

Seat No.: _____

Enrolment No.: _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE SEM-I/II Winter Examination, Dec-2011

Subject code : 110013

Date : 21/12/2011

Subject Name : Engineering Graphics

Time : 10:30 am – 1:30 am

Total marks : 70

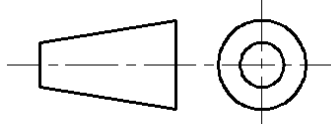
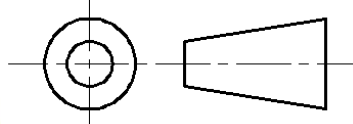
Instructions:

1. Attempt any five questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Lines, dimensions etc. should be as per BIS SP-46.
5. Retain all construction line.

Note:- Student's discretion is advised for the answer to the all theory questions. Theory answer other than this may also guarantee full marks.

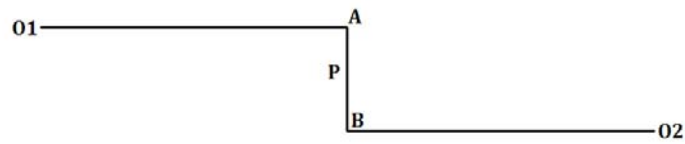
Q.1 (a) Explain the difference between Ist angle and IIIrd angle Orthographic projection. **[03]**

ANS:

No.	I st -angle projection method	III rd -angle projection method
1.	The object is kept in the 1 st quadrant.	The object is kept in the 3 rd quadrant.
2.	The object lies between the observer and the plane of projection.	The plane of projection lies between the observer and the object.
3.	The plane of projection is assumed to be non-transparent.	The plane of projection is assumed to be transparent.
4.	In this method, when the view are drawn in their relative positions, <ul style="list-style-type: none"> the plane comes below the elevation; the left hand side view is drawn to the right side of the elevation. 	In this method, when the view are drawn in their relative positions, <ul style="list-style-type: none"> the plane comes above the elevation; the left hand side view is drawn to the left side of the elevation.
5.	This method of projection is now recommended by the "Bureau of Indian Standards" from 1991.	This method of projection is used in U.S.A. and also in other countries.
6.	The symbols for I st angle projection method: <div style="text-align: center;">  </div>	The symbols for III st angle projection method: <div style="text-align: center;">  </div>

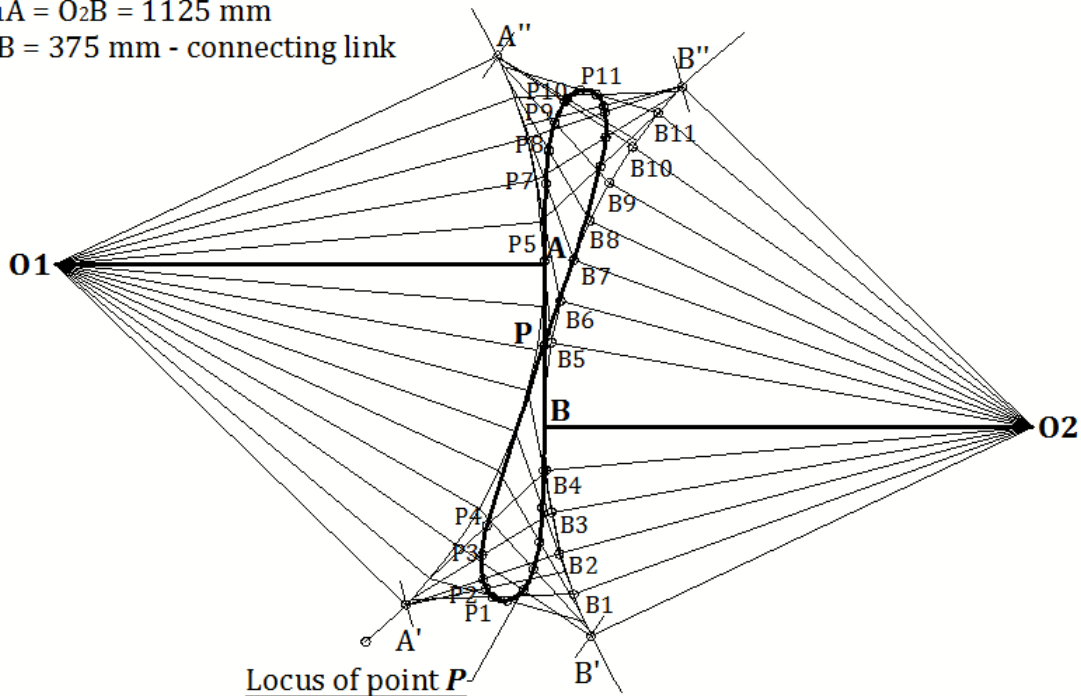
Q.1 (b) Fig. 1 shows the pictorial view of an object. Draw the following views using first angle projection method (a) Sectional Front view looking from direction X, take section along A-A, (b) Top view, (c) Side view from left. Show all dimensions. **[11]**

