UE25EE141A – UNIT 1 – QUESTION BANK – ANSWER KEY

Lecture 1

2. 26V

Lecture 2

1. 240Ω
2. $V_1 = V_2 = 9.412V$
   Power dissipated in 2kΩ resistor is 41.78mW
   Power dissipated in 4kΩ resistor is 20.89mW
   Power dissipated in 8kΩ resistor is 10.44mW

Lecture 3

2. $i_{out} = 8.75mA$

Lecture 4

1. $R_1 = 1.43Ω$
   $R_2 = 0.57Ω$
   $R_3 = 2Ω$

Lecture 5

1. Current through Ammeter A would be 12A
   Current through Ammeter B would be 8A

2. $V_{AB} = 77V$ with S Closed; $V_{AB} = 105V$ with S Open

Lecture 6

1. Current through branch AB is 1A

Lecture 7

2. Equivalent Star is R_a = 0.5Ω, R_b = 0.33Ω & R_c = 1Ω
3. Equivalent Delta is R_{ab} = 3.67Ω, R_{bc} = 11Ω & R_{ca} = 5.5Ω

Lecture 8

1. R_{AB} = 9.65Ω
2. R_{AB} = 6.31Ω

Lecture 9

1. R_{AB} = 24.83Ω
2. R_{AB} = 29.765Ω

Lecture 10

1. I_1 = 0.66 A, I_2 = 0.24 A & I_3 = 0.26 A

   Hence, Current supplied by the battery = 0.66 A

2.

$$I_1 = 6.01 \text{ A}$$
$$I_2 = 3.27 \text{ A}$$
$$I_3 = 3.38 \text{ A}$$
$$I_{5\,\Omega} = 3.38 \text{ A}$$

Lecture 11

1. I_1 = 6 A, I_2 = 7 A & I_3 = 3 A

   Hence, Current through 3Ω resistor = 3 A

2. I_1 = 1.833 A, I_2 = -1.166 A & I_3 = -8 A

   Hence, Current through 6Ω resistor = 2.999 A

Lecture 12

Q2. Current due to 4V battery acting alone in 1Ω is 1.33A

Current due to 3A source acting alone in 1Ω is 2A

Current due to 1A source acting alone in 1Ω is 0.67A

Hence, by SPT, Total current $I = I' + I'' + I''' = 4A$

Lecture 13

1. Voltage across 7Ω resistor when 7A source acting alone is 18.052V
   Voltage across 7Ω resistor when 2A source acting alone is 3.68V
   Hence, by SPT, Voltage across 7Ω resistor, $V = V' + V'' = 21.73V$

2. Voltage across A&B when 6V battery acting alone is 6V
   Voltage across A&B when 5A source is acting alone is 0V
   Voltage across A&B when 10V battery acting alone is 10V
   Hence, by SPT, Voltage across A&B, $V = V' + V'' + V''' = 16V$

Lecture 14

    Q2. V_{TH} = 12V; R_{TH} = 2Ω

        Hence, current through 1Ω resistor = 4A

Lecture 15

    1. V_{TH} = 1V; R_{TH} = 2.75Ω

Lecture 16

    1. V_{TH} = 4V; R_{TH} = 6Ω