Department of Electrical Engineering, IIT (ISM) Dhanbad

Quiz-1 (Monsoon Semester 2022-23), UG 1st Year Common (Sections: A, B, C, D)

A

Basics of Electrical Engineering (EEI101) — Maximum Marks: 20 M

Date: 26/11/2022, 7:15 PM — Duration: 30 Minutes

Name of the Student _____ **Admn. Number** _____ **Signature** _____

Section-I – Answer all Questions (1 Mark Each)

Q1. In Thevenin's theorem, the Thevenin's equivalent voltage is computed by, **[1M]**

a) Measuring voltage across load terminals when load is open circuited

b) Measuring voltage across load terminals when load is short circuited

c) Measuring voltage across the load when the load is connected

d) Neglecting the independent energy sources.

Q2. Source transformation is applicable to both ideal as well as practical voltage and/or current sources. **[1M]**

a) True **b) False**

Q3. A parallel AC circuit in resonance will: **[1M]**

a) Have a high voltage developed across inductive and capacitive section

b) Have a maximum magnitude of impedance

c) Have a maximum magnitude of admittance

d) Act either like an inductor of high value or a capacitor of low value

Q4. In any network, the efficiency of the power, transferred to the load resistance, can be made maximum if the Thevenin's equivalent resistance across the load terminals is made: **[1M]**

a) Much smaller than the load resistance

b) Much larger than the load resistance

c) Equal to the load resistance d) Five times the load resistance.

Q5. In a single-phase AC circuit having series-connected R, L, and C branches, the magnitude of voltage across resistor, inductor and capacitor are 30 V, 60 V and 20 V respectively. The magnitude of applied voltage is ___. **[1M]**

a) 30V **b) 50 V** c) 70 V d) 90 V

Q6. A voltage $v(t) = 230\sqrt{2}sin(\ 2\pi 50t - 20^{o})\ V$ is applied to a series RLC circuit, with R = 2.5 Ω, L = 60 mH, and C = 6.8 μF. If voltage phasor is taken as reference, the current phasor with respect to the voltage, is approximately, **[1M]**

a) 0.512 ∟-89.7° A **(I leads V by 89.7°)** b) 0.724 ∟-89.7° A

c) 0.724 ∟-109.7° A d) 1.023 ∟-89.7° A

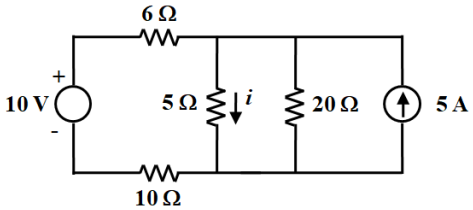
Q7. The current (i) flowing through 5 Ω resistor of the following circuit, due to 10 V source alone, is, **[1M]**

a) 0.4 A

b) 0.5 A

c) 10/21 A

d) 10/31 A



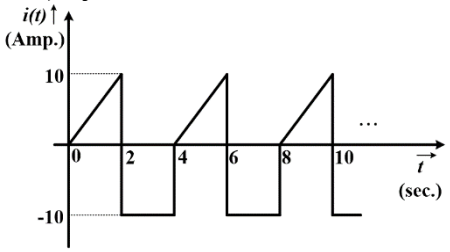
Q8. A current phasor of $(120 - j50)\ A$ flows through a circuit when the applied voltage phasor is $(8 + j12)\ V$. The complex power is: **[1M]**

a) 360 + *j*1840 VA; b) 1560+ j1040 VA; c) 360- j1840 VA ; d)1560- j1040 VA

Section-II – Answer All Questions (2 Marks Each)

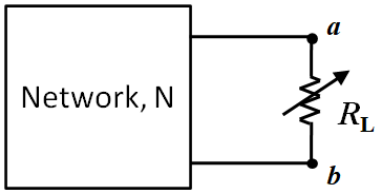
Q9. If the current as shown in the waveform below, is passed through 2 Ω resistor, the average power absorbed (over one cycle) by the resistor is ___? **[2M]**

a) 0 W
b) 12.5 W
c) 16.3 W
d) 50 W
e) 133.3 W



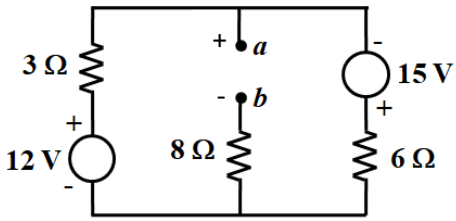
Q10. For the following network (N), the power absorbed by the load resistance R_L = 6 Ω is 24 W. If the R_L is changed to 16 Ω then the power absorbed is 16 W. The value of Norton equivalent current (I_N) and Norton resistance (R_N) are: **[2M]**

a) 5 A and 2 Ω.
b) 5 A and 4 Ω.
c) 10 A and 4 Ω.
d) 10 A and 2 Ω.



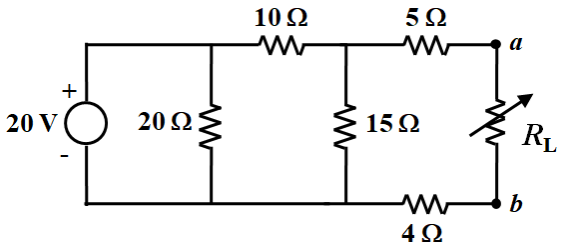
Q11. For the following network, the Thevenin's equivalent resistance and the Thevenin's equivalent voltage seen from the a-b terminals are, **[2M]**

a) 12 V, 1.6 Ω
b) 3 V, 10 Ω
c) 27 V, 6.42 Ω
d) -3 V, 17 Ω



Q12. For the following circuit, the power delivered to the load (R_L), connected across a-b terminals, under the maximum power transfer condition is: **[2M]**

a) 2.4 W b) 4 W
c) 8 W d) 12 W



Q13. In a series RLC circuit, R = 2 Ω, L = 1 mH, and C = 0.4 μF. The half-power frequencies are ___ ? (Choose the closest values) **[2M]**

a) 48 krad/s & 52 krad/s
b) 48.5 krad/s & 51.5 krad/s
c) 48 krad/s & 50 krad/s
d) 49 krad/s & 51 krad/s

Q14. For the circuit shown below, the magnitude of Thevenin's equivalent voltage, and Thevenin's equivalent impedance, between the load terminals a-b, are: **[2M]**

a) 37.95 V, 6.48 + j2.64 Ω
b) 37.95 V, 6.48 - j2.64 Ω
c) 47.95 V, 6.48 + j2.64 Ω
d) 47.95 V, 6.48 - j2.64 Ω