MEE102 TUTORIAL QUESTIONS

a. Draw the given views shown in figures a1, a2, and a3 full size. Construction lines must not be erased and all centre lines must be shown as in the figures.

b. A rod AB pivots about A and moves through 90° to AC at uniform speed. At the same time a pivot (P) starts at B and slides along the rod at uniform speed to reach A at the same time that the rod reaches its final position. Draw the locus of the point (P).

c. figure c shows the outline of two pulley wheels connected by a belt of negligible thickness. To a scale of 1/10 draw the figure showing the construction necessary to obtain the points of contact of the belt and pulleys.

d. Construct a regular nonagon of side 45 mm.

e. figure e shows two circles, A and B, and a common external tangent and a common internal tangent. Construct (a) the given circles and tangents and (b) the smaller circle that is tangential to circle B and the two given tangents. Measure and state the distance between the centres of the constructed circle and circle A.

f. Draw an epicycloid and hypocycloid for 75 mm diameter rolling circles and a 225 mm diameter base circle in a single view.

g. Draw full size in third angle projection the following views of the details shown in figure g1 and g2 (a) Elevation in the direction of T (b) End view in the direction of arrow S (c) Plan view projected from view (a).

h. Draw one complete turn for right-hand and left-hand helices44 mm diameter and 72 mm lead.

i. In the given mechanism shown in figure i, the cranks AO and BQ revolve in opposite directions at the same speed, and are joined by the rods AC and BCP. Plot the locus of P for one revolution of the cranks, if AO and BQ are 25 mm, AC is 125mm and CP is 20 mm.

j. The rod AB shown in figure j moves so that A is always on OY and B is always on OX. Plot the locus of P for the maximum movements of A and B if AB is 130mm and AP is 58 mm.

k. Draw an ellipse having axes of 120mm and 80 mm by the auxiliary circles method.

l. Draw a parabola with its axis vertical, in a rectangle 128mm high by 114mm wide.

m. Find graphically the circumference of a circle of diameter 70 mm, and check the result by calculation.

n. Draw a regular pentagon with sides 30 mm long and construct its involute.

o. AB and AC are two straight lines which intersect at an angle of 30 °. D is a point between the two lines at perpendicular distances of 37 and 62 mm, respectively from AB and AC. Describe the circle that touches the two converging lines and passes through point D; the centre of this circle is to lie between the points A and D. Now draw two other circles each touching the constructed circle externally and also the converging lines. Measure and state the diameters of the constructed circles.

p. plot the locus of a point P that moves so that its distance from the circumference of two circles, centres O1 and O2 and radii 20 and 15 mm, respectively, is always in the ratio 2:3, respectively

q. plot the locus of a point P that moves so that its distance from two fixed points R and S, 50 mm ap is always in the ratio 2:1, respectively.

Figure a1

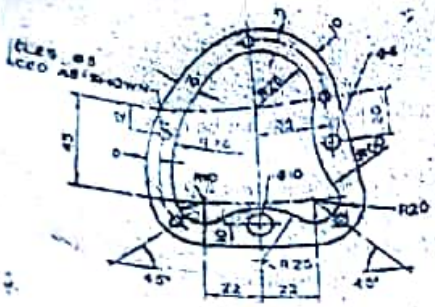
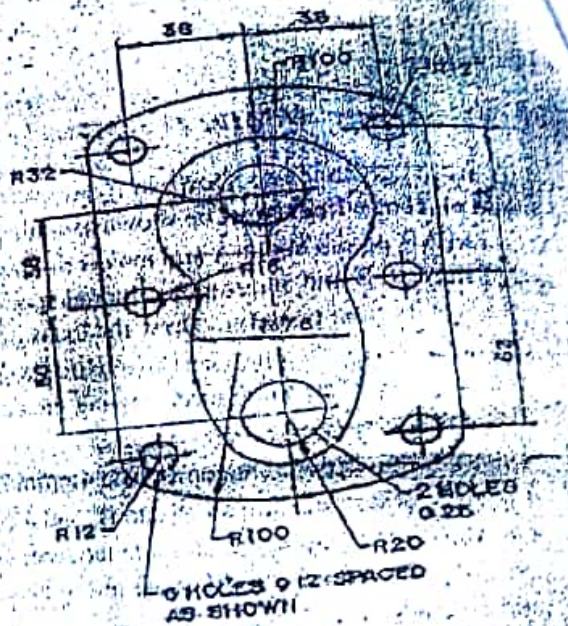


