

Bachelor of Mechanical Engineering 1st Year, 2nd Semester Examination, 2018

Descriptive Geometry & Surface Development

Time: 4 hours

Full Marks: 100

Group A

1. (a) Find the true length and the angles α , β and γ of a line AB following revolution method.

Given: A(20, -10, 20); B(60, -40, 50)

- (b) Find the shortest distance from the point X onto the line AB. Also find the coordinates of the point on the line up to which shortest distance is measured.

Given: X(40, -40, 30); A(20, -20, 10); B(70, -30, 30). [15+15]

Group B

Answer any one

2. Line XY and the plane ABC are described in terms of the co-ordinates given below. Find the point of intersection between the line XY and the plane ABC. Also determine the angle between the line and the plane.

Given: X(30, 25, -45); Y(60, 40, -10);
A(0, 10, -25); B(30, 45, -10); C(50, 20, -40). [20]

3. Find the line of Intersection and dihedral angle between the planes ABC & XYZ.

Given: A(15, -20, 20); B(40, -40, 45); C(55, -10, 10)
X(70, -30, 30); Y(110, -15, 40); Z(95, -50, 15). [20]

Group C

Answer any one

4. Find the Horizontal, Vertical and Profile Traces (HQ, VQ and PQ respectively) of the plane ABC.

Given: A(25, -15, 10); B(50, -25, 40); C(60, -40, 20). [20]

5. (a) The Fig. Q5 (a) shows traces of two planes Q_1 & R_1 . Find the angle between the planes.

- (b) The Fig. Q5 (b) shows traces of two planes Q_2 & R_2 . Find the line of intersection between them.

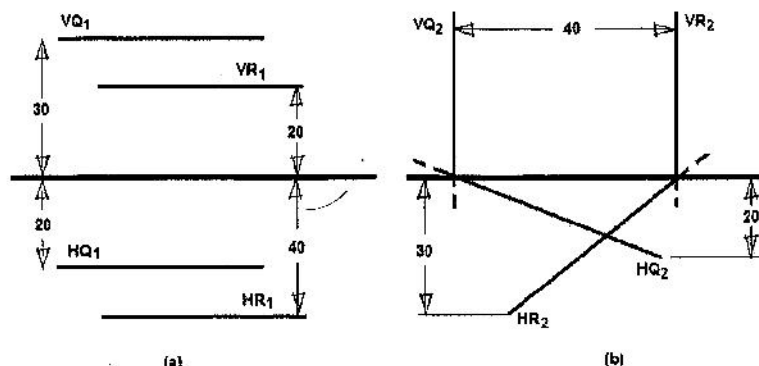


Fig. Q5.

[10+10]

[Turn over

Group D

Answer any one

6. Consider an un-truncated right circular cone with base diameter 70 mm and height 110 mm. The upper part of the cone, is removed by a cutting plane inclined at an angle of 30° (where angle is measured in reference to the base of the cone) centrally at a height of 80 mm from the base of the cone. Develop the total surface of the truncated cone. [30]

7. Consider two cylinders of diameters 80 mm and 50 mm respectively. The higher diameter cylinder with height of 100 mm is placed with its base on the ground in the upright position. It is intersected by the lower diameter cylinder at right angle from a single side at the mid-height. Show the intersection of the two. [30]