Kaferelsheikh University
Faculty of Engineering
Department of Electrical Engineering
Year: First
Subject: Electronic Circuits

Date: 14/06/2021
Time allowed: 1.5 Hours
Full Mark: 45 Marks
Final Exam: 1 Page
Academic Number: ECE 1001

Answer the following questions

[1] Question One: (25 Marks)

a) Prove that: $I_C = \beta I_B + I_{CEO}$. **(6 Marks)**

b) Explain how the BJT transistor can be used as an inverter (switch). **(6 Marks)**

c) For the emitter-bias network of Figure (1), determine: I_B, I_C, V_{CE}, V_C, V_E, V_B and V_{BC}. **(7 Marks)**

d) The emitter-bias configuration of Figure (2) has the following specifications: $I_{CQ} = 0.5I_{Csat}$, I_{Csat} = 8 mA, V_C = 18 V, and β = 110. Determine R_C, R_E, and R_B. **(6 Marks)**

[2] Question Two: (20 Marks)

a) Explain the JFET universal transfer characteristic. Define the JFET forward transconductance. **(5 Marks)**

b) The 2N5459 JFET has typically I_{DSS} = 8 mA and $V_{GS(off)}$ = - 6 V (maximum). Using these values, determine the drain current for V_{GS} = 0 V, - 1 , and - 3 V. **(5 Marks)**

c) Determine I_D and V_{GS} for the JFET with voltage-divider bias in Figure (3), given that for this particular JFET the parameter values are such that $V_D \cong 7\,V$. **(5 Marks)**

d) For the circuit shown in Figure (4), find (1) r_{in}, (2) r_{in} (stage), (3) A_v, (4) v_L, (5) i_L, and (6) i_L/i_s (assume that α = 1). **(5 Marks)**

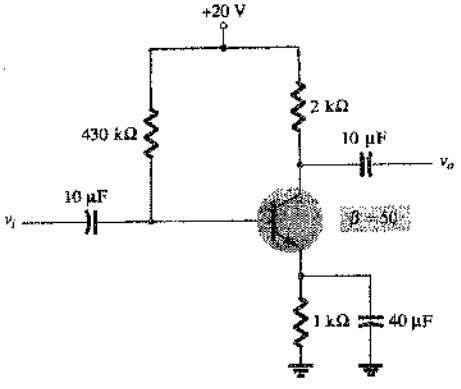


Figure (1)

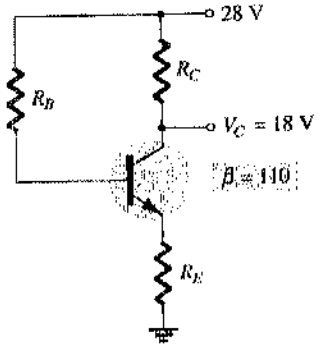


Figure (2)

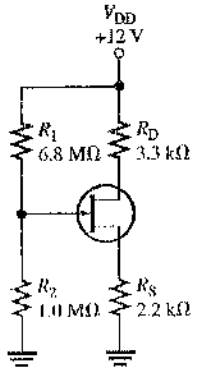


Figure (3)

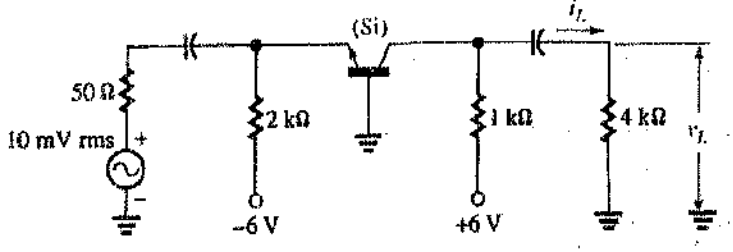


Figure (4)

Best Wishes
Dr. Emad A. Elshazly

Kafrelsheikh University
Faculty of Engineering
Electrical Engineering Department
Year : First
Subject : Electric Circuits

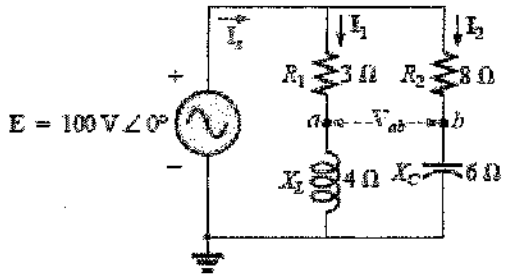
Date : 14/06/2021
Time: allowed : 90 minutes
Full Mark: 45 Marks
Name:
Academic Number :

Intended learning outcomes (ILOs): [a1, a4, a5, b1, b2, b3, b5, c8, c9, d1, d3]

Question No.1 [10 Marks]

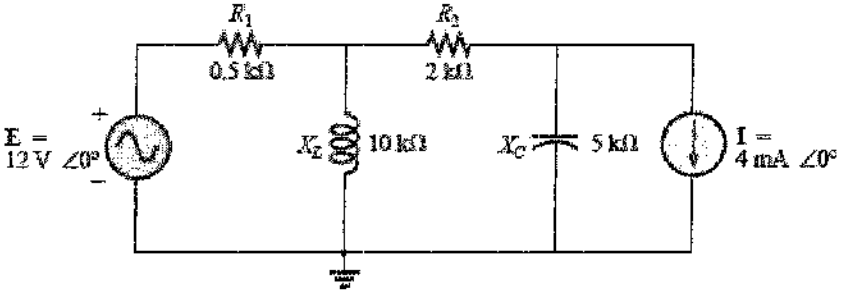
A- Calculate the current Is

B- Find the voltage V_{ab}



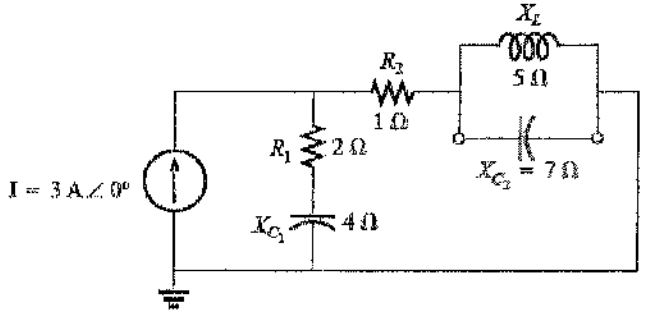
Question No.2 [10 Marks]

Determine the voltage across the inductor for the network of the following Fig.



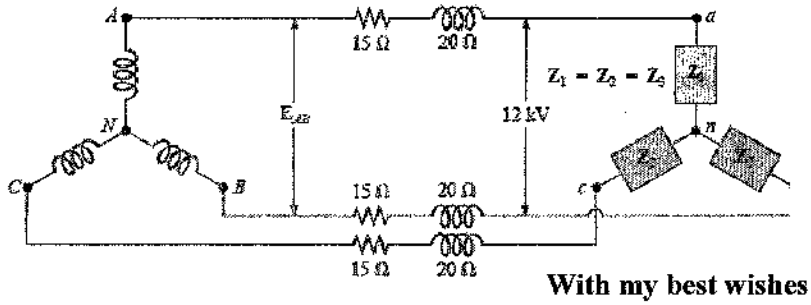
Question No.3 [10 Marks]

Find the Norton equivalent circuit for the network external to the 7-Ω capacitive reactance in the following Fig.



Question No.4 [15 Marks]

The system delivers a total power of 160 kW at 12,000 V to a balanced three-phase load with a lagging power factor of 0.86. Determine the magnitude of the line voltage E_{AB} of the generator.



With my best wishes
Dr. Sherif Emam