



C09-EE-606

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**BOARD DIPLOMA EXAMINATION, (C-09)
MARCH/APRIL—2018
DEEE—SIXTH SEMESTER EXAMINATION**

POWER SYSTEM—II

Time : 3 hours]

[Total Marks : 80

PART—A

3×10=30

- Instructions :** (1) Answer **all** questions.
(2) Each question carries **three** marks.
(3) Answers should be brief and straight to the point and shall not exceed *five* simple sentences.

1. List any three advantages and three disadvantages of d.c. transmission over a.c. transmission.
2. Define short, medium and long lines.
3. Draw a bipolar HVDC transmission system.
4. List any six requirements of line supports.
5. Define sag and list the factors affecting it.
6. List any six types of substations.

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7. What is the purpose of (a) metallic sheath, (b) bedding and (c) armouring in a cable?
8. Compare ring main and radial distribution systems in any three aspects.
9. What are the causes of busbar faults?
10. Write any three advantages of neutral grounding.

PART—B

10×5=50

Instructions : (1) Answer *any five* questions.

(2) Each question carries **ten** marks.

(3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. (a) Explain the effect of transmission line voltage on the following :
 - (i) Line efficiency
 - (ii) Line voltage drop
 - (iii) Volume of conductor material

(b) A 3-phase overhead transmission line delivers 5000 kW at 22 kV at 0.8 p.f. lagging. The resistance and reactance per phase are 4 and 6 respectively. Calculate (i) percentage regulation and (ii) efficiency. 5+5=10
12. A 3-phase, 50 Hz, 150 km line has a resistance, inductive reactance and shunt admittance of 0.1 Ω , 0.5 Ω and 3×10^{-6} mho per km per phase. If the line delivers 50 MW at 110 kV and 0.8 p.f. lagging, determine the sending voltage and current. Use nominal- method. 10
13. (a) Define corona. Explain the methods of reducing corona.
- (b) Draw a neat sketch of duplicate busbar system. 5+5=10

14. (a) Derive an expression for sag in overhead lines when the supports are at equal levels and the tension is governed by the conductor weight only.
- (b) A transmission line has a span of 225 m and weight of 75 kg/100 m. The line conductor has a cross-section area of 3.1 sqcm, ultimate breaking strength of 1250 kg/sqcm. Line is covered with ice and its weight is 1 kg/m. If load due to wind pressure is 1.4 kg/m, calculate the maximum sag. Take safety factor as 3. 5+5=10
15. (a) Define string efficiency. Explain the methods of improving string efficiency.
- (b) An insulator string consists of 3 units each having a safe working voltage of 15 kV. The ratio of self-capacitance to shunt capacitance is 8:1. Find the maximum safe working voltage of the string and string efficiency. 5+5=10
16. A 2-wire feeder *ABC* has a load of 120 A, 0.8 p.f. at *C*, and of 60 A, 0.8 p.f. lagging at *B*. The impedance of *AB* is $(0.04 - j0.08)$ and that of *BC* is $(0.08 - j0.12)$. If the voltage at the far end *C* is to be maintained at 400 V, determine the voltage (a) at *A* and (b) at *B*. The load power factors refer to the voltage at far end. 10
17. (a) Explain the protection of parallel feeders using directional relays.
- (b) Explain with circuit diagram the differential protection of busbars. 5+5=10
18. (a) Explain valve-type lightning arrester with a neat diagram.
- (b) Explain resistance grounding with a neat diagram. 5+5=10
