QP CODE: 24019920

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Reg No : .....

Name : .....

B.Sc DEGREE (CBCS) REGULAR / IMPROVEMENT / REAPPEARANCE EXAMINATIONS, MAY 2024

Second Semester

B.Sc Electronics Model III

Core Course - EL2CRT04 - NETWORK THEORY

2017 ADMISSION ONWARDS

31F34503

Time: 3 Hours Max. Marks : 80

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Part A

*Answer any **ten** questions.*

*Each question carries **2** marks.*

1. The voltage sources are to be short circuited and the current sources are to be open circuited in order to find the equivalent resistance of a circuit. Give reasons.
2. State Reciprocity Theorem.
3. Define Transient Response.
4. A circuit of resistance 10 ohm and inductance of 0.1 H is in series has a direct voltage of 200 V suddenly applied to it. Find the voltage drop across the inductance at the instant of switching on. Justify.
5. The port currents of a two port network are given by the equations shown below. Which parameter model is this and find the parameters.
   $I_1 = 2.5V_1 - V_2$
   $I_2 = -V_1 + 5V_2$
6. Why z- parameters are called as impedance parameters?
7. What are the laws used when equivalent circuit with h-parameter is drawn for a two-port network? Justify.
8. What do you mean by characteristic impedance of a network? What is its importance?
9. What are the characteristics of a symmetrical π-network?
10. What is the propagation constant of T-network?

11. What is an immittance function?

12. What do you mean by time-domain behaviour?

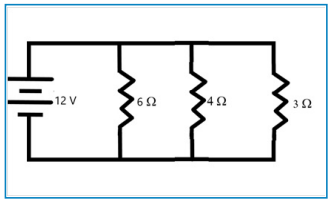
(10×2=20)

Part B

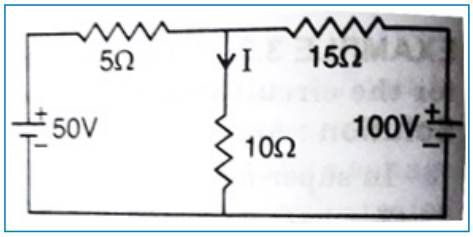
*Answer any **six** questions.*

*Each question carries **5** marks.*

13. Find the current through these resistances.



14. For the circuit shown below, determine the current I through the 10Ω resistor using mesh analysis.



15. Derive the Laplace transform of $sin\ wt$.

16. Explain the relation between unit impulse, step and ramp signals.

17. Find the transmission parameters for the following circuit.

18. In a 2-port network, $Z_{11} = 2$ ohms, $ZZ_{12} = Z21 =$5 ohms and $Z_{22} =$1 ohm. Determine (a) Y-parameters, (b) h-parameters.

19. Explain T-type attenuators.

20. What are poles and zeroes of a network function. Find the poles and zeroes of the network function given by:
$N(s) = \frac{s(s+2)}{(s-1)(s^2+4s+5)}$

21. Explain the different methods to compute the stability of circuit.

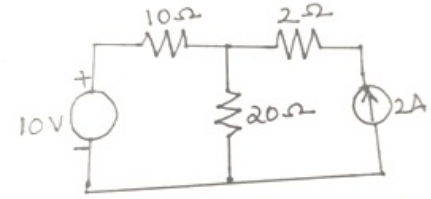
(6×5=30)

Part C

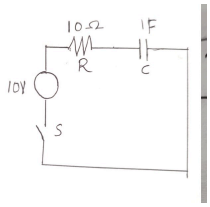
*Answer any **two** questions.*

*Each question carries **15** marks.*

22. State Supeposition theorem. Find the current through and voltage across 2 Ohm resistor.



23. Consider a circuit shown below. The switch is closed at t=0. Find the time constant, total current and the voltage across the resistor and capacitor.



24. What do you mean by filters? What are the classifications of filters? Explain with ideal frequency response.

25. Explain Routh criterion for stability. For the given denominator polynomial of a network function, verify the stability of the network using the Routh criterion:
$Q(s) = s^3 + s^2 + 3s + 8$

(2×15=30)