Paper Code A

Reg No:_____

COURSE CODE: MEC135

COURSE TITLE: BASICS OF MECHANICAL ENGINEERING

Time Allowed: 3 hrs **Max. Marks: 70**

Read the following instructions carefully before attempting the question paper.

1. This question paper is divided into two parts A and B.
2. Part A contains 10 questions of 2 marks each. All questions are compulsory.
3. Part B contains 6 questions of 10 marks each. Attempt any 5 questions out of these 6 questions. In case all the 6 questions are attempted then only the first five attempted question will be evaluated.
4. Answer all questions in serial order.
5. Do not write or mark anything on the question paper except your registration no. on the designated space.

Part-A

Q. 1(a) For drawing thin lines of uniform thickness the pencil should be sharpened in the form of----· L1CO3[2 marks]

Ans: Chiesel

(b)Write freehand, in single-stroke (i) vertical capital letters of 3 mm height, the following paragraph "The word single-stroke should not be taken to mean that the letter should be made in one stroke without lifting the pencil L1CO3 [2 marks]

Ans: **Question Sense is not Clear**

(c) Two types of dimensions needed on a drawing are _____ and ____dimensions. L1 CO3[2 marks]

Ans: **Question Sense is not Clear.** Probably answer is **Aligned** and **Unidirectional**

(d) The ratio of the length of the drawing of the object to the actual length of the object is called?

Ans: Representative Factor (R.F.)

L2 CO5[2 marks]

(e) When measurements are required in three units --·-·-···-·---·--- scale is used. L2 CO5[2 marks]

Ans: **Diagonal**

(f) For the A1 size sheet, the number of zones suggested by B.I.S. along the length are¬¬ _____ while those along the width are ____. L2 CO5[2 marks]

Ans: **Out of Syllabus**

(g) _____deals with the relationship between forces and the resulting motion of bodies on which they act. L3 CO6[2 marks]

(h) M.O.I. of a circle = ... where d is the diameter of the circle. L3 CO6[2 marks]

Ans: **Question is Incomplete. About which axis?**

$$I_{ZZ} = \frac{\pi}{32}(d)^4 \quad , \qquad I_{XX} = I_{YY} = \frac{\pi}{64}(d)^4$$

(i) Centroid of a triangle lies at ..... from the base, where h is the height of triangle. L3 CO6 [2 marks]

Ans: **h/3**

(j) The moment of couple is known as ..... which is equal to one of the forces forming the couple multiplied by arm of the couple. L3 CO6[2 marks]

Ans: **Question Sense is not Clear**

Possible answer may be **Torque**

PART-B

Q.2 Construct a scale of 1.5 inches = 1 foot to show inches and long enough to measure upto 4 feet. L2 CO1 [10 marks]

Ans: Question is out of Syllabus (Not as per BIS Norms)

