University Institute of Engineering & Technology

(Recognised Under Section 2(f) and 12B of UGC)

Kurukshetra University, Kurukshetra

TIME – 3 Hrs 15 Min

THEORY EXAMINATION – FEB 2021	
B.TECH-ECE	**SEMESTER – III**

M.M. - 56

PAPER - EC-213

SUBJECT- Network Theory

INSTRUCTIONS TO BE FOLLOWED

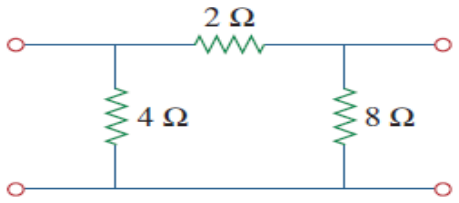
- **Allotted time for examination is 3 hours 15 min that includes time for downloading the question paper, writing answers, scanning of answer sheets and E-mailing the PDF files to the designated Email ID.**
- **All the ECE-A students should send their answer sheets on this Email ID- btech3rdecea@kuk.ac.in**
- **All the ECE-B regular and reappear students should send their answer sheets on this Email ID- btech3rdeceb@kuk.ac.in**
- **The candidates will be required to attempt 75% of the question paper (maximum) by choosing to their any best questions accumulating 56 marks.**
- **The PDF files should be saved as Roll No. and Subject Code. Proper attention should be given while sending the email and in the subject line, the Roll Number and Subject Code should be mentioned.**
- **Maximum Page Limit should be 20 (Twenty) for attempting the question paper on A4 sheets which could be downloaded and printed from the sample sheets given in the Kurukshetra University Examination guidelines.**
- **Over-attemptation should be avoided.**
- **Handwriting should be neat and clean and diagrams should be clear and contrasted.**
- **The candidate should not write their Mobile No. otherwise Unfair Means Case will be made.**
- **While attempting the paper, the candidate will use blue/black pen only.**
- **Before attempting the paper, the candidate will ensure that he/she has downloaded the correct question paper. No complaint for attempting wrong question paper by the candidate will be entertained.**
- **Candidate must ensure that he/she has put his/her signature on each page of the answer sheet used by him/her. Answer sheet without the signature of the candidate will not be evaluated.**

