Total No. of printed pages = 3

19/6th Sem/DEE 611

2022

SUBSTATION, SWITCHGEAR AND PROTECTION

Full Marks – 100

Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer any *five* questions.

1. (a) How the electrical substations are classified according to service requirement and constructional features ? What are outdoor, indoor and pole-mounted substations ? Specify their voltage ranges ? 6+4=10

   (b) What are the major equipments used in substations ? What are the different types of bus-bar arrangements used in substations ? 5+5=10

2. (a) What are protective relays ? With a neat diagram, explain how protective relays are connected to current transformer, trip circuit and circuit breaker for tripping operation ? 2+8=10

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(b) Define the following : 2×5=10

(i) Instantaneous relay

(ii) Pick-up current

(iii) Current setting

(iv) Overcurrent relay

(v) Differential relay.

3. (a) What are the essential features of switchgear ? Discuss about the major equipment used in switchgear. 4+6=10

(b) Write about the working of SF_6 circuit breaker. Also mention some important applications of SF_6 circuit breaker. 5+5=10

4. (a) What do you mean by 'zones of protection' in power system ? Discuss three important fundamental requirements of protective relaying. 4+6=10

(b) Write briefly about the primary and back-up protection schemes used in power system. 5+5=10

5. (a) What are the different types of faults that may occur in a transformer ? 10

(b) Discuss about the methods of neutral grounding. 10

6. (a) With neat diagram, show how service mains, energy meter, main switch and distribution box (4-way) are connected in domestic wiring system. Write full form of – MCB, MCCB, ELCB, SPD and RCCB. 5+5=10

(b) How MCBs are classified ? Write proper applications of each type of MCB. 4+6=10