

Code No: 133BJ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech II Year I Semester Examinations, February - 2024

NETWORK ANALYSIS

(Electronics and Communication Engineering)

Time: 3 Hours

Max. Marks: 75

- Note:** i) Question paper consists of Part A, Part B.
 ii) Part A is compulsory, which carries 25 marks. In Part A, answer all questions.
 iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART - A

(25 Marks)

- 1.a) What is the difference between planar and non-planar graphs? [2]
- b) A toroidal air cored coil with 2000 turns has a mean radius of 25 cm, the diameter each turn being 5 cm .If the current in the coil is 10A, find the mmf. [3]
- c) What do you mean by half power frequencies and bandwidth? [2]
- d) What is the time constant of the circuit as shown in **Figure. 1**. [3]

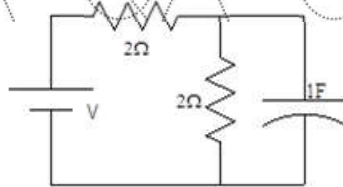


Figure. 1

- e) A unit impulse voltage is applied at $t=0$ to the R-L circuit shown in **Figure.2** while $i(0^-)=1$ A. What is the expression for $i(t)$? [2]

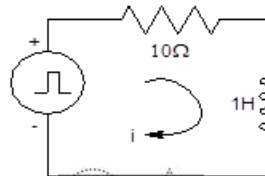


Figure.2

- f) Determine the RMS value of the periodic wave as shown in **Figure.3** below? [3]

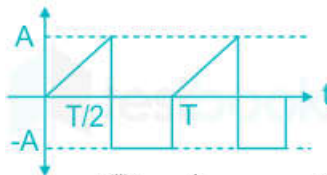


Figure.3

- g) Draw the equivalent circuit of a two port network in terms of Z-Parameters. [2]
- h) What is a driving point function? Explain the necessary conditions for driving point functions. [3]
- i) State the properties of LC networks. [2]
- j) What is input impedance and characteristic impedance? [3]

- b) In the network of **Figure.9** determine $V_k(0+)$, $\frac{dV_k}{dt}(0+)$ and $\frac{d^2V_k}{dt^2}(0+)$. The network was in steady state when the switch K is opened at $t=0$. [5+5]

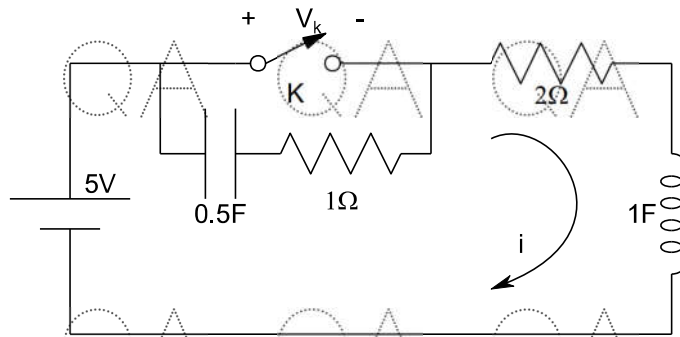


Figure.9

- 8.a) Calculate the h-parameters for the following network as shown in **Figure.10** then determine the Z-parameters for the same network using inter-relations

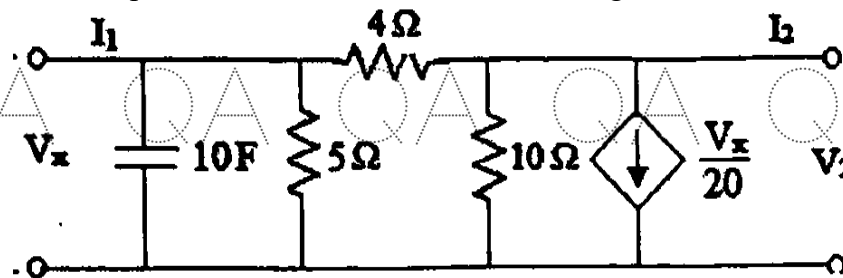


Figure.10

- b) The transform voltage $V(s)$ of a network is given by

$$V(S) = \frac{4S}{(S+2)(S^2+2S+2)}$$

plot its pole-zero diagram and hence obtain $v(t)$.

[5+5]

OR

- 9.a) For the two port circuit shown in **Figure.11** find the
i) Z parameters and
ii) Y-parameters.

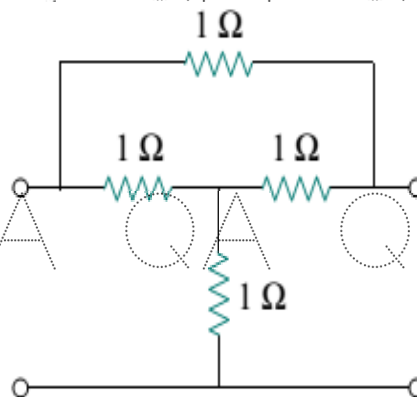


Figure.11

QA QA QA QA QA QA QA G

- b) Find the driving point admittance function $Y(s)$ for the network shown in **Figure.12** and also plot the polezero diagram. [5+5]

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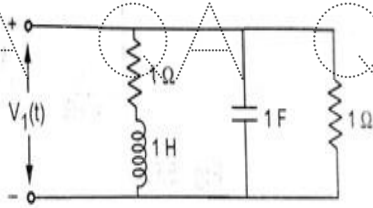


Figure.12

QA 10. Design a K-type band pass filter having cut-off frequencies of 1 KHz and 10 KHz and design impedance of 500Ω . [10]

OR

- 11.a) Design constant-k T-section and Π -section low pass filter having cutoff frequency $f_c=2$ kHz and nominal impedance of $R_o = 600\Omega$.

QA b) It is desired to design a symmetrical T- attenuator to give an attenuation of 60 dB so that it works into a load of 400Ω resistance. Find the value of R_1 and R_2 . [5+5]

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