



B.E DEGREE EXAMINATIONS: MAY 2017

(Regulation 2015)

Fourth Semester

ELECTRICAL AND ELECTRONICS ENGINEERING

U15EET402 : Transmission and Distribution

COURSE OUTCOMES

- CO1:** Calculate the parameters of transmission lines from the conductor configuration and physical characteristics of the lines.
- CO2:** Model the transmission line and analyze their performance.
- CO3:** Calculate the number of insulators based on string efficiency and design the physical parameters of cables.
- CO4:** Describe the components of substation and grounding.
- CO5:** Compare the HVDC and AC systems and analyze the performance of AC distribution systems.
- CO6:** Describe the essential components of transmission and distribution, model and analyze their performances.

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Matching type item with multiple choice code

CO2 [K₂]

List I	List II
A. short transmission line	i. $V_S = V_R + I_L * Z$
B. Medium T method	ii. $V_S = A * V_R + B * I_R$
C. Medium Π method	iii. $V_S = V_R + I_R * Z$
D. Long transmission line	iv. $V_S = V_1 + I_S * Z/2$

- | | A | B | C | D |
|----|-----|-----|-----|----|
| a) | ii | iii | iv | i |
| b) | iii | iv | i | ii |
| c) | iv | iii | i | ii |
| d) | iv | i | iii | ii |

2. The A, B, C, D constants of a 220 KV line are; $A=D=0.94 \angle 10$, $B=130 \angle 730$,

CO2 [K₂]

$C=0.110 \angle 200$. If the sending voltage of the line for the given load delivered at nominal voltage is 240 KV, % voltage regulation of the line is

- | | |
|-------|-------|
| a) 5 | b) 9 |
| c) 16 | d) 21 |

9. Assertion (A): A radial distribution is more reliable than ring main distribution system CO5 [K₂]
Reason (R): Each distributor is fed via two feeder, so there will be continuous power supply even if there is fault at one feeder.
- a) Both A and R are Individually true and R is the correct explanation of A b) Both A and R are Individually true but R is not the correct explanation of A
c) A is true but R is false d) A is false but R is true
10. Earth continuity inside an installation i.e. from plate earth to any point in installation should be CO4 [K₂]
- a) 0.5 ohm b) 1 ohm
c) 2 ohms d) 8 ohms

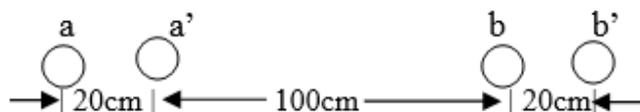
PART B (10 x 2 = 20 Marks)
(Answer not more than 40 words)

11. Mention the advantages of using bundled conductors? CO1 [K₂]
12. On what factors the skin effects depend? CO1 [K₂]
13. Mention the advantages of using bundled conductors? CO2 [K₂]
14. What is Ferranti effect? CO2 [K₂]
15. State the properties of insulating materials? CO3 [K₂]
16. Define dielectric stress. CO3 [K₂]
17. What are the classifications of substations due to construction? CO4 [K₂]
18. What is neutral grounding? CO4 [K₃]
19. Differentiate radial and ring main system. CO5 [K₂]
20. Write any two advantages and limitations of HVDC transmission system. CO5 [K₂]

Answer any FIVE Questions:-
PART C (5 x 14 = 70 Marks)
(Answer not more than 300 words)

Q.No. 21 is Compulsory

21. Discuss the methods to improve the value of string efficiency with suitable sketches. CO3 [K₂]
22. i) In a single phase line as shown in figure, conductors a and a' are in parallel form one conductor while conductors b and b' form the return path. Calculate the total inductance of the line per km assuming the current is equally shared by the two parallel conductors. Conductor diameter is 2.0 cm. (7) CO1 [K₂]



- ii) Derive the expression for the capacitance of three phase line with equilateral spacing. (7) CO1 [K₂]

23. A 3 Phase 50 Hz, 100 km long over line has the following constants. Resistance per phase per km = 0.153 ohm, inductance per phase per km = 1.21 mH, capacitance per phase per km = 0.00958 μ F. The line supplies a load of 20MW at 0.9 pf lagging at a line voltage of 110 KV at the receiving end. Using nominal π representations calculate the sending end voltage, current, power factor, regulation and efficiency. CO2 [K₂]
24. i) Describe any four types of substation bus schemes. (7) CO4 [K₂]
ii) Write short notes on bus-bar arrangement in substation. (7) CO4 [K₂]
25. Discuss in detail about resistance grounding and neutral grounding. CO4 [K₂]
26. Describe with the neat sketch radial, ring-main and interconnected distribution system. CO6 [K₂]
27. Explain the different types of HVDC links and main components of a HVDC system. CO5 [K₂]
Also state the advantages of HVDC transmission over AC transmission.