Figure a2



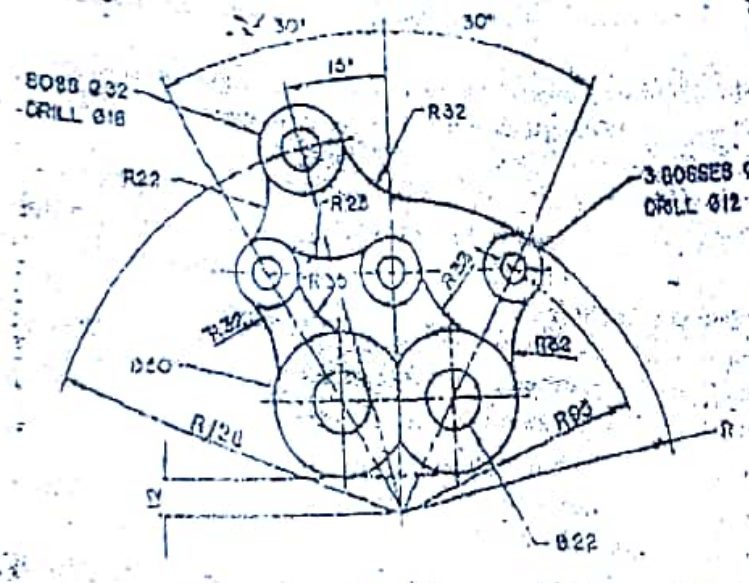
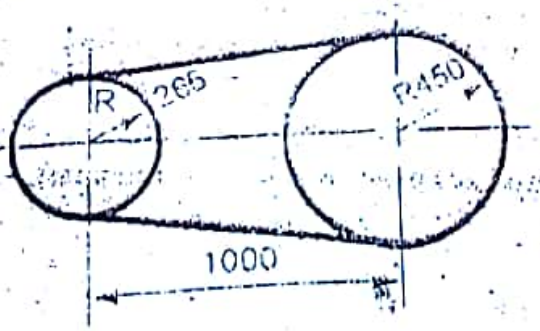


Figure a3

Figure c



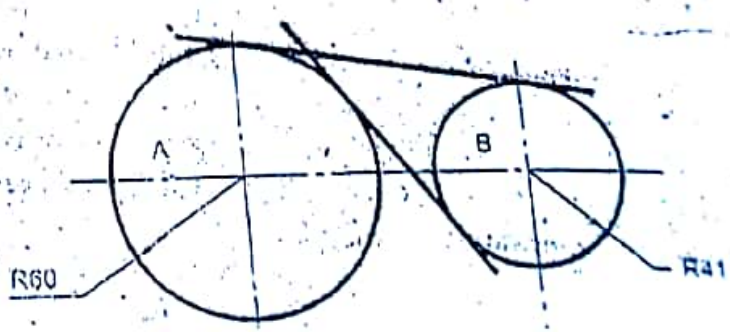


Figure g1

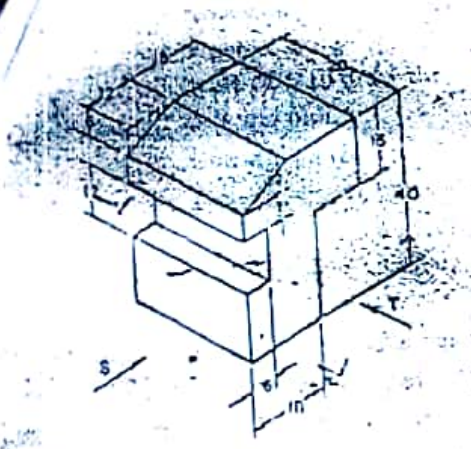
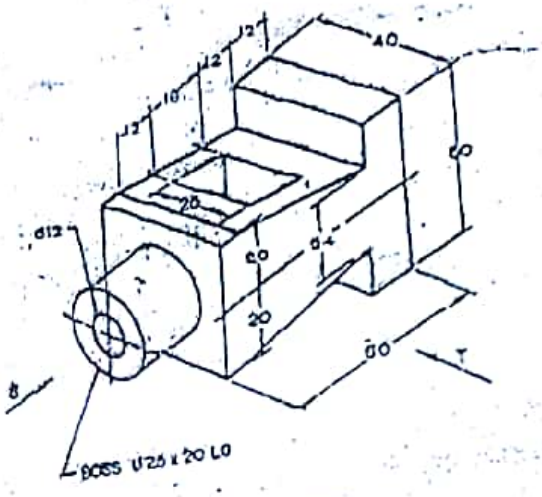


Figure g2



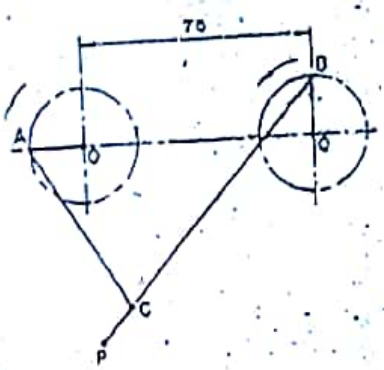


Figure i

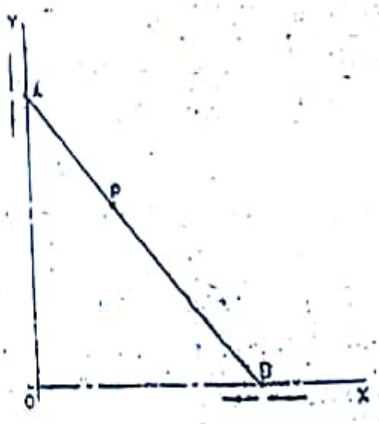


Figure j