Q.2 (a) Fig. 2 shows the four bar chain mechanism O_1ABO_2 and the dimensions are as below:
 $O_1A = O_2B = 1125$ mm connecting link $AB = 375$ mm
 Draw the locus of mid-point M of AB , considering O_1A as driving link. **[07]**



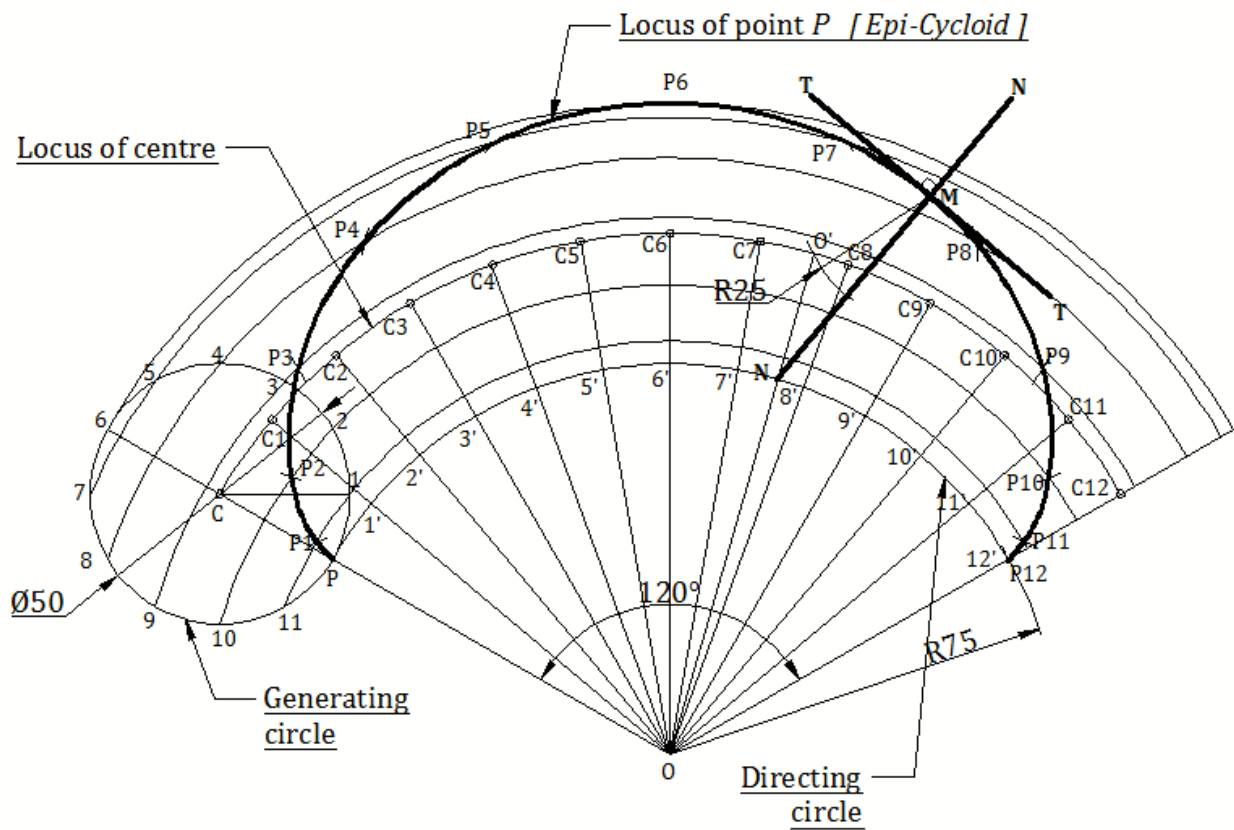
ANS:

