Enrolment No. 1 8 1 0 0 8 6

S1(UEE11B06)E

B.Tech 1st Semester (Group-I) Mid-term Examination, 2018

Name of Subject: Basic Electrical Engg.

Paper Code: UEE11B06

Full Marks: 50 **Time: 2 hrs.**

A. Choose the correct alternative from the followings: **10×1=10**

(i) Which of the following materials has a negative temperature co-efficient of resistance?
(a) Copper (b) Aluminum (c) Carbon (d) Brass

(ii) Capacitor does not allow the sudden change of
(a) current (b) voltage (c) power (d) none of the above

(iii) The concept on which Superposition is based is
(a) non-linearity (b) duality (c) reciprocity (d) linearity

(iv) In the power system, under the conditions of maximum power transfer, the efficiency is nearly
(a) 0 % (b) 50 % (c) 100 % (d) maximum

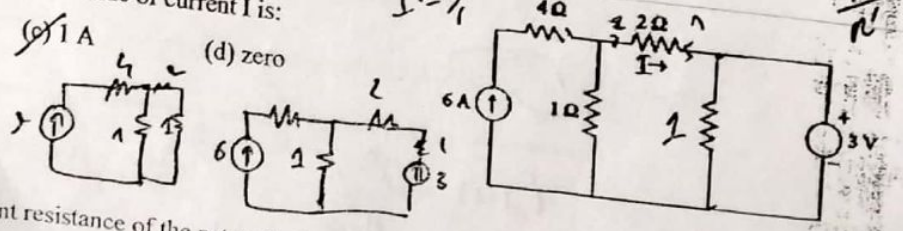
(v) Two lamps 100 W and 40 W are connected in series across 230 V (alternating). Which of the following statement is correct?
(a) 100 W lamp will glow brighter (b) 40 W lamp will glow brighter (c) both lamps will glow equally bright (d) 40 W lamp will fuse

(vi) KVL works on the principle of
(a) law of conservation of energy (b) law of conservation of charge (c) both (d) none of the above

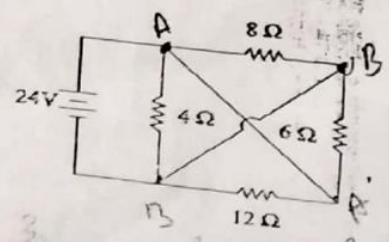
(vii) Under the conditions of maximum power transfer, a voltage source is delivering a power of 30 Watt to the load. The power generated by the source is:
(a) 45 Watt (b) 30 Watt (c) 60 Watt (d) 90 Watt

(viii) The length of a certain conductor of resistance 100 Ω is doubled and its cross-sectional area is halved. Its new resistance is:
(a) 100 Ω (b) 200 Ω (c) 50 Ω (d) 400 Ω

(ix) In the circuit shown in figure, the value of current I is:
(a) 3 A (b) 2 A (c) 1 A (d) zero



(x) Battery current and equivalent resistance of the network shown in figure are:
(a) 15 A, 8/5 Ω (b) 5 A, 16/5 Ω (c) 3 A, 9/5 Ω (d) 10 A, 4/5 Ω

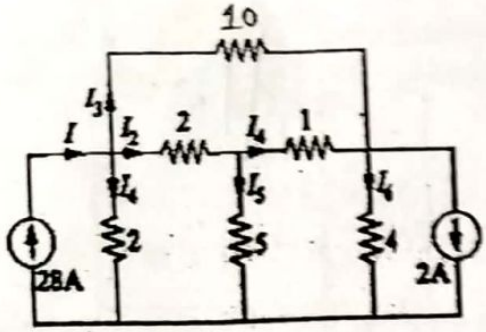


P.T.O.

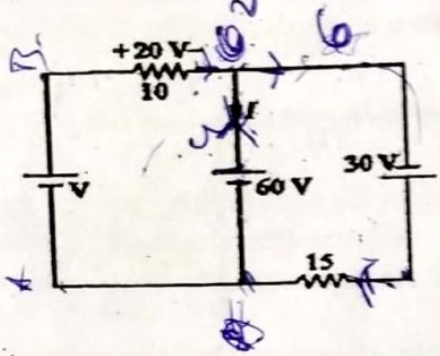
4×10 = 40

B. Answer any 4 of the followings:

(a) Using **Nodal analysis method**, find currents in the various resistors of the circuit shown in figure below. All resistances are in ohms.

