

**C 3215**

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2007.

Fourth Semester

(Regulation 2004)

Electrical and Electronics Engineering

EE 1252 — TRANSMISSION AND DISTRIBUTION

(Common to B.E. (Part-Time) Third Semester Regulation 2005)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State the advantages of ring main distribution system over radial system.
2. What is meant by STATCOM?
3. Briefly explain ACSR.
4. Define transmission efficiency.
5. Mention the advantages of bundled conductors.
6. Draw the phasor representation of short transmission line.
7. Why the potential distribution across the string units of insulator is not uniform.
8. Name any two insulating materials used for cable.
9. List out the disadvantages of single bus scheme.
10. What is the role of circuit breaker in power system?

PART B — (5 × 16 = 80 marks)

14. (a)

11. (a) (i) What are the advantages of high transmission voltage for the transmission of electric power? Explain. (8)
- (ii) A 50 km long transmission line supplies a load of 5 MVA at 0.8 pf lagging at 33 kV. The efficiency of transmission is 90%. Calculate the volume of Al conductor required for the line when 3-phase, 3 wire system is used. The specific resistance of Al is  $2.85 \times 10^{-8} \Omega\text{-m}$ . (8)

(b)

Or

- (b) Explain in detail the types of FACTS controllers. (16)

15. (a)

12. (a) (i) Derive an expression for the loop inductance of a single phase line. (8)
- (ii) A single phase transmission line has two parallel conductors 3 m apart, the radius of each conductor being 1 cm. Calculate the loop inductance per km length of the line if the material of the conductors is (1) copper (2) steel with relative permeability of 100. (8)

(b)

Or

- (b) (i) Derive an expression for capacitance of a 3-phase line when the conductors are symmetrically placed. (8)
- (ii) Calculate the capacitance of a 100 km long 3-phase, 50 Hz overhead transmission line consisting of 3 conductors each of diameter 2 cm and spaced 2.5 m at the corners of an equilateral triangle. (8)

13. (a) (i) Explain the classification of lines based on their length of transmission. (8)
- (ii) A short 3-phase transmission line with an impedance of  $(6 + j8) \Omega$  per phase has sending and receiving end voltages of 120 kV and 110 kV respectively for some receiving end load at a pf of 0.9 lagging. Determine power output and sending end power factor. (8)

Or

- (b) (i) Discuss the advantages and disadvantages of corona. (8)
- (ii) A 3 phase transmission line is having three conductors equilaterally spaced 6 m apart. The diameter of each conductor is 2 cm. The air temperature is 27°C and pressure is 72 cm of Hg. If the surface factor is 0.82 and irregularity factor is 0.9, find the critical disruptive and visual critical disruptive voltages. (8)

14. (a) In a 33 kV overhead line, there are three units in the string of insulators. If the capacitance between each insulator pin and earth is 11% of self capacitance of each insulator, find the distribution of voltage over 3 insulators and string efficiency. Draw the equivalent circuit. (16)

Or

- (b) A single core cable of conductor diameter 2 cm and lead sheath of diameter 5.3 cm is to be used on a 66 kV, 3 phase system. Two inter sheaths of diameter 3.1 cm and 4.2 cm are introduced between the core and lead sheath. If the maximum stress in the layers is the same, find the voltages on the inter sheath. (16)

15. (a) Describe the following substation bus schemes with suitable diagram.

- (i) Double bus with double breaker. (8)  
(ii) Double bus with single breaker. (8)

Or

- (b) Explain the following connection schemes of distribution system.

- (i) Radial system. (8)  
(ii) Inter connected system. (8)

age for the  
(8)

VA at 0.8 pf  
5. Calculate  
n 3-phase,  
of Al is  
(8)

(16)

hase line.  
(8)

uctors 3 m  
te the loop  
ial of the  
y of 100.  
(8)

when the  
(8)

e, 50 Hz  
s each of  
quilateral  
(8)

length of  
(8)

dance of  
oltages of  
ad at a pf  
nd power  
(8)

(8)

ilaterally  
. The air  
e surface  
e critical  
(8)