$O_1A = O_2B = 1125$ mm
 $AB = 375$ mm - connecting link



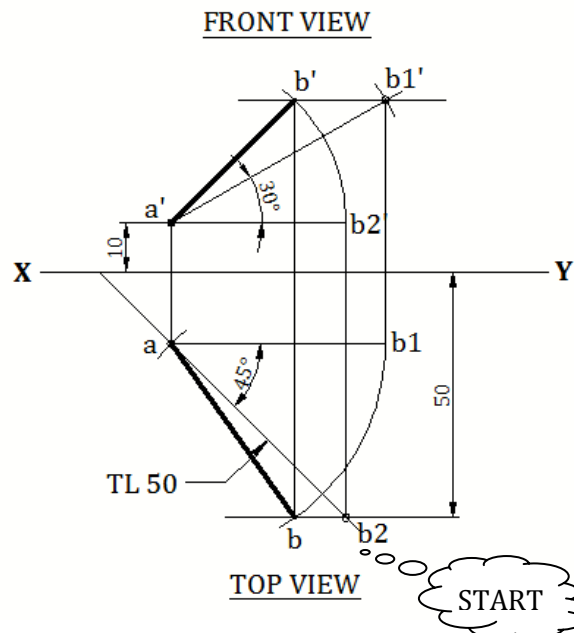
Q.2 (b) A circle of 50 mm diameter rolls along the circumference of another circle of 150 mm diameter from outside. Draw the path of a point P on the circumference of the rolling circle for one complete revolution and name the curve. **[07]**

ANS:



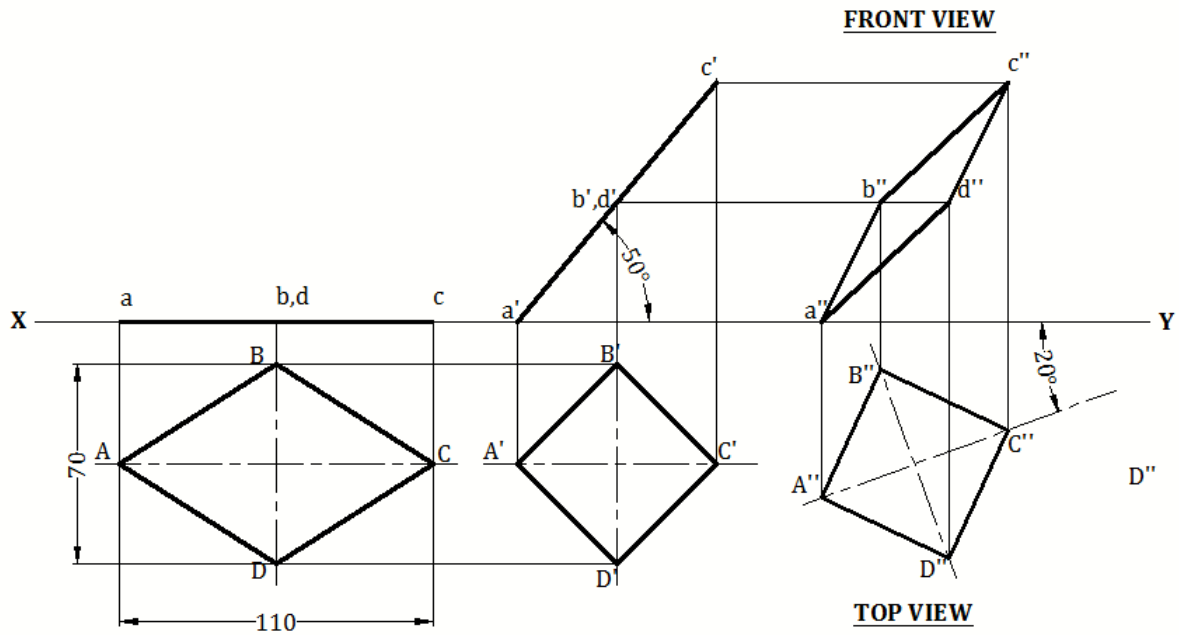
Q.3 (a) A straight line AB has its end A 10 mm above HP and end B 50 mm in front of the VP. Draw the projection of line AB, if it is inclined to HP by 30° and to VP by 45° and it is 50 mm long. [07]

