

**BACHELOR OF ENGINEERING IN PRODUCTION ENGINEERING
EXAMINATION, 2017**

(2nd Year, 1st Semester, Supplementary)

PRODUCT AND SYSTEM GRAPHICS (OLD)

Time : Three hours

Full Marks : 100

Answer any five questions

- 1(a) Two Mild Steel plates are fastened by a hexagonal bolt, a hexagonal nut and a plain washer. Sketch the arrangement showing two views. (8)
- (b) With the help of neat sketches identify the salient differences between pitch and lead of a multi start thread. (6)
- (c) Sketch a Iso Metric and a B S W thread profiles showing at least two pitches for each . Also indicate salient dimensions in terms of pitch. (6)
- 2(a) Define the following terms with neat sketch in connection with geometrical tolerance :
(i) SYMMETRICAL TOLERANCE
(II) POSITION TOLERANCE
(iii) CYLINDRICITY TOLERANCE
(iv) PROFILE TOLERANCE (8)
- (b) State with neat sketches *six* different salient rules of co-ordinate dimensioning. (6)
- (c) Sketch giving two views of the following items
(i) hook bolt (ii) Castle Nut (iii) Spring washer (6)
- 3(a) Explain (a) design assembly drawing (b) sub assembly drawing (5)
- (b) State the different features of an assembly drawing. (5)
- (c) Symbolically represent the following items :
(i) chain and sprocket drive (ii) non return valve (iii) Strainer (iv) bevel gear (v) gear mounted keyed on a shaft (5)
- (d) Sketch the following giving two views :
(a) Pan head rivet (b) gib head key (5)

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- 4(a) With the help of neat schematic diagram briefly explain the function of Cathode Ray Tube (CRT). (6)
- (b) Explain with neat sketch the working principle of raster scan monitor (4)
- (c) A rotating part is attached to a shaft by means of a woodruff key in position. Sketch the two views of the arrangement . (6)
- (d) State the *four* major advantages of computer graphics. (4)
- 5(a) Discuss with mathematical expressions Bresenham's one – eighth circle drawing technique. Hence write the algorithm. (8)
- (b) With the help of Bresenham's circle drawing algorithm find the different points (at least eight points) of a circle whose centre is at origin and radius is 10 unit. (6)
- (c) Sketch the following items
(i) saddle key (ii) Tee head bolt (iii) lock nut (6)
- 6(a) If a point (x,y) is scaled in both x and y direction having scale factor S_x and S_y respectively with respect to a point (X_R, Y_R) , prove that $x_1 = x.S_x + X_R - S_x.X_R$ and $y_1 = y.S_y + Y_R - S_y.Y_R$, where x_1 and y_1 are the final co-ordinates of point (x,Y) (7)
- (b) Find the final co-ordinate of the point A $(-7,9)$ which is reflected with respect to a line CD, equation of which is $3x-7y+6=0$. (8)
- (c) Sketch a tripple start helix having diameter 40 mm and lead 100mm. (5)
- 7(a) With the help of neat sketch distinguish between window and viewport Determine the expression of scale factors along x and y directions for the transformation that maps a window whose lower left corner is (XW_{min}, YW_{min}) and upper right corner is (XW_{max}, YW_{max}) on a viewport that has lower left corner is (XV_{min}, YV_{min}) and upper right corner is (XV_{max}, YV_{max}) . Hence find the total transformation. (7)
- (b) Briefly discuss the strategy of Cohen and Sutherland two-dimensional line clipping technique. (7)
- (c) Sketch (a) machine screw (b) capstan nut (c) profile of Acme thread (6)

8(a) Explain with neat sketch (a) World Co-ordinate System (b) Normalised Co-ordinate System (6)

(b) What is tilting?

A point A (5,9,7) is rotated counter clockwise 60° about the axis x. Find out the final position of the point A. (6)

(c) State properties of Be'zier curve.

There are four separate sections of a Bèzier curve. The four sections contain 5,3,6 and 4 control points respectively. Discuss briefly with the aid of neat sketches how these sections can be blended to form a single smooth Be'zier curve. (8)