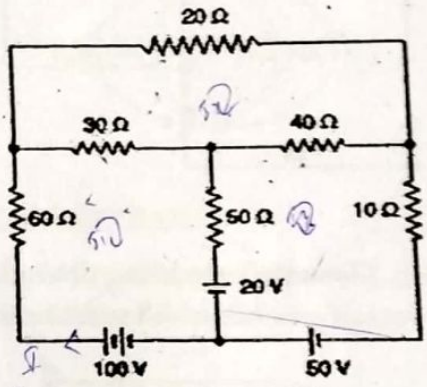


(b) Using **KVL** and **KCL**, find the values of V and I in the circuit shown in figure below. All resistances are in ohms.

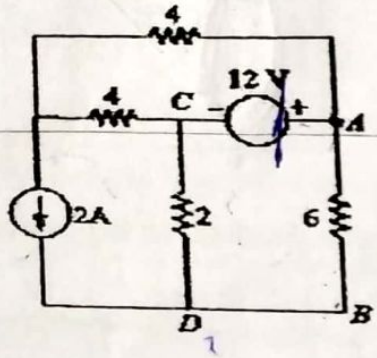


[7+3] = 10

2. (a) Using **Maxwell's loop current method**, calculate current in each branch of the circuit shown in figure below. All resistances are in ohms.



(b) Use **Norton's theorem** to find the current flowing through 6 Ω resistor of the network shown in figu below. All resistances are in ohms.



[6+4] =

3. (a) State **Maximum power transfer theorem**. Prove that the efficiency of a circuit transferring maxin power to any branch is 50%.

P.

B.Tech1st Semester Mid-term Examination, 2017
Name of Subject: Basic Electrical Engineering
Paper code: UAD11B06

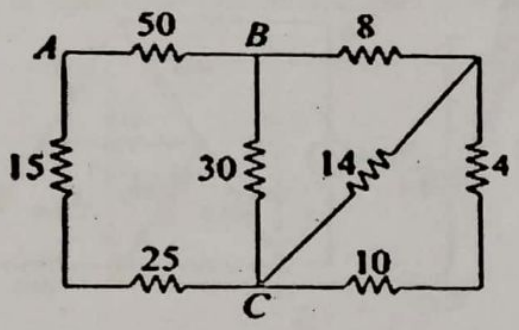
Full Marks: 50 **Time: 2 hrs.**

A. Answer all the questions [5×2=10]

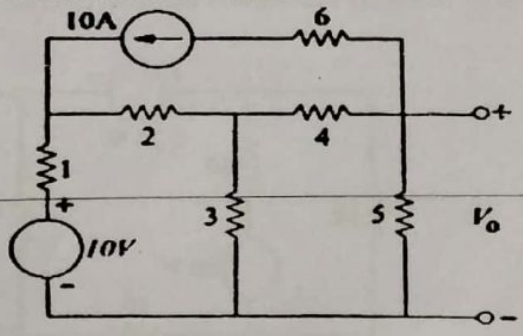
1. Explain how an inductor behaves in a circuit when (i) it is just switched ON and (ii) the circuit is reached its steady state.
2. Define the terms: (i) loop (ii) node (iii) mesh (iv) unilateral circuit.
3. The current in a 5 Ohm resistor connected in a network is 2 Amp. If this resistor is replaced by another of 10 Ohm, what will be the new current.
4. A current of 10 Amp enters a parallel combination of 2 resistances of 2 Ohm and 3 Ohm. Determine the current in each resistor using current division principle.
5. Draw and explain V-I characteristic of a practical current source.

B. Answer any 4 from the following questions [4×10=40]

1. **(a)** Compute the equivalent resistance of the circuit shown in figure below between points AC and BC. All resistances are in ohms.

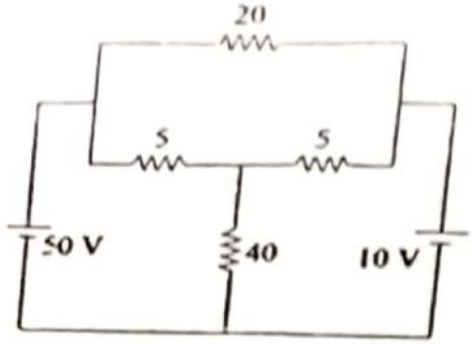


(b) Using loop current method/mesh analysis, calculate the output voltage V_0 for the circuits shown in figure below. All resistances are in ohms.

