D 20632 **(Pages : 3)** Name.....

Reg. No.....

THIRD SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION SEPTEMBER/OCTOBER 2011

AI 09 306—ELECTRIC CIRCUITS AND NETWORK THEORY

(2009 Admissions)

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *the questions.*

1. State Superposition theorem.
2. Define the terms impedance and admittance.
3. State the significance of final value theorem.
4. Define propagation constant.
5. Name an application each for band elimination filter and attenuator.

(5 × 2 = 10 marks)

Part B

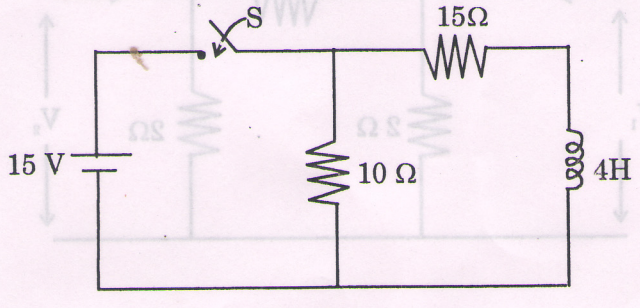
Answer any four questions.

6. State and prove any four properties of Laplace transform.
7. Write notes on Bode plot.
8. Find the Laplace transform of a full wave rectified sinusoidal signal.
9. State the restrictions on pole and zero location in transfer functions.
10. Define and state the significance of various ABCD parameters.
11. For a given, $Z_{11} = 3\Omega$, $Z_{12} = 1\Omega$, $Z_{21} = 2\Omega$ and $Z_{22} = 1\Omega$, find the admittance matrix.

(4 × 5 = 20 marks)

Part C

12. (a) For the following circuit, find the current in the 15 Ω resistor when the switch is closed at $t = 0$. Assume that the initial current through the inductor is zero.



Or

(b) Sine wave is applied to the following circuit when the switch S is closed at $t = 0$. Find the Current $i(t)$.

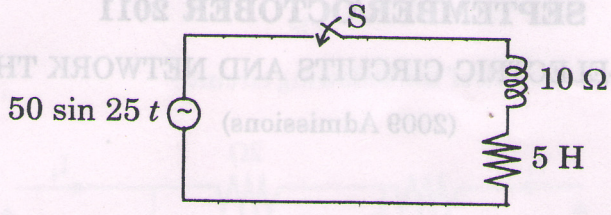


Fig. 2

13. (a) For the following network, find the transfer functions $G_{21}(s)$, $Z_{21}(s)$ and driving point impedance $Z_{11}(s)$.

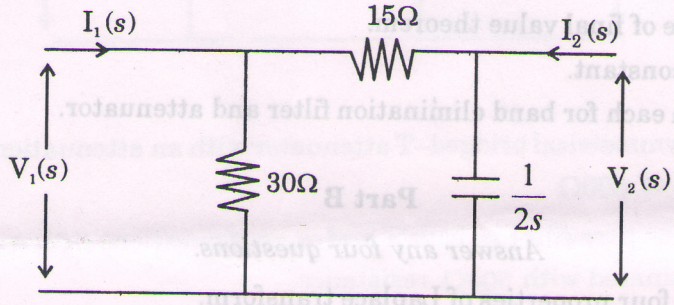


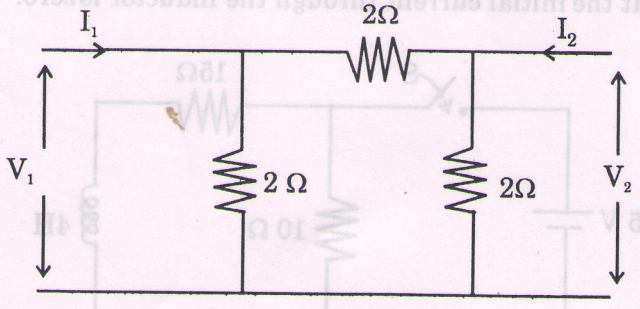
Fig.3

Or

(b) Draw the pole zero diagram for the given network function and hence find V(t).

$$V(s) = \frac{4(s+2)s}{(s+1)(s+3)}.$$

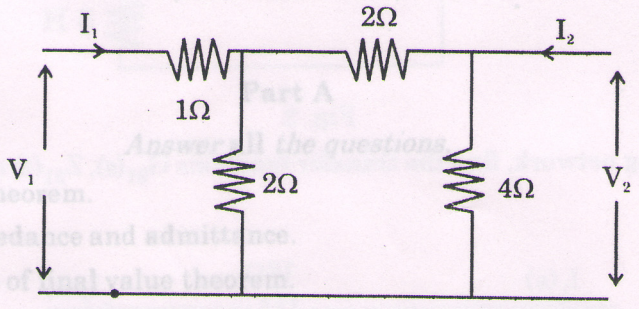
14. (a) (i) Find the transmission parameters for the following circuit :



(ii) Design a T type attenuator to give an attenuation of 65 dB to work in a line of 600Ω impedance.

Or

(b) (i) Find the Z parameters of the following circuit :



(ii) Design a symmetrical bridged–T attenuator with an attenuation of 30 dB and terminated into a load of 600Ω

15. (a) (i) Design a low pass filter in both T and π configurations with a cut-off frequence of 2kHz when terminated with 500Ω resistance.

(ii) Discuss the Butterworth filter characteristics.

Or

(b) Derive the expression for the cut-off frequency of a constant K high pass filter and discuss its characteristics.

(4 × 10 = 40 marks)