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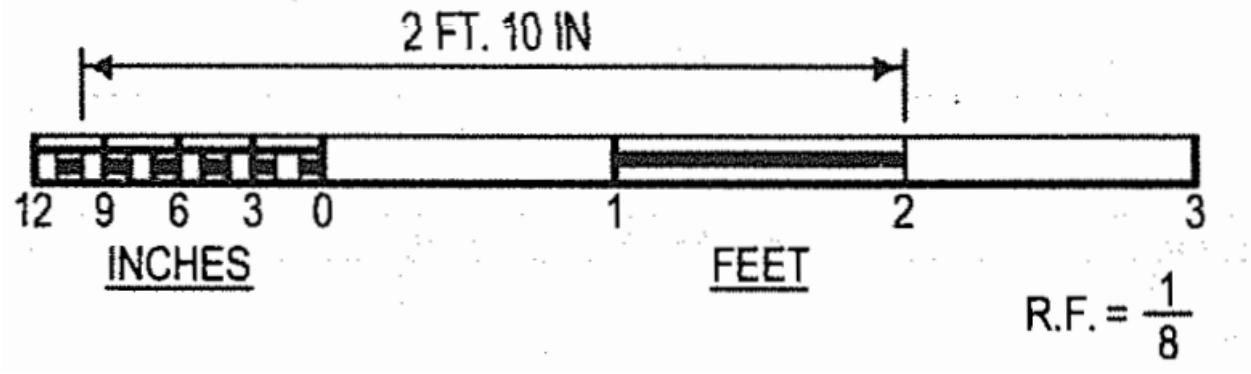
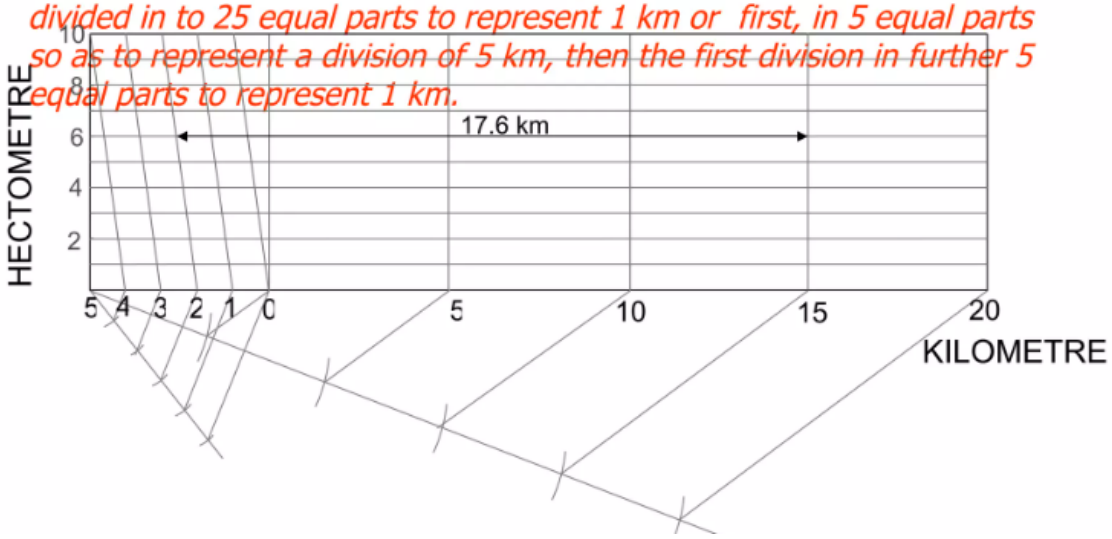


Q.3 On a map, the distance between two points is 14 cm. The real distance between them is 20 km. Draw a diagonal scale of this map to read kilometres and hectometres, and to measure up to 25 km. Show a distance of 17.6 km on this scale. L1 CO2 [10 marks]

$$R.F = \frac{\text{Length on drawing in cm}}{\text{Actual length of object in cm}} = \frac{14\text{ cm}}{20\text{ km}} = \frac{14\text{ cm}}{20X10^5\text{ cm}} = \frac{7}{10^6}$$

$$L.O.S. = R.F. \times \text{Max. Length in cm} = \frac{7}{10^6} X 25X10^5\text{ cm} = 17.5\text{ cm}$$

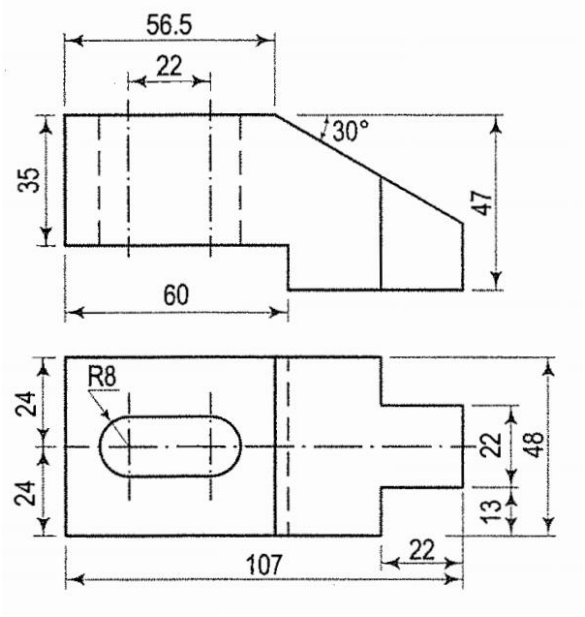
Hint: As the maximum length is 25 km, the line should be either be divided in to 25 equal parts to represent 1 km or first, in 5 equal parts so as to represent a division of 5 km, then the first division in further 5 equal parts to represent 1 km.



