KUMARAGURU
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Register Number:……………………..

B.E DEGREE EXAMINATIONS: MAY 2014

(Regulation 2009)

Fourth Semester

ELECTRICAL AND ELECTRONICS ENGINEERING

EEE107: Transmission and Distribution

Time: Three Hours   **Maximum Marks: 100**

Answer all the Questions:-
PART A (10 x 1 = 10 Marks)

1. The inductance of a single phase two wire line is given by (D is the distance between conductors and d is the diameter of conductor)
   a) (a) $0.4 \log_e (D/r)$ mH/km
   b) (b) $0.55 \log_e (D/r)$ mH/k
   c) (c) $0.4 \log_e (r/D)$ mH/km
   d) (d) $0.55 \log_e (r/D)$ mH/km.

2. Stranded conductors and bundled conductors are used for voltages respectively
   a) >230KV and < 230KV
   b) < 230KV and >230KV
   c) > 230KVand >230 KV
   d) < 230 KV and < 230KV

3. If the power factor of the load decreases, the line losses
   a) Increases
   b) Decreases
   c) Remains unaltered
   d) Equal to zero

4. The dimensions of constants B and C are respectively
   a) ohm and Siemen
   b) ohm and ohm
   c) Volt and Ampere
   d) ohm and mho

5. If shunt capacitance is reduced, then the string efficiency is
   a) Reduced
   b) Increased
   c) Zero
   d) Equal to shunt capacitance value

6. In a single core cable, armouring is not done inorder to
   a) Stimulate excessive sheath losses
   b) Avoid excessive sheath losses
   c) Reduce the dielectric strength
   d) Lay cable according to the value of ε_r

7. Which component is used for either making or breaking a circuit along with a circuit breaker
   a) Feeder
   b) Main bus
   c) Isolator
   d) Fuse

8. Low voltage and medium voltage bus bars are of

a) Strain type   b) Rigid type

c) EHV class   d) UHV class

9. The typical value of break even distance in a HVDC transmission system is

a) 500 KM   b) 600 KM

c) 700 KM   d) 800 KM

10. For the same conductor length, power loss and maximum voltage to earth, which system requires minimum conductor area?

a) single phase AC   b) Three phase AC

c) Two wire AC   d) Three wire AC

PART B (10 x 2 = 20 Marks)

11. What is the purpose of transposition?

12. What is self and mutual GMD?

13. What is meant by surge impedance loading?

14. What is meant by critical disruptive voltage?

15. What are the various methods to improve string efficiency?

16. What are the different methods of laying underground cables?

17. What is a substation? What are the classifications of a substation?

18. Mention the importance of grounding grid?

19. What is meant by sub main, stepped main and tapered main?

20. State the advantages of HVDC system.

PART C (5 x 14 = 70 Marks)

21. a) Draw and explain the structure of modern power system with typical voltage levels

(OR)

b) i) Derive an expression for Inductance of a single phase transmission system   (7)

ii) Calculate the capacitance of a 100Km long, three phase, 50Hz overhead transmission line consisting of three conductors each of diameter 2cm and space 2.5m at the corners of an equilateral triangle.   (7)

22. a) A 100km long, 3Φ, 50 Hz transmission line has the following line constants: Resistance/phase/km=0.1Ω: Reactance/phase/km = 0.5Ω: Susceptance/phase/km = 10 x 10^{-6} S; If the line supplies a load of 20MW at 0.9p.f lagging at 66kV at

the receiving end, calculate by nominal ∏ method: (i) sending end power factor (ii) Percentage regulation (iii) Transmission efficiency

(OR)

b)   A 132kV, 50Hz, 3Φ transmission line delivers a load of 50MW at 0.8 p.f lagging at the receiving end. The generalized constants of the transmission line are: A=D=0.95∠1.4°; B=96∠78°; C=0.0015∠90°. Find the regulation of the line and charging current. Use nominal T method

23. a) i)   Draw and explain the suspension type insulator along with its advantages.   (7)

    ii)   Draw and explain the construction of cable used for transmission of power   (7)

(OR)

b)   The self capacitance of each unit in a string of three suspension insulators is C. The shunting capacitance of the connecting metal work of each insulator to earth is 0.15C while for the line it is 0.1C. Calculate (i) the voltage across each insulator as a percentage of the line voltage to earth and (ii) string efficiency.

24. a)   Explain the bus bar arrangements and different types of substation bus schemes.

(OR)

b)   What is the necessity of grounding? Explain in detail about the types of grounding system? Explain about the various factors to be considered while designing the grounding grid.

25. a)   A single phase distributor 2Km long supplies a load of 120A at 0.8p.f. lagging at its far end and a load of 80A at 0.9p.f. lagging at its mid-point. Both power factors are referred to the voltage at the far end. The resistance and reactance per Km (go and return) are 0.05Ω and 0.1Ω respectively. If the voltage at the far end is maintained at 230KV, calculate (i) voltage at the sending end (ii)Phase angle between the voltages at the two ends.

(OR)

b) i)   Draw and explain the different types of distribution systems.   (7)

    ii)   Explain with necessary diagrams the different kinds of HVDC links used in HVDC systems.   (7)

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