

**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  $60^\circ$  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)