PART-A

Q. No. – 1 Answer the following questions. **15x1=15**

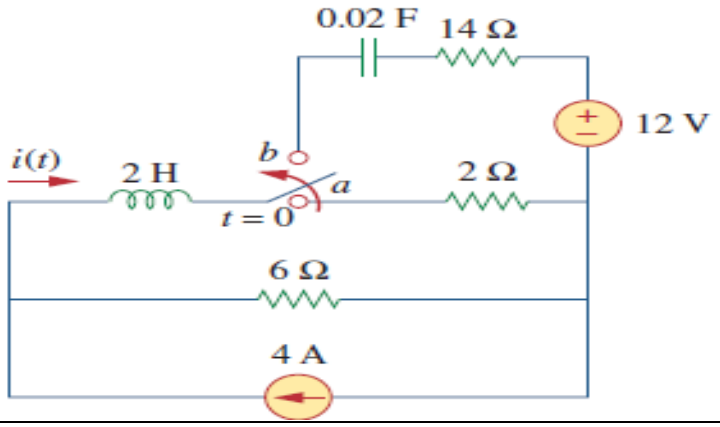
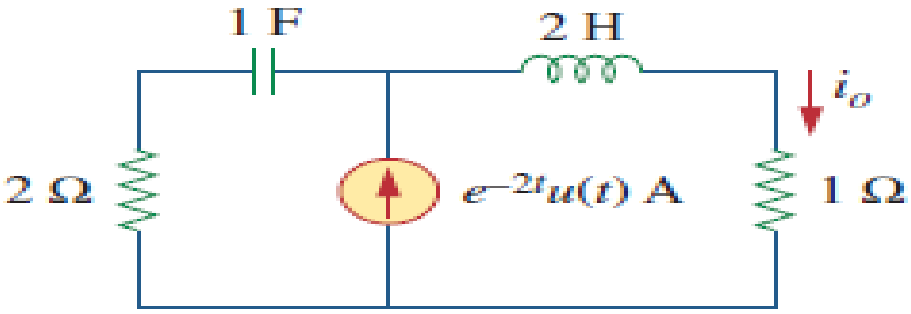
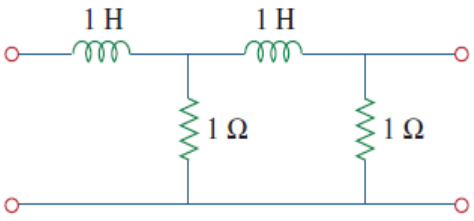
(i)	**If a graph consists of 5 nodes, then the number of twigs in the tree is?**
(ii)	**A graph is said to be an undirected graph if _____ of the graph has _____direction.**
(iii)	**If Z_1, Z_2 are same type of reactance, then $\|Z_1/4\ Z_2\|$ is real, then the value of α is?**
(iv)	**Consider a function Z(s)=5(s+1)(s+4)/(s+3)(s+5). Find the value of R_1 after performing the first form of Foster method.**
(v)	**The number of zeros including zeros at infinity is _____ the number of poles including poles at infinity.**
(vi)	**The real parts of all poles and zeros in a driving point function must be?**
(vii)	**In determining open circuit impedance parameters, among V_1, V_2, I_1, I_2, which of the following are independent variables?**
(viii)	**Consider the impedance function $Z(s)=(s^2+6s+8)/(s^2+3s)$. Find the first reminder obtained by taking the continued fraction expansion after performing the first Cauer form**
(ix)	**For the given information $Z_{11} = 3$, $Z_{12} = 1$, $Z_{21} = 2$, $Z_{22} = 1$. Find the value of Y_{22}.**
(x)	**Consider the impedance function $Z(s)=(s^2+6s+8)/(s^2+3s)$. Find the value of C_1 after performing the first Cauer form.**
(xi)	**The value of resonant frequency in the m-derived low pass filter is?**
(xii)	**A constant k high pass p section has a characteristic impedance of 200 Ω at $f = \infty$. At $f = f_c$, the characteristic impedance will be?**
(xiii)	**The condition for a 2port network to be reciprocal is _____**
(xiv)	**A 20 μF capacitor is charged from a 8 volt source through a resistance of 20 kΩ. The charging current offer 45 m sec. If the initial voltage on C is – 3 V is _____**
(xv)	**How many incandescent lamps connected in series would consume the same total power as a single 100 W/220 V incandescent lamp. The rating of each lamp is 200 W/220 V?**

PART-B

2	**Why we use Graph theory in the Networks. Explain the Cut-set matrix with an example.**	**5**
3	**What is One port Network? Discuss the Restrictions on pole and zero Locations for transfer Function.**	**5**
4	**Obtain the *Z* parameters for the network shown in given figure.** 	**5**
5	**Describe the rules to find out whether a polynomial F(s) is Hurwitz polynomial or not.**	**5**

PART-C

6	**Derive the expression for step response of a RC circuit.**	**10**
7	**Derive an expression to prove energy conservation concept for an RL circuit with Suitable diagram.**	**10**
8	**The switch in the circuit of figure is moved from position *a* to *b* (a make before break Switch) at $t = 0$. Determine $i(t)$ for $t > 0$ and i(t) for t<0.**	**10**

		
9	**Determine $i_o(t)$ in the below given circuit** 	**10**
10	**Find h and Z parameters of a two-port network if** $$T = \begin{bmatrix} 4 & 1.5 \\ 10 & 4 \end{bmatrix}$$	**10**
11	**For the ladder network in given figure, determine the *h* parameters in the *s* domain.** 	**10**
12	**Determine the foster I and II forms of realization of the RC impedance function** $$Z(s) = \frac{2(s+2)(s+4)}{(s+1)(s+3)}$$	**10**
13	**Explain with suitable Diagram** **(i) Passband** **(ii) Band pass filter** **(iii) Low pass Filter** **(iv) High pass filter** **(v) Bandstop filter**	**10**