NATIONAL INSTITUTE OF TECHNOLOGY DURGAPUR

Engineering Graphics Sessional (MES 01), 2017-18

SCALES AND GEOMETRICAL CONSTRUCTIONS

1. Construct a plain scale of metres and decimeters, the R.F. of the scale being 1/40. The scale should be long enough to read upto 6 metres. Mark two points on the scale at 3.6 metres apart.
2. A distance of 2 m 47 cm is represented by a line 6.5 cm long. Find R.F. of the scale and draw a diagonal scale of the R.F. so that metres, decimeters and centimeters can be read off the scale. The scale should be long enough to read upto 6 metres. Also mark two points on the scale, at 3.76 metres apart.
3. A rectangular plot of land of area 16,000 sq. m is represented by a rectangle of area 90 sq. cm on a map. Sides of the rectangle are in the ratio of 1:2.5. Draw a diagonal scale to read accurately upto metres.
4. Construct a vernier scale of metres to read upto centimeters when 8 cm represents 1 m. State the R.F. and measure a distance of 89 cm with the help of the scale.
5. Construct comparative scales of metres and yards when R.F. is 1/72. The yard scale should read upto 1" accurately and the metre scale upto 1 centimetre. State the corresponding reading on the yard scale for 11.55 m on the metre scale.
6. A fixed point F is at a distance of 3 cm from a fixed line ZZ_1. Draw the locus of a point P moving in the plane containing the line ZZ_1 and the point F so that its distance from F is equal to its distance from ZZ_1.
7. Draw a triangle TPQ having given PQ = 12 cm, PT = 10 cm and QT = 9 cm. Construct a parabola which touches PT and QT at P and Q respectively. Determine the axis, vertex, focus and latus rectum.
8. Inscribe a parabola inside a parallelogram of sides 10 cm and 8 cm, the angle between the sides being 65^{o}.
9. Construct an ellipse having major and minor axis 10 cm and 5 cm respectively by the method of intersecting arcs.
10. Diagonals of a rhombus are 12 cm and 6.5 cm. Draw the figure and inscribe in it an ellipse using auxiliary circles. Measure the major and minor axes and locate the foci.
11. Inscribe an ellipse in a parallelogram of sides 10 cm and 6.5 cm, the angle between the sides being 75^{o}, by the method of intersecting lines.
12. Describe the hyperbola, the transverse axis and foci being given: transverse axis 7 cm, foci 8.5 cm apart. Draw the asymptotes of the curve and state its eccentricity.
13. Draw an archimedean spiral of one convolution having given 2 cm and 6 cm as its shortest and longest radius vectors.
14. The ratio between two consecutive radius vectors (of a logarithmic spiral) including an angle of 30^{o} is 11 **:** 10. The shortest radius vector is 10 mm. Draw the logarithmic spiral for one convolution.
15. Draw the cycloid of rolling circle 6 cm diameter for one complete revolution of the rolling circle.
16. Draw the involute of a circle of diameter 4 cm.
17. Draw epicycloid and hypocycloid for which the diameter of the rolling circle is 4 cm and that of the base circle is 12 cm.

Class Assignment – Prob No. 1, 2, 7, 11, 15

Home Assignment (to be submitted in A4 papers) – 13, 14, 16