



Q1: Answer both equations below (A and B)

- A. Suppose A is a one dimension array with (10) elements. Write a code program which sorts A so that its elements are increasing and sorters into a new array B. Display the origin array (A) and create array (B) into picturebox which element from A and B in one row respectively.
- B. Write a code program to design a simple calculator. This program uses a combo box which includes four operators, addition, subtraction, multiplication and division and two list boxes included the integer numbers. It can perform the above four basic calculations by changing the operators.

Q2: Execute the following points:

- 1- Declare and read an A-row, B-column matrix array X.
- 2- Add "four" items to list2 in form_load event.
- 3- Remove all items from the list1.
- 4- Write the outputs of the following visual basic coding segment:
Dim A(12) As Single, i
For i = 0 to 12
A(i)=4+i
Print A(i);
Next i

Q3: Suppose N is a (5x2) matrix array is entered into ListBox on row by row. Write a program segment to find the location I and J such that N (I,J) contains the largest value in N. Print the values of array N. Display the Largest value and the location into textboxes.

Q4: answer either (A) or (B)

- (A) An MxN matrix array A is entered into input box. Write a visual basic program segment which is calculated the SUM of elements in each Column and Stored in a one dimension Z. Print the arrays A and Z and the sum of all elements of array Z.
- (B) Suppose a numeric array (A) having M elements. Write a code Program to calculate the elements of the numeric array C, where a numeric array C is determined from the following formula:

$$[C] = [A] * [A]^T . \text{ Print a numeric array C.}$$

Q5: Suppose a one dimension array A with N elements is entered into inputbox. Write a visual basic program segment which is calculated the product: $Prod = \prod_i^N (1 - A_i)$

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Note: Answer five questions only

Q1: (20 Mark)

Use the PRINCIPLE OF SUPERPOSITION to calculate the current flowing in the 10Ω load resistor (R_L) in the circuit of Fig (a):-

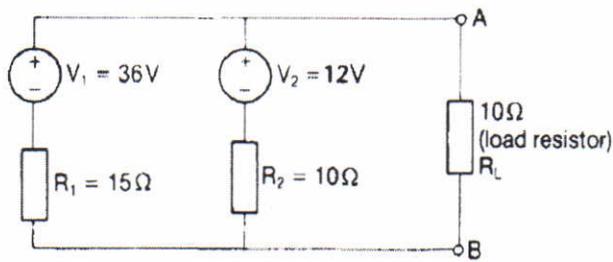


Fig. (a)

Q2: (20 Mark)

Use THEVENIN'S THEOREM to determine the maximum and minimum values of the current I_L when the resistor (r) in the circuit of Fig. (b) is variable from 0 to 250Ω .

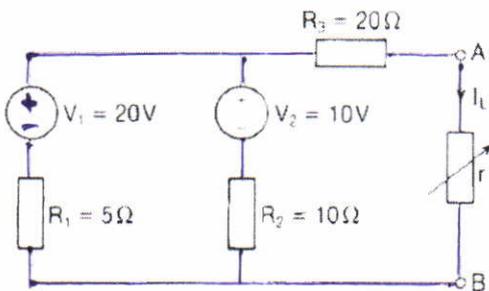


Fig. (b)

Q3: (20 Mark)

Use NORTON'S THEOREM to calculate the maximum and minimum values of the potential difference the resistor (r) in the circuit of Fig. (c). If (r) is variable between 10Ω and 100Ω .

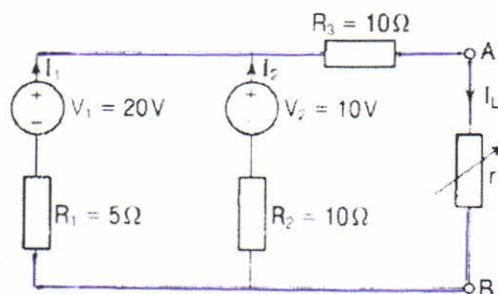


Fig (c)

Q4: (20 Mark)

In the circuit of Fig (d). Calculate (1) the impedance of the circuit, (2) the current drawn from the supply, (3) the phase angle of the circuit.

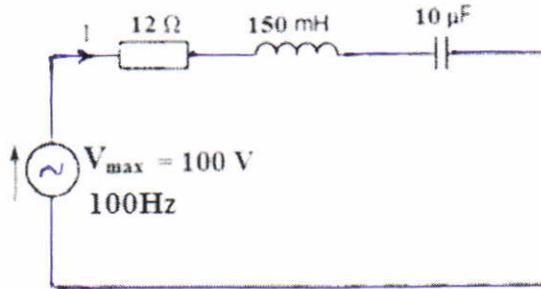


Fig . (d)

Q5: Answer only one branch; (20 Mark)

- a- A coil having a resistance of 10Ω and an inductance of 125 mH is connected in series with a $60 \mu\text{F}$ capacitor across a 120 V supply. At what frequency does resonance occur? Find the current flowing at the resonant frequency.
- b- A series circuit of resistance 70Ω and inductance 85 mH is connected to a 270 V , 80 Hz supply. Calculate the active power dissipated, reactive power, apparent power, and power factor?

Q6: (20 Mark)

- 1- If $I_1 * I_2 = 24.187 \angle 29.74^\circ$, when $I_1 = 3 + j6$, find I_2 in polar.
- 2- If $I_2 / I_1 = 0.538 \angle -97.13^\circ$ when $I_1 = 3 + j6$, find I_2 in rectangular .

Good – Luck

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Note: Answer All questions

Q1: Chose the correct answer (five only). (15 marks)

- 1- The process of joining two similar or dissimilar metallic components with application of pressure and with or without the use of filler metal:
a) machining. d) welding. b) forming. c) Casting.
- 2- One of the chief sources of iron is:
a) epoxy b) silicone. c) Red Haematite. d) Bauxite.
- 3- Iron manufacturing is done in several steps one of them is :
a) Washing and concentration. b) Baeyer's process. c) Serpek's process. d) Hall's process.
- 4- Stress compressive load is :
a) negative. b) positive. c) equivalent. d) any of the above.
- 5- The extraction of aluminum is :
a) Melting zone. b) Basic process c) Acid process d) electrometallurgy
- 6- Up to certain load the material will recover its original dimensions when the load is released, this is known as :
a) Hardness . b) Elastic behavior. c) Stiffness. d) Plastic behavior.

Choose (A or B) only (10 marks)

- Q2:** A) Draw a stress-strain diagram for mild steel specimen with pointing carefully all zones.
: B) Sketch and mark carefully a diagram for Electrolysis of Aluminum .

Q3: Define (five) of the following: (15 marks)

- 1- Hardness. 2- Brittleness. 3- Pig iron.
- 4- Casting. 5- Stack in Cupola furnace. 6- Shear force (F).

Q4: Choose (three) of the following: (15 marks)

- 1- Explain ferrous and Non-ferrous metals.
- 2- What are the commercial forms of iron?
- 3- Explain the Electrolysis of pure alumina?
- 4- Explain four of the reaction zones in Cupola furnace.