SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN
(AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai — 600 044.
B.Sc.(Maths) END SEMESTER EXAMINATIONS APRIL-2023
SEMESTER - IV
20UMACT4008 - Statics

Total Duration : 2 Hrs 30 Mins. Total Marks : 60

Section B

Answer any **SIX** questions $(6 \times 5 = 30$ Marks)

1. Report the laws of friction.
2. One end of a rope of a 20m is to be fixed to a telegraph post and the other end is to be pulled by a man on the ground with a constant force F. To cause the maximum effect to overturn the post at what height the rope is to be fixed?
3. Three forces acting along the sides of a triangle in the same order are equivalent to a couple, show that they are proportional to the sides of the triangle.
4. A rod of length 5a is bent so as to form five sides of a regular hexagon. Show that its centre of mass is at a distance $(1.33)^{1/2}$ from either end of rod.
5. A string of length 4m is attached to two points A and B 2m. apart, in the same horizontal level. A smooth ring of mass 80gm threaded to it is acted on by a horizontal force P which holds it in equilibrium at a point vertically below B. Find the tension in the string and the magnitude of P.
6. If two like parallel forces of magnitude P,Q,(P>Q) acting on a rigid body at A ,B are interchanged in position , show that the line of action of the resultant is displaced through a distance $\frac{AB(P-Q)}{P+Q}$.
7. P and Q are magnitudes of two like parallel forces. A couple of moment of magnitude G is combined with them. Show that the resultant of the parallel forces is displayed through a distance $\frac{G}{P+Q}$.
8. Determine the center of mass of three uniform rods forming a triangle.

Section C

Answer any **THREE** questions $(3 \times 10 = 30$ Marks)

9. Forces of magnitude 2,$\sqrt{3}$,5,$\sqrt{3}$,2 respectively act at one of the angular points of a regular hexagon towards the other five points in order. Show that their resultant is of magnitude 10 and makes an angle of 60 with the first force.

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10. State and prove Lami's theorem.
11. State and prove Varigon's theorem.
12. P,Q,R are points on the side BC,CA,AB of a triangle ABC dividing them internally in the same ratio $1 + \lambda$: 1 - λ. Show that the forces AP,BQ,CR acting at A,B,C are equivalent to a couple of moment $2\lambda\Delta$. where $\Delta$is the area of the triangle ABC.
13. Determine the center of mass of solid right circular cone of height h.

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