Q.4 Figure shows the orthographic projections of the objects in the first-angle projection method. Draw them in the third-angle projection method.

Paper Code A

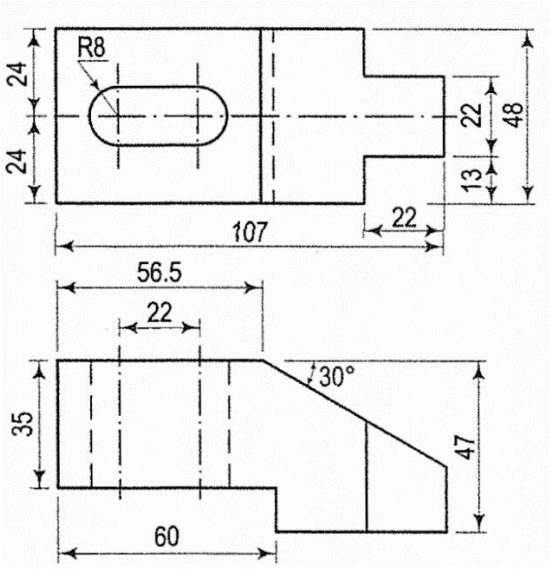
Reg No:_____



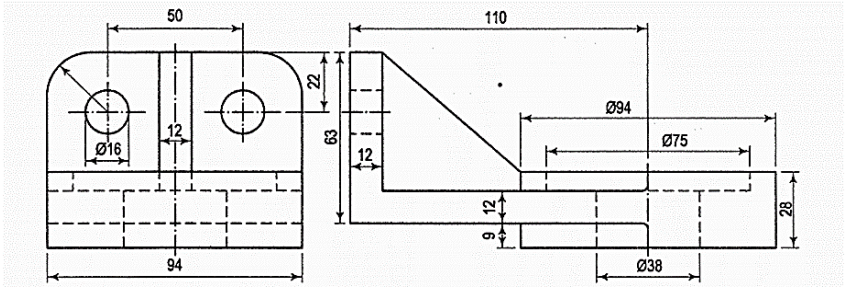
L1

CO3[10 marks]

Sol.



Q.5 Draw the isometric view of the bracket shown in the two views in figure.



L2 CO4[10 marks]

Sol.

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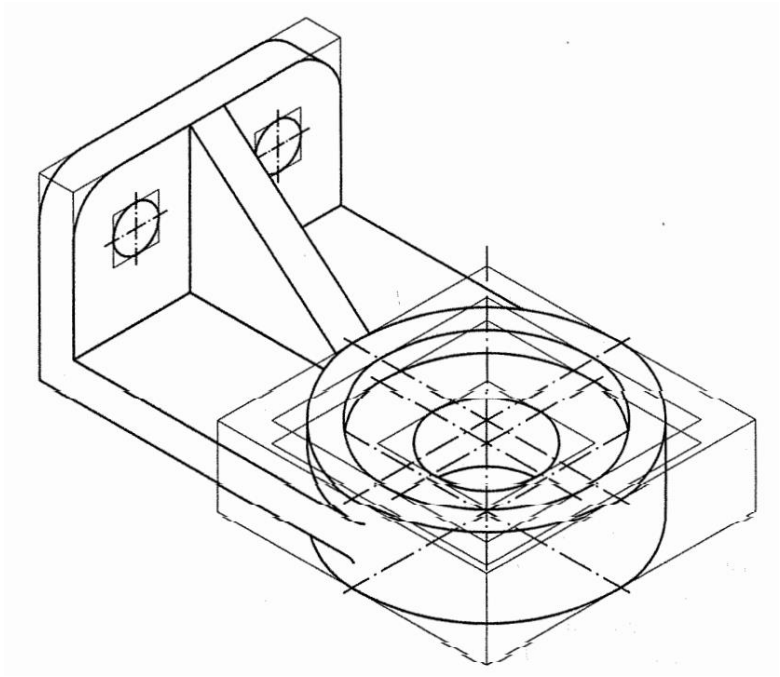
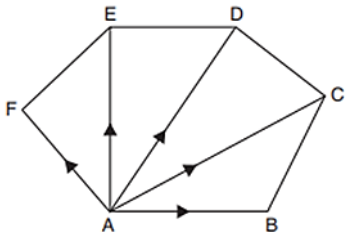


Q.6 ABCDEF is a regular hexagon. Forces of magnitudes 2, 4 √3, 8, 2 √3 and 4 N act at A in the directions of AB, AC, AD, AE, and AF respectively. Determine the resultant completely.



