



BRAINWARE UNIVERSITY

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Barasat, Kolkata -700125

Term End Examination 2022
Programme – B.Tech.(ECE)-2019/B.Tech.(ECE)-2020
Course Name – Network Theory
Course Code - PCC-EC304
(Semester III)

Full Marks : 60

Time : 2:30 Hours

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question)

1 x 15=15

1. Choose the correct alternative from the following :
 - (i) Select the period of the signal when it is time shifted?
 - a) Different in different situation
 - b) Changes according to the situation
 - c) Remains the same
 - d) Takes the shifted value
 - (ii) Select the outcome of a periodic convolution of signals in case of continuous time fourier series
 - a) Convolution is easier
 - b) Multiplication in frequency domain
 - c) Division in frequency domain
 - d) Addition of signals in frequency domain
 - (iii) Choose the Laplace transform of ramp function $r(t) = t$.
 - a) $1/s$
 - b) $1/s^2$
 - c) $1/s^3$
 - d) $1/s^4$
 - (iv) Choose the voltage and current in a capacitor are related as?
 - a) $i=Cdt/dv$
 - b) $v=Cdv/dt$
 - c) $i=Cdv/dt$
 - d) $v=Cdt/dv$
 - (v) Write the name of the real part of the complex frequency
 - a) radian frequency
 - b) neper frequency
 - c) sampling frequency
 - d) angular frequency
 - (vi) The ratio of transform voltage to the transform current is known as _____ of the resistor.
 - a) transform voltage
 - b) transform current
 - c) transform impedance
 - d) transform admittance
 - (vii) In a circuit with more number of loops, which law can be best suited for the analysis?
 - a) KCL
 - b) Ohm's law
 - c) KVL
 - d) None of these
 - (viii) Kirchoff's current law is applied at

- a) loops
 c) both loop and node
- (ix) The current law represents a mathematical statement of fact that
 a) voltage cannot accumulate at node
 c) charge at the node is infinite
- (x) Potential difference in electrical terminology is known as?
 a) Voltage
 c) Resistance
- (xi) Pick the incorrect statement among the following
 a) Inductor is a passive element
 c) Resistor is a passive element
- (xii) For a voltage source to be neglected, the terminals across the source should be
 a) replaced by inductor
 c) replaced by some resistance
- (xiii) Explain if source impedance is complex, then maximum power transfer occurs when the load impedance is _____ the source impedance.
 a) equal to
 c) complex conjugate of
- (xiv) Explain the efficiency in case of maximum power transfer theorem is
 a) 100 %
 c) 50 %
- (xv) If there are N nodes in a circuit, find the number of nodal equations that can be formed are?
 a) N+1
 c) N-1
- b) nodes
 d) none of these
- b) charge cannot accumulate at node
 d) none of these
- b) Current
 d) Conductance
- b) Current source is an active element
 d) Voltage source is a passive element
- b) short circuited
 d) open circuited
- b) negative of
 d) negative of complex conjugate of
- b) less than 50 %
 d) 50 % - 100 %
- b) N
 d) N-2

Group-B

(Short Answer Type Questions)

3 x 5=15

2. Compare Thevenin's Theorem with Norton's Theorem. (3)
3. Illustrate Kirchhoff's Laws with example. (3)
4. Compare series and parallel circuit. (3)
5. Compare series and parallel resonance. (3)
6. How to transfer the a) Current Source into a Voltage Source, b) Voltage Source into a Current source (3)

OR

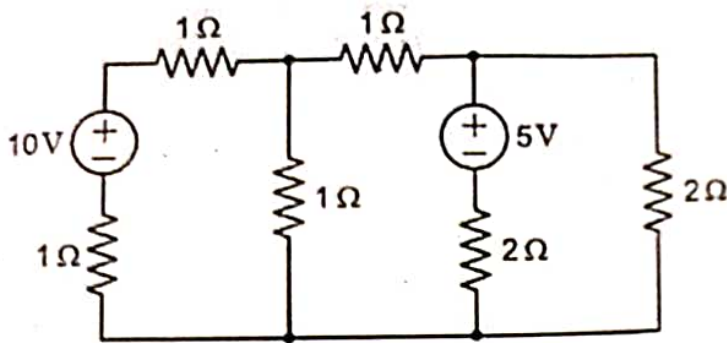
Modify a Star network into a Delta network. (3)

Group-C

(Long Answer Type Questions)

5 x 6=30

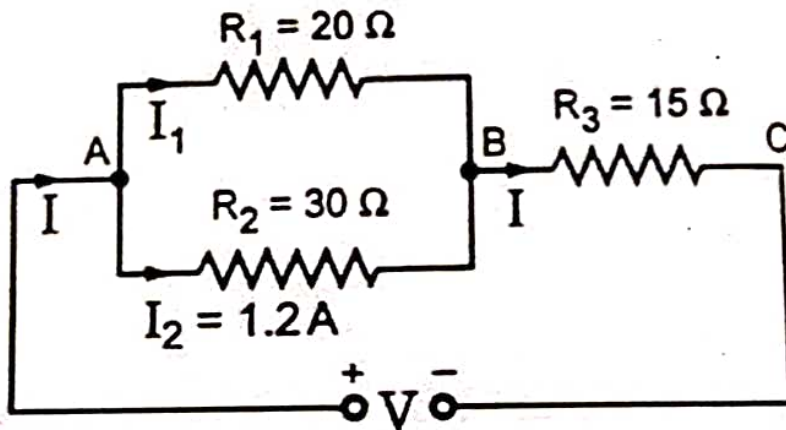
7. An alternating value is $V=100\sin 100t$ discuss its- I. Amplitude II. Time period III. Frequency IV. Angular velocity V. Form factor VI. Peak factor (5)
8. Applying Thevenin's theorem find the current flowing through outer 2 ohm resistor shown in figure (5)



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9. If a load draws a current of 10A at 0.8 lagging when connected to 100v supply calculate the value of power absorbed and the resistance of the load. (5)
10. A resistance of 20 Ohm, inductor 20H and capacitor 200pF are connected in series to a single phase 230v source with variable frequency. Analyze the condition where the maximum current in the circuit will flow and explain the impedance and power factor during the condition. (5)
11. A circuit consists of two parallel resistors having resistances of 20 Ohm and 30 Ohm respectively connected in series with a 15 Ohm resistor. If the current through 30 Ohm resistor is 1.2 A, Quote (i) currents in 20 Ohm and 15 Ohm resistors (ii) the voltage across the whole circuit (iii) voltage across 15 Ohm resistor and 20 Ohm resistor (iv) total power consumed in the circuit. (5)

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12. Assess the transient response of a R-L circuit supplied from DC source. (5)

OR

The 10 uF capacitor in RC circuit of initial charge of 100 uC. At t=0, the switch being closed, a dc voltage of 100 V is applied. Estimate the current. (5)