ANS:



Q.3 (b) ABCD is a rhombus of diagonals $AC = 110$ mm and $BD = 70$ mm. Its corner A is in the HP and the plane is inclined to HP such that the plan appears to be a square. The plan of diagonal AC makes an angle of 20° to the VP. Draw the projections of the plane and find its inclination with HP. [07]

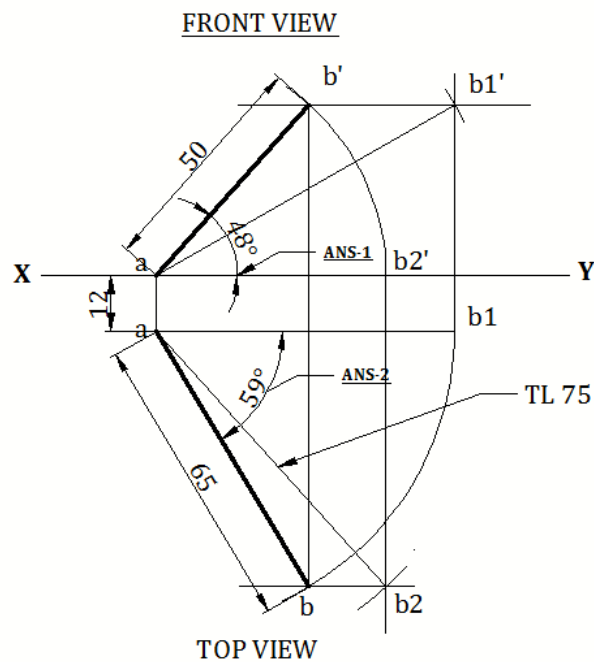
ANS:



Q.4 (a) The top view of 75 mm long line AB measures 65 mm, while the length of its front view is 50 mm. Its one end A is in the HP and 12 mm in front of the VP. Draw the projections of line AB and its inclinations with the HP and the VP.

[07]

