B.Sc. DEGREE EXAMINATION,NOVEMBER 2019
II Year IV Semester
Statics

Time : 3 Hours   **Max.marks :75**

Section A $(10 \times 2 = 20)$ Marks

Answer any **TEN** questions

1. If the resultant of two forces acting at a point with magnitudes 7 and 8 is a force with a magnitude 13 ,find the angle between the forces.

2. Define angle of friction.

3. State triangle law of forces.

4. Show that the greatest inclination of a rough inclined plane to the horizontal so that a particle will remain on it at rest,is equal to the angle of friction.

5. Define moment of a force.

6. Define like and unlike parallel forces.

7. Define Couple.

8. If P, Q, R are forces act along the sides BC,CA,AB of a triangle ABC taken in order. Show that, if their resultant passes through incentre ,then$P+Q+R=0$.

9. Define centre of mass.

10. Where will be the centre of gravity of solid right circular cone?

11. State Newton's laws of motion.

12. Define rigid body.

Section B $(5 \times 5 = 25)$ Marks

Answer any **FIVE** questions

13. Find the magnitude and direction of the resultant of two forces $\overrightarrow{F}_1$ and $\overrightarrow{F}_2$.

14. State the laws of friction.

15. Two like parallel forces of magnitudes P, Q act on a rigid body.If the second force is moved away from the first parallell through a distance $'d'$,show that the resultant of the forces moves through a distance $\dfrac{Qd}{P+Q}$.

16. Show that a system of coplanar forces reduce either to a single force or to a couple.

17. Find the centre of gravity when three uniform rods forming a triangle

18. Forces of magnitudes F_1, F_2, F_3 act on a particle.If their directions are parallel to $\overline{BC}$, $\overline{CA}$, $\overline{AB}$,where ABC is a triangle ,show that the magnitude of their resultant is $\sqrt{F_1^2 + F_2^2 + F_3^2 - 2F_2F_3\cos A - 2F_3F_1\cos B - 2F_1F_2\cos c}$

19. Find the resultant of two like parallel forces acting on a rigid body.

Section C $(3 \times 10 = 30)$ Marks

Answer any **THREE** questions

20. The magnitude of the resultant of two given forces P, Q is R.If $Q$is doubled, then R is doubled .If Q is reversed,then also R is doubled.Show that $P : Q : R = \sqrt{2} : \sqrt{3} : \sqrt{2}$.

21. State and prove Lami's theorem.

22. State and prove Varignon's theorem.

23. $ABCDEF$is a regular hexagon.Forces $P, 2P, 3P, 2P, 5P, 6P$ act along AB, BC, DC, ED, EF, AF.Show that the six forces are equivalent to a couple and find the moment of the couple.

24. Find the centre of gravity of solid hemisphere of radius a.

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19. Find the resultant of two like parallel forces acting on a rigid body.

Section C $(3 \times 10 = 30)$ Marks

Answer any THREE questions

20. The magnitude of the resultant of two given forces P, Q is R.If $Q$is doubled, then R is doubled .If Q is reversed,then also R is doubled.Show that $P : Q : R = \sqrt{2} : \sqrt{3} : \sqrt{2}$.

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23. $ABCDEF$is a regular hexagon.Forces $P, 2P, 3P, 2P, 5P, 6P$ act along AB, BC, DC, ED, EF, AF.Show that the six forces are equivalent to a couple and find the moment of the couple.

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