

Avinashilingam Institute for Home Science and Higher Education for Women
Coimbatore-641 043
Bachelor's Degree Examination – November-2017
II-Semester

Class: II UG
Major : Mathematics

Time :3 hours
Max.Marks: 100

15BMAC08- Mechanics

Part-A

10x1=10

Choose the correct answer

1. If three forces keep a particle in equilibrium then the forces are -----
a) coplanar b) non coplanar c) zero d) positive
2. If the particle is in equilibrium then the sums of components of the forces in two mutually perpendicular directions are -----
a) Zero b) positive c) negative d) none
3. The work done by the forces in a virtual displacement is called ----- by the forces
a) virtual work done b) total work done c) zero work done d) none
4. The virtual work done by the applied forces in virtual displacement is -----
a) Zero b) virtual work c) work d) applied force
5. The shape of a uniform string hanging under gravity is -----
a) ellipse b) parabola c) catenary d) none
6. When c is large in hanging string, the string is nearly a -----
a) ellipse b) parabola c) catenary d) none
7. All the trajectories touch the enveloping -----
a) Parabola b) point of projection c) velocity d) none
8. The path pursued by a projectile is called ----- of the projectile
a) trajectory b) bijjectory c) velocity d) displacement
9. Equiangular spiral is a -----
a) line b) curve c) parabola d) point
10. In a central orbit, linear velocity(v) is
a) hp b) h/p^2 c) h^2/p^3 d) none

PartB

5X6=30

Answer the following

Answer should not exceed 400 words or two pages

11. State and Prove converse of polygon of forces
(or)
11. If I is the incentre of a triangle ABC. If the forces of magnitudes P, Q, R acting along the bisectors IA, IB, IC are in equilibrium, Show that $\frac{P}{\cos \frac{A}{2}} = \frac{Q}{\cos \frac{B}{2}} = \frac{R}{\cos \frac{C}{2}}$
- 12.a. A uniform beam of length 2a, rests in equilibrium against a smooth vertical wall and up on a smooth peg O at a distance d from the wall. Show that in the position of equilibrium, the beam is inclined to the wall at an angle θ given by $\sin^3 \theta = d/a$.
(or)
- 12.b. Two uniform rods AB and AC, each of length 2a, are freely jointed at A and rest in a symmetrical position on a smooth sphere of radius r. Show that if 2θ is the angle between them $\sin^3 \theta = r \cos \theta$
- 13.a. Show that the shape of the uniform string under centre of gravity is catenary.
(or)
- 13.b) If the tangents at the points A and B of a hanging string are at right angles, Show that the tension at the middle point M of the arc AB is equal to the half of the weight of the string AB.
- 14.a) The speed of a projectile at any point on its path equals the speed of a particle acquired by it falling from the directrix to the point.
(or)
- b) A particle is projected with a velocity of 9.6 m at an angle of 30° . Find the greatest height of the particle.