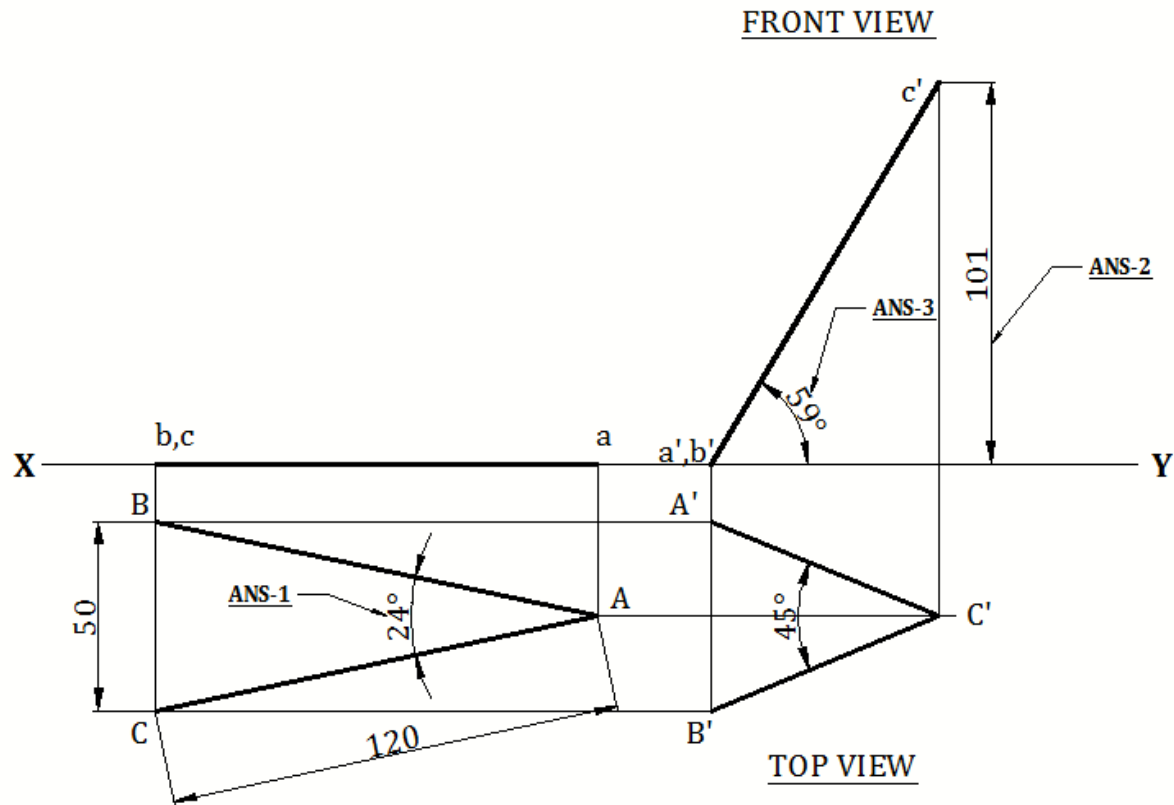
ANS:



Q.4 (b) The top plan of a pair of equal legs AB and AC of compass appears as an isosceles triangle having base 50 mm and vertex angle at 45°. Actual length of compass legs AB and AC are 120 mm. Assume points B and C on HP and line connecting B and C is perpendicular to VP. Draw the projections and find (i) the actual angle between two legs, (ii) the height of point above HP and (iii) angle of plane, containing compass, makes with HP.

[07]

ANS:



Q.5 (a) Engineering graphics is a language of all persons involved in engineering activities. Discuss the statement. [03]