L2 CO5[10 marks]

Sol.

$\Sigma F_x = 2 + 4\sqrt{3}\cos 30 + 8\cos 60 - 4\sin 30$

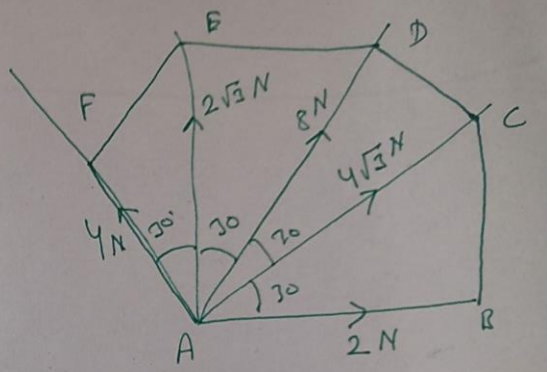
$\Sigma F_x = 10\ N$

$\Sigma F_y = 2\sqrt{3} + 4\cos 30 + 8\cos 30 + 4\sqrt{3}\cos 60$

$= 17.32\ N$

$R = \sqrt{10^2 + 17.32^2} = 20\ N$

$\alpha = \tan^{-1}\left[\frac{17.32}{10}\right] = 60°$



Paper Code A

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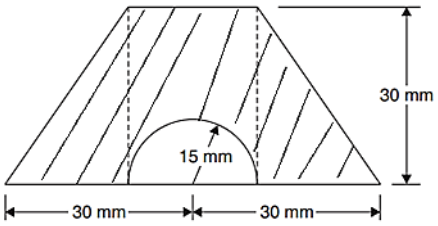
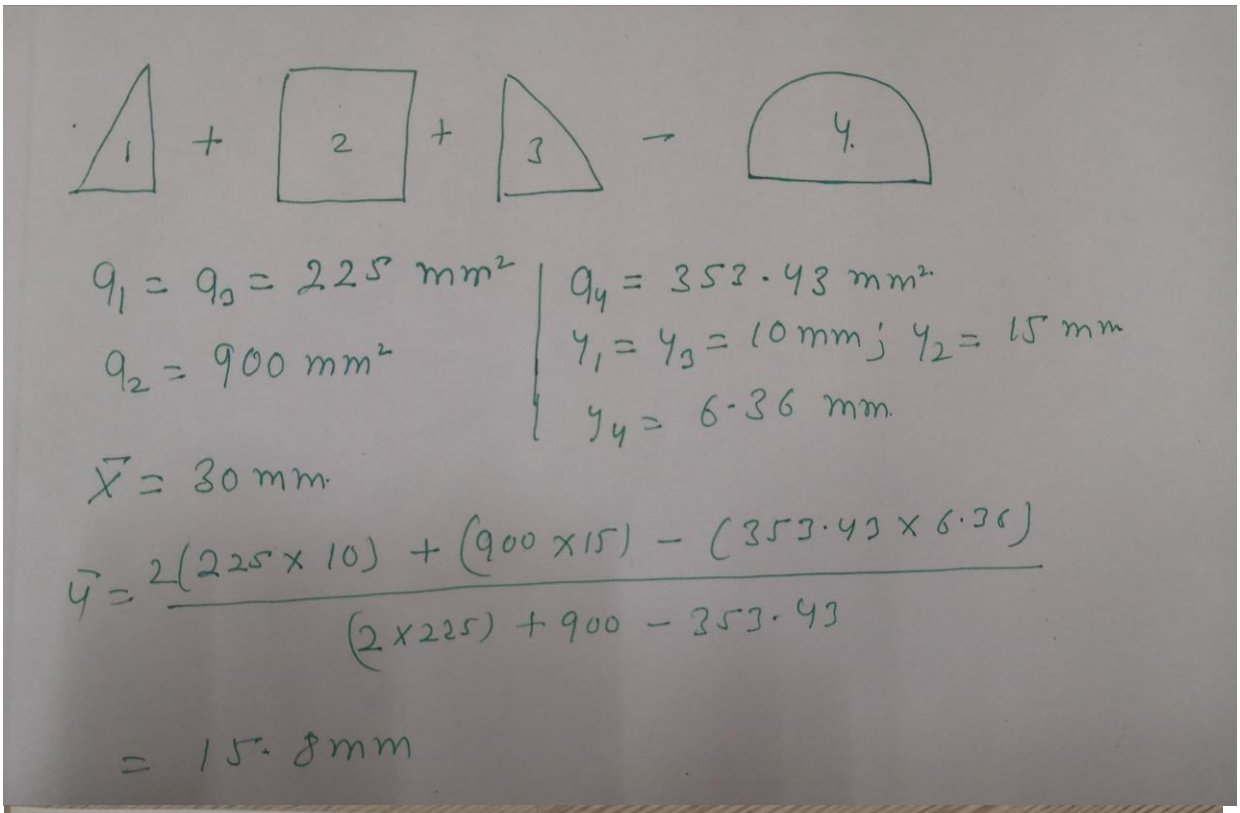
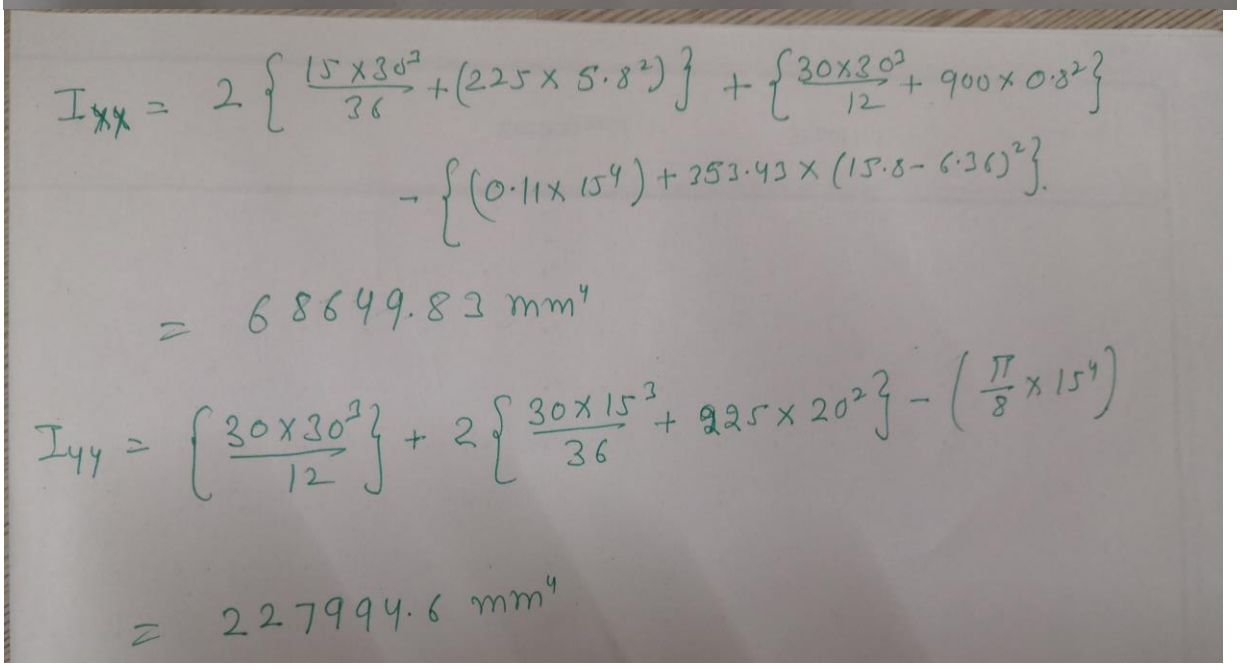
Q.7 Find the centroidal moment of inertia of the shaded area shown in Figure.



L3 CO6 [10 marks]

Sol.





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