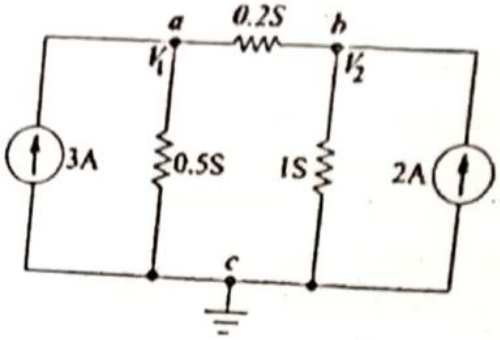


[5+5]

2. (a) Using Superposition theorem, find the current through the 40 Ω resistor of the circuit shown in figure below. All resistances are in ohms.

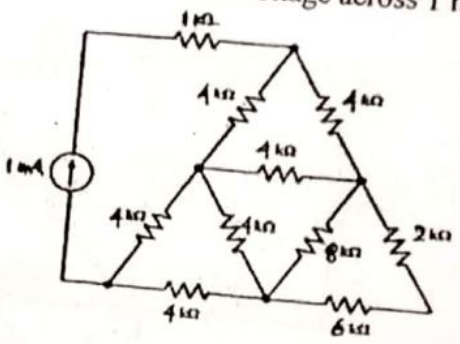


(b) Using nodal voltage method, find the various current branch currents shown in figure below. All conductances are in Siemens (S).



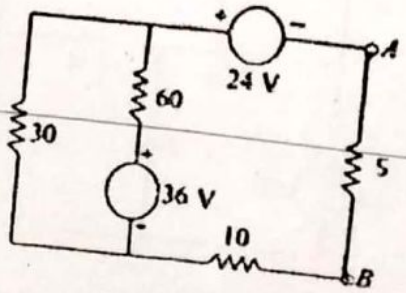
3. **(a)**State and proof Maximum power transfer theorem. [5+5]

(b) Using star-delta transformation, calculate thevoltage across 1 mA current source.



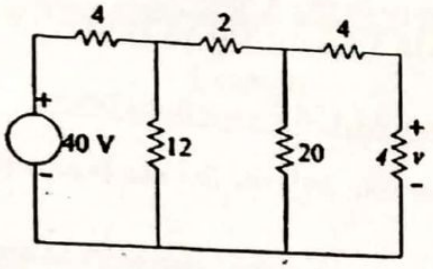
4. (a) State Thevenin's theorem

(b)Find the current which would flow in the 5 Ω resistor connected between points A and B as shown in figure below by using (i) Thevenin's theorem (ii) Norton's theorem. All resistances are in ohms. [(1+3) +6]

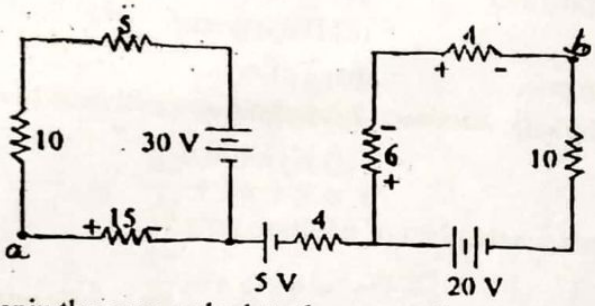


[2+ (4+4)]

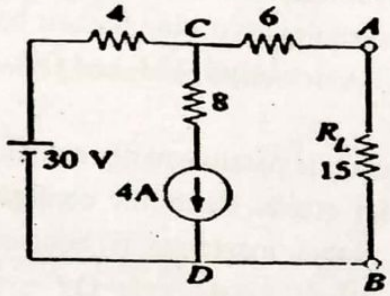
5. (a) Use source transformation technique to find the value of voltage v. All resistances are in ohms.



(b) In the network shown in figure below, calculate the voltage between points a and b i.e. V_{ab}. All resistances are in ohms.



(c) Using Norton's/Thevenin theorem, calculate the current flowing through the 15 Ω load resistor in the circuit shown in figure below. All resistancesare in ohms.



[3+2+5]

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B.Tech 1st Semester Mid-term Examination, 2016
Name of Subject: Basic Electrical Engg.
Paper Code: UAD11B06

Full Marks: 50 Time: 2 hrs.

