

D 30963

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Name.....

Reg. No.....

**FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION
OCTOBER 2012**

**EE 09 502—ELECTRICAL POWER GENERATION, TRANSMISSION AND
DISTRIBUTION
(2009 Scheme)**

Time : Three Hours

Maximum : 70 Marks

Part A

*All questions are compulsory.
Answer all questions*

1. State the applications of diesel power plant.
2. An overhead line has a span of 250 m. The tension in the line is 1500 kg while the conductor weighs 750 kg per 1000 m. Calculate the maximum sag in the conductor.
3. What is corona ?
4. Determine the insulation resistance of a single core cable of inside diameter 0.03 m, outside diameter 0.075 m and length 2 km ; the resistivity of the insulating material being $6 \times 10^{12} \Omega\text{-m}$.
5. Name the four parameters on which the performance of a transmission line as an element of power system depends.

(5 × 2 = 10 marks)

Part B

Answer any four questions.

6. Enumerate the advantages and disadvantages of hydro plants.
7. List the various non-conventional energy sources. Bring out the advantages of the same.
8. What are the advantages and disadvantages of corona ?
9. Give a comparison between overhead system and underground system.
10. Deduce an expression for insulation resistance of a single core cable in terms of specific resistance of dielectric, its core and sheath diameter.
11. Show that the inductance per loop meter of a two-wire transmission line using solid round conductor is given by

$$L = 4 \times 10^{-7} \ln \left(\frac{D}{r} \right) \text{H}$$

Where D = distance between the conductors, and r = GMR of the conductor.

(4 × 5 = 20 marks)

Turn over

Part C

Answer any one question from each module.

12. Explain with the help of a neat sketch, the construction and working of a nuclear power plant.

Or

13. (a) Derive an expression for the most economical value of power factor which may be attained by a consumer.

(b) Describe the desirable characteristics of a tariff.

14. Write short notes on :

(a) Use of guard rings.

(b) Causes of failure of insulation.

Or

15. A three phase overhead transmission line is being supported by three discs of suspension insulators. The potentials across the first and second insulators are 8 kV and 11 kV respectively. Calculate

(a) the ratio of capacitance between pin and earth to self capacitance of each unit, and

(b) the string efficiency.

16. (a) How does AC distribution differ from d.c. distribution ?

(b) A 2 wire d.c. distributor cable AB is 2.2 km long and supplies loads of 25 A, 50 A, 75 A at 0.4 km, 1 km, and 1.6 km from point A. Each conductor has a resistance of 0.05Ω per km. Calculate the potential difference at each point, if the potential difference of 400 V is maintained at point A.

Or

17. A single core cable used on 33 kV, 50 Hz has conductor diameter 10 mm and inner diameter of sheath 25 mm. The relative permittivity of insulating material used is 3.5. Find the capacitance of the cable per km, the maximum electrostatic stress in the cable, the minimum electrostatic stress in the cable, and charging current per km.

18. (a) Explain briefly, the self GMD and the mutual GMD.

(b) A single phase transmission line has two parallel conductors, each of 1.2 cm diameter, and 2.5 m apart. Calculate the loop inductance per km length of the line, if the material of the conductor is (i) copper, and (ii) steel with relative permeability of 200.

Or

19. Determine the ABCD constants for a medium transmission line with nominal T configuration. Draw neatly the corresponding vector diagram.

(4 × 10 = 40 marks)