DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination – Winter 2018

Course: B. Tech in Electronics and Telecommunication Engineering **Sem: III**

Subject Name: Network Analysis **Subject Code: BTEXC304**

Max Marks: 60 **Date: 07-12-2018** **Duration: 3 Hr.**

Instructions to the Students:

1. *Solve **ANY FIVE** questions out of the following.*
2. ***Draw figures wherever necessary.***
3. *The level question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in front of the question.*
4. *Use of non-programmable scientific calculators is allowed.*
5. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve the following.**	**CO01**	
A)	In the circuit shown in Fig. 1, determine current through 5 ohm resistance using mesh analysis.		**[06]**

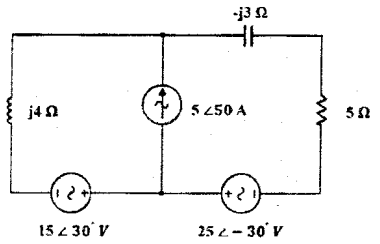

Fig. 1

B) In the circuit shown in Fig. 2, obtain the value of the load impedance between the terminals X and Y for maximum power transfer. Hence, determine the maximum power absorbed by this load. **[06]**

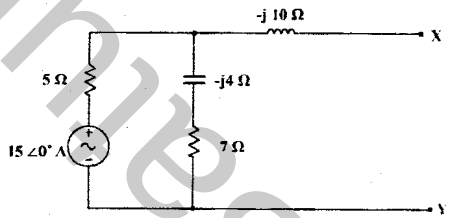

Fig. 2

Q.2 Solve Any Two of the following. **CO01, CO02**

A) Derive expression for frequencies at which voltage across L and C are maximum in a series resonant circuit. Also determine values of voltages across L and C at this frequency. **[06]**

B) A coil of 12H and resistance of 15Ω is shunt with 100pf capacitor. The combination is connected across a generator of 100V, having internal resistance of 70kΩ, Determine **[06]**
(a) voltage across parallel circuit at resonance and
(b) bandwidth.

C) Derive an expression for selectivity and bandwidth of anti-resonant circuit. If the circuit impedance of a parallel resonating frequency is (100 + j10) Ω at frequency 2.5 MHz. Find value of L and C if the Q of inductor is 6 and it is constant. **[06]**

Q. 3 Solve the following. **CO01, CO02**

A) For a symmetrical T network, explain briefly the terms, **[08]**
a) characteristic impedance
b) Propagation constant.
Also derive and expressions for these parameters in terms of circuit impedances.

B) Design a prototype low pass filter sections so as to have design impedance of 700Ω and f_c = 2kHz. Find circuit elements. Also find characteristic impedance Z_0 at frequency of 1kHZ, 2kHz and 5kHz. **[04]**

Q.4 Solve any two of the following. **CO01**

A) For a 2-port passive network, define- **[06]**
(a) driving point impedance
(b) driving point admittance
(c) current transfer ratio
(d) transfer admittance

B) For the network shown in Fig. 3 below, determine Z (open circuit impedance) parameter. Also verify condition for reciprocity and symmetry for the same. **[06]**

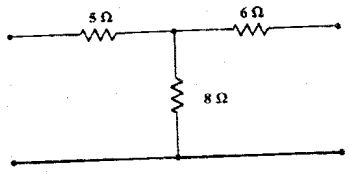

Fig. 3

C) Obtain equations for Y-parameters in terms of Z, h and ABCD parameters. **[06]**

Q. 5 Solve the following. **CO01,CO03**

A) In the R-C circuit shown in below Fig 4, the switch is closed at t = 0. Obtain expression for current $i(t)$. **[06]**

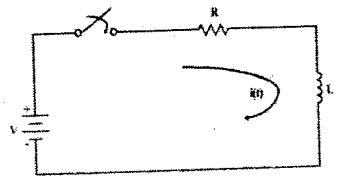

Fig 4

B) In the circuit shown in Fig.5, the switch K is moved from position 'a' to position 'b' at t = 0. A steady state having previously been established at when the switch was position 'a'. Using Laplace Transform method, find value of $i(t)$. **[06]**

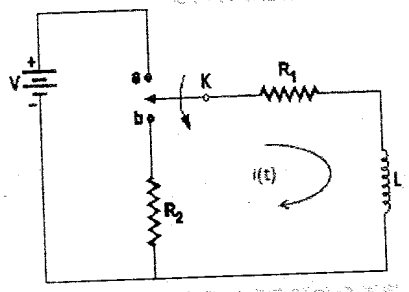

Fig. 5

Q. 6 Solve the following. **CO03, CO04**

A) For a transmission line of length l, starting from the differential equations, derive the expressions for the sending-end voltage and current in terms of receiving end voltage and currentsand the secondary line constants. **[06]**

B) A 50 Ω lossless transmission line of length 1.37 λ is terminated into load of (60 + j 40) Ω. Using Smith Chart, Find **[06]**
a) input impedance of the line
b) input and load admittances
c) Reflection coefficient in amplitude and phase
d) Standing wave ratio (S)
e) Minimum and maximum values of the impedances along the line
f) Distance of 1st voltage minima and maxima from the load

***** End *****