation. Explain in detail. **(10)**

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