A. Answer all the questions: 2×5=10

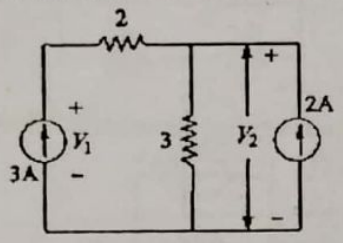
(i) Define the terms:- Ideal constant voltage source and Ideal constant current source.

(ii) Explain how an inductor behaves in a circuit when (a) it is just switched on (b) the circuit has reached its steady state.

(iii) Differentiate between Bilateral and Unilateral circuit.

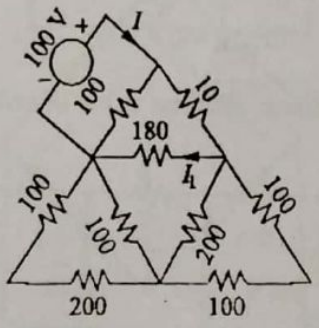
(iv) The resistance of a conductor of diameter d and length l is R Ω. If the diameter of the conductor is halved and its length is doubled, the resistance becomes R_1 Ω. Determine the relation between R_1 and R.

(v) Find the values of variables indicated in the circuit shown in figure below. All resistances are in ohms.

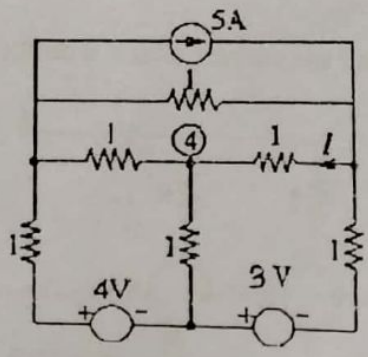


B. Answer any 4 of the followings: 4×10=40

1. (a) In the circuit shown in figure below find I and I_1.

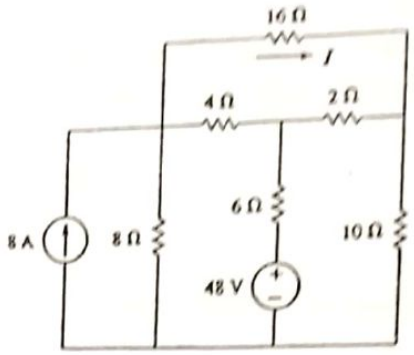


(b) Using Nodal analysis method find the current I as shown in figure below. All resistances are in ohms.

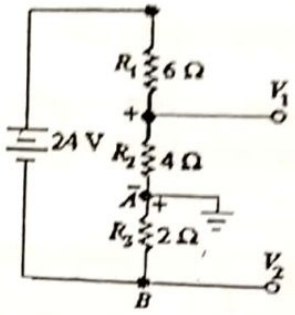


5+5=10

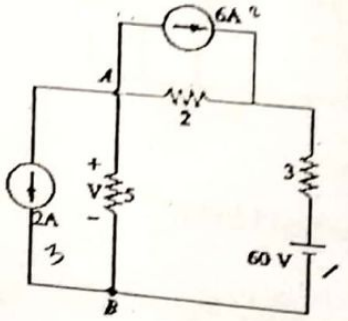
2. **(a)** State Thevenin's theorem. Find the current flowing through the 16 Ω resistor shown in fig. using Thevenin's theorem.



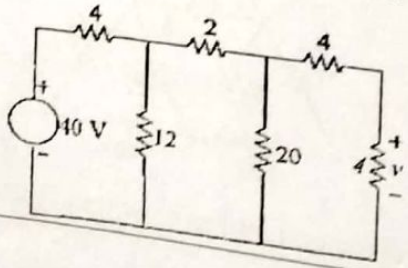
(b) What are the output voltages of the unloaded voltage divider shown in figure below? What is the direction of current through AB?



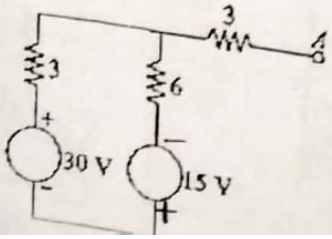
3. (a) State Superposition theorem. Use Superposition theorem to find the voltage drop across 5 Ω resistor shown in figure below. (2+5) +3=10



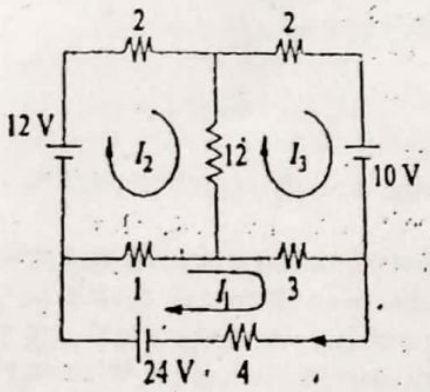
(b) By using repeated source transformations, find the value of voltage v shown in figure below.