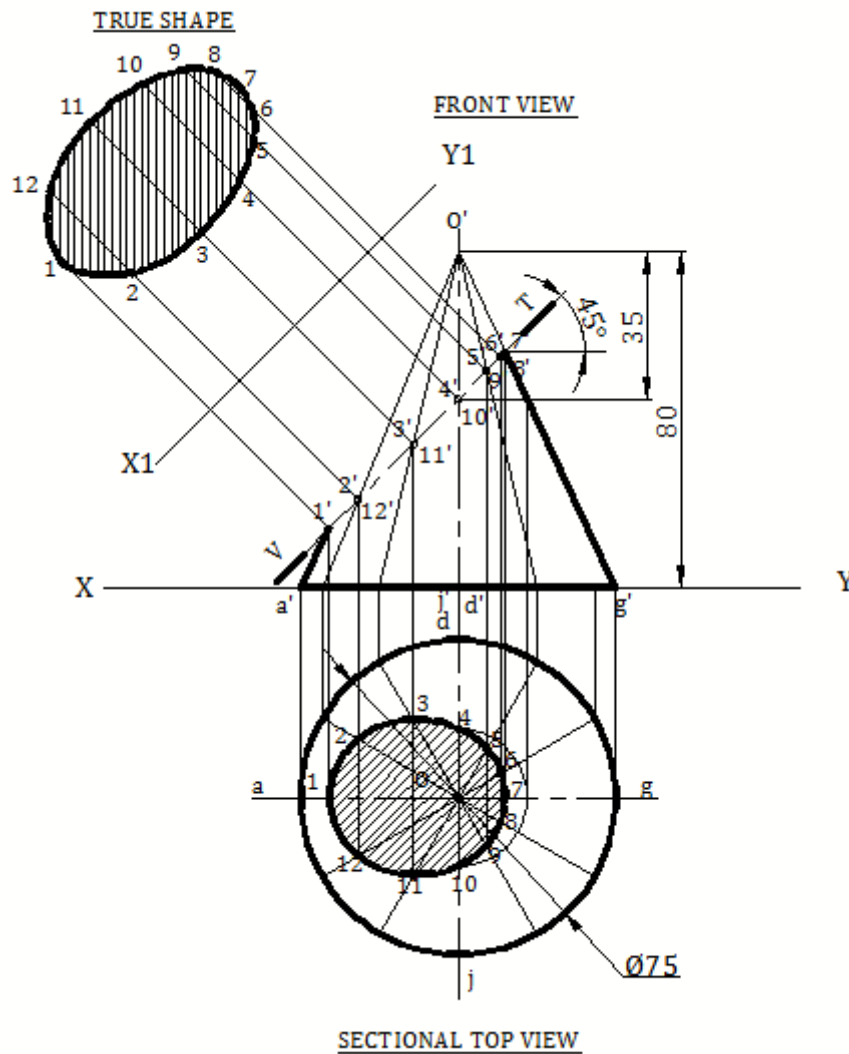
ANS:

A drawing prepared by an engineer, for an engineering purpose, is known as an Engineering Drawing or Engineering Graphics. Engineering drawing is the graphic language, from which any trained person can visualize the object. It conveys the same picture to every trained person. Drawing prepared in one country may be utilized in any other country, irrespective of the language spoken there.

While teaching majority of subjects; figures or sketches of related objects, machines or systems are made use of, to explain the principles of operation, relation between the parts, etc. Unless the figures are presented, following the norms of draughting practice; the required information cannot be fully conveyed. Hence, engineering graphics is a language of all persons involved in engineering activities.

Q.5 (b) A cone, base 75 mm diameter and axis 80 mm long is resting on its base on the HP. It is cut by a section plane perpendicular to the VP, inclined at 45° to the HP and cutting the axis at a 35 mm from the apex. Draw front view, sectional top view and true shape of the section. [11]

ANS:



Q.6 (a) Write short note on BIS SP-46 engineering drawing standard. **[03]**

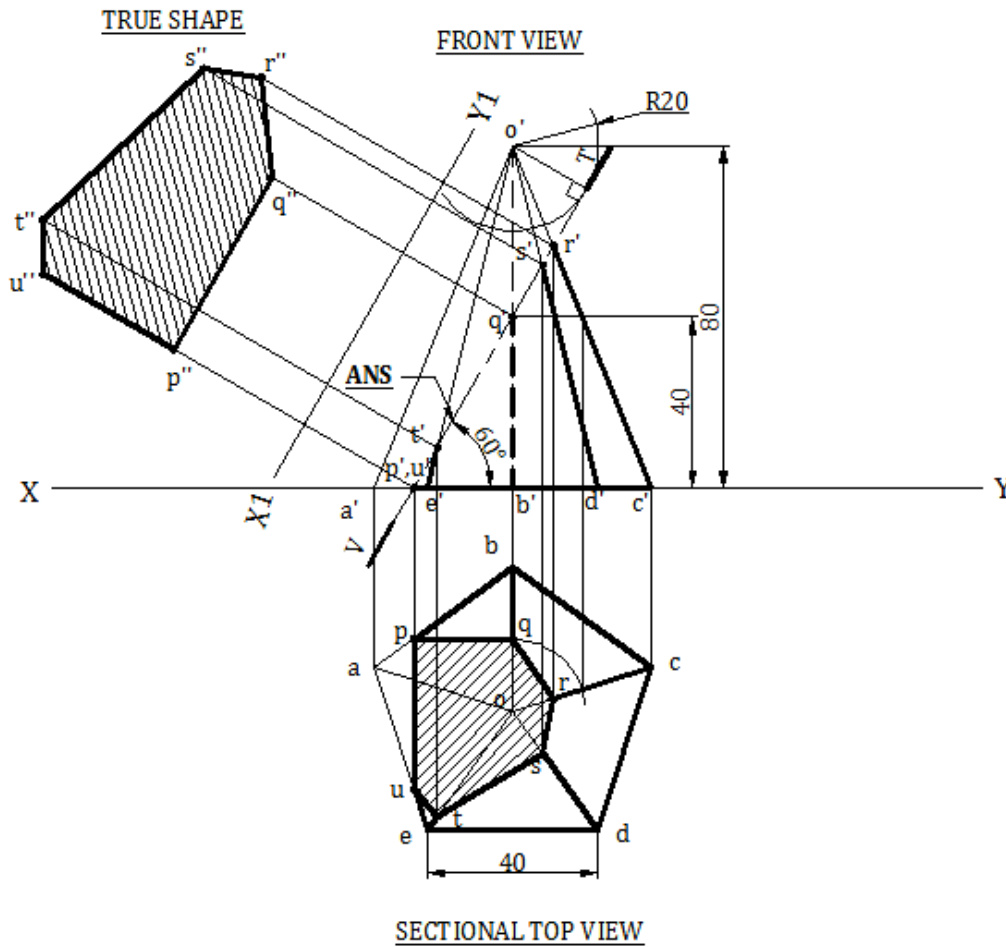
ANS:

Engineering drawing is used to communicate information to industries. To have uniformity in drawings they are required to follow some drawing standard approved by *International Standard Organization (ISO)*.

In India, *Bureau of Indian Standards (BIS)* has been assigned the job of standardizing the items for interchange-ability of parts. Standards are available for any machine component as well as for the drawings. Each standard has been assigned a definite number. The original standard for drawing was *IS-696* and was formulated in 1960. It was revised in 1972. The latest revision was in 1988 which is numbered as *SP-46*.

Q.6 (b) A pentagonal pyramid, side of base 40 mm and height 80 mm, is resting on its base with one of the edges of the base away from VP is parallel to VP. It is cut by an AIP bisecting the axis, the distance of the section plane from the apex being 20 mm. Draw the elevation and sectional plan of pyramid and draw the true shape of the section. Also find the inclination of the section plane with the HP. **[11]**

ANS:



Q.7 (a) Define development of surfaces and state its applications in engineering field. **[03]**

ANS:

Imagine that a solid is enclosed in a wrapper of thin material, such as paper. If this covering is opened out and laid on a flat plane, the flattened-out paper is the development of the solid. Thus, *when surfaces of a solid are laid out on a plane, the figure obtained is called its development.*

Application:

The knowledge of development of surfaces is essential in many industries such as automobile, aircraft, ship building, packaging and sheet-metal works.

In construction of boilers, bins, process-vessels, hoppers, funnels, chimneys etc; the plates are marked and cut according to the developments which, when folded, form the desired objects. The form of the sheet obtained by lying all the outer surfaces of the solid with suitable allowances for the joints is known as pattern.

Q.7 (b) A hollow square pyramid, side of base 45 mm and height 65 mm, is resting on HP on its base with all sides of base equally inclined to VP. A square hole of size 20 mm is drilled through the pyramid. Sides of the square hole are equally inclined to HP. Axis of the square hole and pyramid intersect at right angle 20 mm above the base of the pyramid. Axis of the hole is perpendicular to VP. Draw the plan, elevation and development of the lateral surfaces of the pyramid. [11]

ANS:

