B.Sc. DEGREE EXAMINATION, APRIL 2018.

II YEAR IV SEMESTER

Core Major - Paper VIII - STATICS

Time : 3 Hours Max. Marks : 75

SECTION A – (10 × 2 = 20 marks)

Answer any *TEN* questions

1. What is momentum?
2. If the resultant of two forces acting at a point with magnitudes 3P and 5P is a force with magnitude 7P, find the angle between two forces.
3. List the forces that act on a particle which is in limiting equilibrium with a tendency to slide up the plane are.
4. State the Triangle law of forces.
5. Define moment of force.
6. Define parallel forces. What are the types of parallel forces?
7. Define couple.
8. Can a couple and a force keep rigid body in equilibrium?
9. Define centre of mass.
10. Write the mass centre of lamina in the form of a sector of a circle of radius “a”
11. Define centre of gravity.
12. When the forces are said to be concurrent?

SECTION B – (5 × 5 = 25 marks)

Answer any *FIVE* questions

1. State five laws of friction.
2. Show that "If three forces keep a particle in equilibrium, then the forces are coplanar"
3. Show that the greatest inclination of a rough inclined plane to the horizon so that the particle will remain on it is at rest is equal to the angle of friction
4. Prove that a system of coplanar forces reduce either to a single force or single couple
5. Derive the mass centre of the hollow right circular cone of height h
6. The forces of magnitude F1.F2,F3 act on a particle, If they are parallel to BC,CA,AB where ABC is a triangle Show that the magnitude of their resultant is $\sqrt{F\_{1}^{2}+F\_{2}^{2}+F\_{3}^{2}-2F\_{2}F\_{3}\cos(A)-2F\_{3}F\_{1}\cos(B)-2F\_{1}F\_{2}\cos(C)}$
7. Derive the mass centre of cardiodal lamina.

[P.T.O.]

SECTION C – (3 × 10 = 30 marks)

Answer any *THREE* questions

1. State and prove the Lami’s theorem
2. State and prove Varignon's theorem.
3. Derive the mass centre of the solid right circular cone of height h.
4. Discuss if three coplanar forces keep a rigid body in equilibrium .
5. Show that the mass centre of a quadrilateral lamina is the same as the mass centre of a system of four particles of equal masses placed at the angular points and an equal negative mass placed at the point of intersection of the diagonals.