4. **(a)** Using Norton's theorem, determine the current which would flow in a 4 Ω resistor if connected between terminals A and B in figure below. (2+5) +3=10



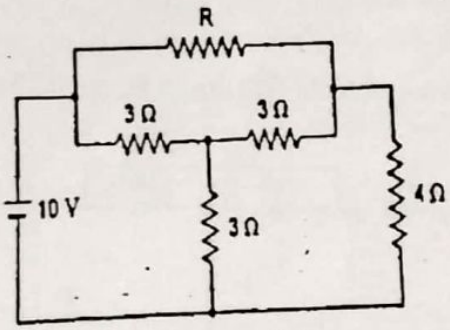
(b) Apply mesh analysis method to find loop currents I_1, I_2 and I_3 in the circuit shown in figure below.



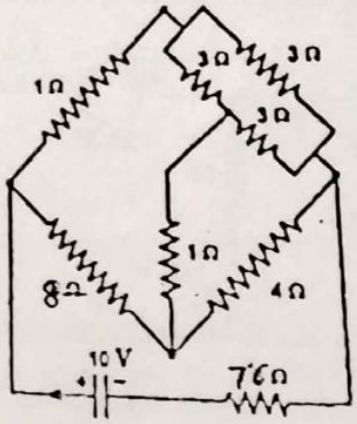
5+5=10

(a) State Maximum power transfer theorem.

(b) Determine the value of R such that 4 Ω resistor consumes maximum power from the network.



(c) With the help of Star-delta transformation, determine the current supplied by the voltage source shown in figure below.



(1+3)+6=10

S_1(UAD11B06)

B. Tech 1st Semester (Group-I) Mid term Examination, 2015

Name of Subject: Basic Electrical Engg.

Paper Code: UAD11B06

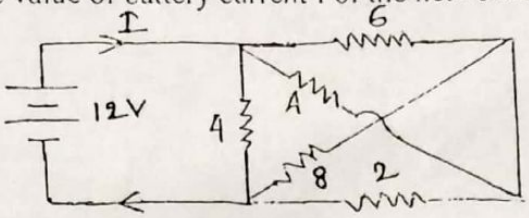
Full Marks: 50 Time: 2 hrs.

Answer Question No.1 and any 4 from the rest

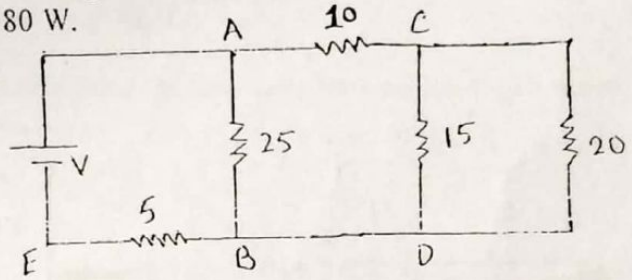
1. (a) Define Bilateral and Unilateral circuit. [2]

(b) Show that the energy stored in an inductor is $\frac{1}{2}LI^2$ [2]

(c) Compute the value of battery current I of the network shown in figure below. [2]

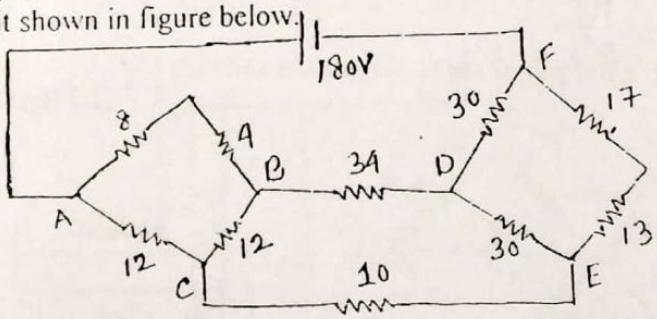


2. (a) In the circuit shown in figure below, find the value of supply voltage V so that 20 Ω resistor can dissipate 180 W.



(b) Explain how a capacitor behaves in a circuit when (a) it is just switched on and (b) the circuit has reached at its steady state.

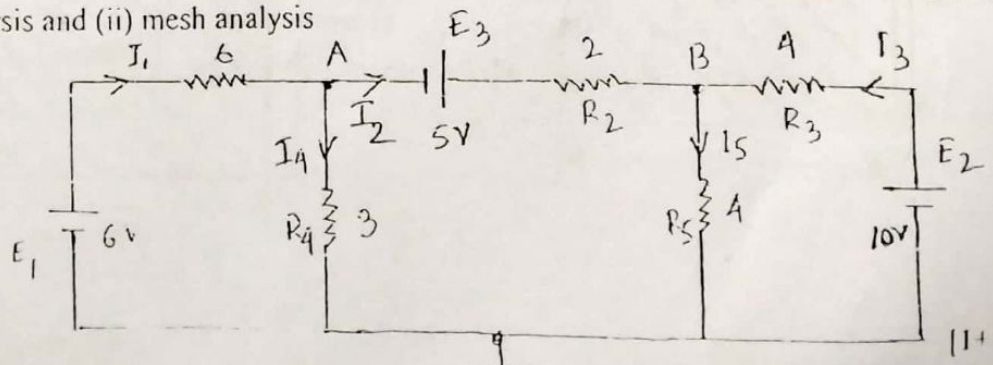
(c) Using star-delta conversion, calculate the current flowing through the 10-Ω resistor of the circuit shown in figure below.



[3+2+6]

3. (a) Define ideal constant current source.

(b) Find the branch currents in the circuit shown in figure below by using (i) nodal analysis and (ii) mesh analysis



[1+(5+5)]

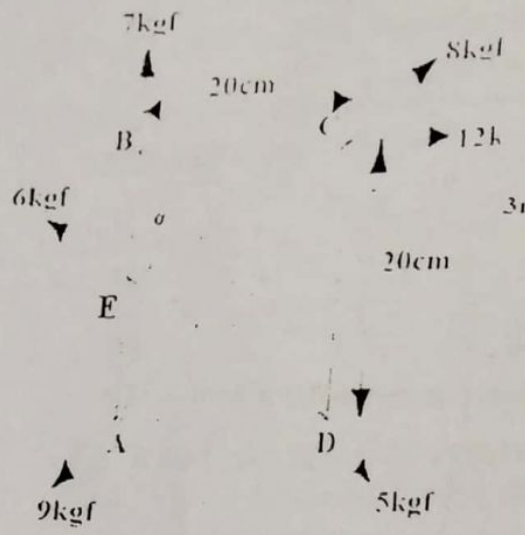


Figure: 1

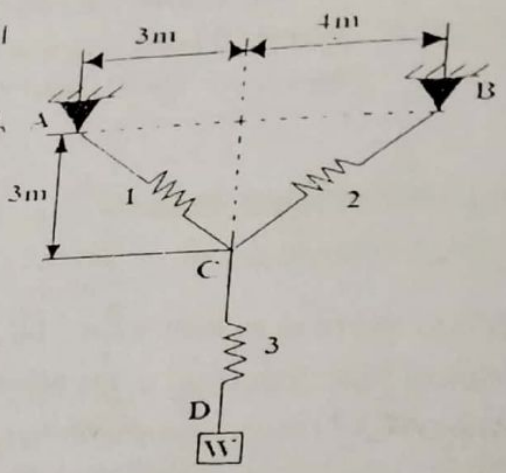


Figure: 2

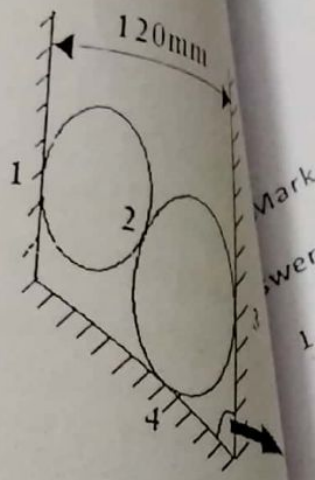


Figure: 3

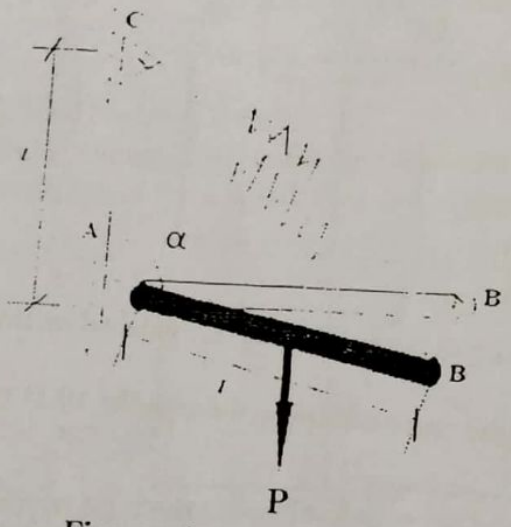


Figure: 4

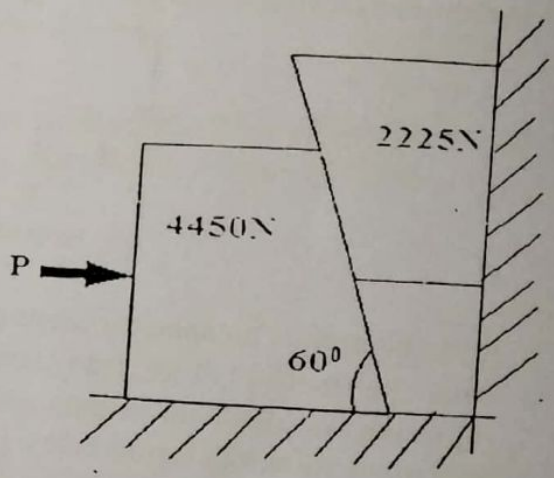


Figure: 5

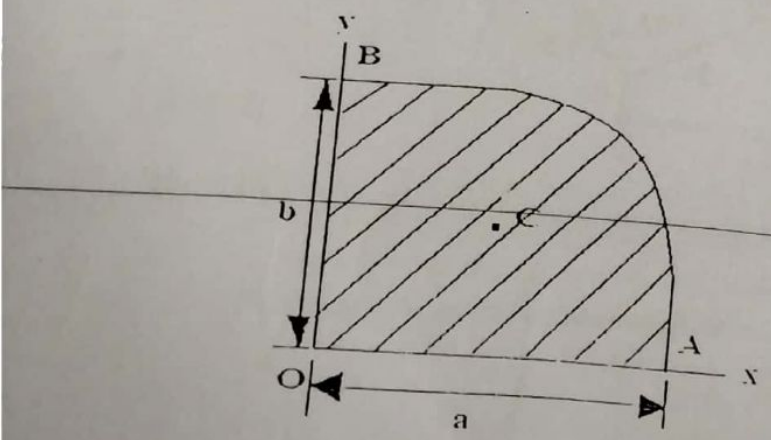


Figure: 6

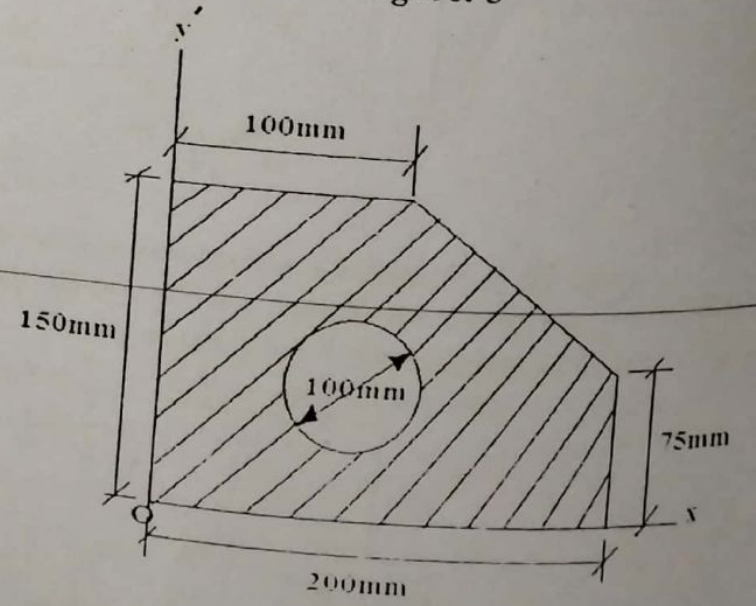


Figure: 7