Parshvanath Charitable Trust's

A. P. SHAH INSTITUTE OF TECHNOLOGY

(Approved by AICTE New Delhi & Govt. of Maharashtra, Affiliated to University of Mumbai)
(Religious Jain Minority)

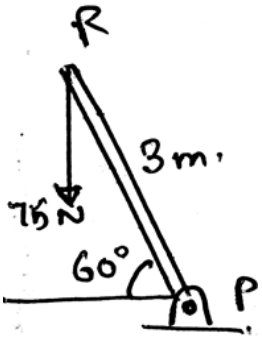
UNIVERSITY TEST

Term Test QP Code **Second Half**

1. What is the direction of the resultant vector if two vectors having equal length is placed in the Cartesian plane at the origin as, one being parallel to and heading towards positive x-axis and the other making 165 degree with it and heading in the opposite direction of that of the first one?
   a) It is either in the 1st quadrant or in the 2nd quadrant
   b) It is either in the 1st quadrant or in the 3rd quadrant
   c) It is either in the 1st quadrant or in the 4th quadrant
   d) Only in the 1st quadrant

2. 4. The tendency of rotation of the body along any axis is also called _____
   a) Moment of inertia
   b) Moment of couple
   c) Torque
   d) Force

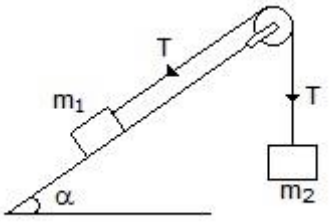
3. Determine the moment of the force along point P.



   a) 110 Nm
   b) 112.5 Nm
   c) 60 Nm
   d) 87.5 Nm

4. The maximum height of a projectile on a horizontal plane, is
   a) $u^2 \sin^2\alpha/2g$
   b) $u^2 \cos^2\alpha/2g$
   c) $u^2 \sin^2\alpha/g$
   d) $u^2 \cos^2\alpha/g$

5. A block of mass m_1, placed on an inclined smooth plane is connected by a light string passing over a smooth pulley to mass m_2, which moves vertically downwards as shown in the below figure. The tension in the string is
   a) m_1/m_2
   b) $m_1 . g . \sin\alpha$
   c) $m_1.m_2/m_1 + m_2$
   d) $m_1 . m_2.g\ (1 + \sin\alpha)/(m_1 + m_2)$



6. Which of the following statement is correct?

a) The algebraic sum of the forces, constituting the couple is zero
b) The algebraic sum of the forces, constituting the couple, about any point is the same
c) A couple cannot be balanced by a single force but can be balanced only by a couple of opposite sense
d) All of the above

7. The time of flight (t) of a projectile on an upward inclined plane is(where u = Velocity of projection, α = Angle of projection, and β = Inclination of the plane with the horizontal.)
a) $t = g \cos \beta/2u \sin (\alpha - \beta)$
b) $t = 2u \sin (\alpha - \beta)/g \cos \beta$
c) $t = g \cos \beta/2u \sin (\alpha + \beta)$
d) $t = 2u \sin (\alpha + \beta)/g \cos \beta$

8. Coefficient of friction is the
a) Angle between normal reaction and the resultant of normal reaction and the limiting friction
b) Ratio of limiting friction and normal reaction
c) The friction force acting when the body is just about to move
d) The friction force acting when the body is in motion

9. Moment of inertia of a triangular section of base (b) and height (h) about an axis through its apex, is
a) $bh^3/4$
b) $bh^3/8$
c) $bh^3/12$
d) $bh^3/36$

10. A ladder is resting on a smooth ground and leaning against a rough vertical wall. The force of friction will act
a) Towards the wall at its upper end
b) Away from the wall at its upper end
c) Downward at its upper end
d) Upward at its upper end

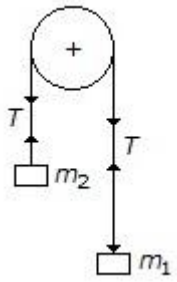
11. The three forces of 100 N, 200 N and 300 N have their lines of action parallel to each other but act in the opposite directions. These forces are known as
a) Coplanar concurrent forces
b) Coplanar non-concurrent forces
c) Like parallel forces
d) Unlike parallel forces

12. Two forces are acting at an angle of 120°. The bigger force is 40 N and the resultant is perpendicular to the smaller one. The smaller force is
a) 20N
b) 40N
c) 10N
d) 80N

13. A body moves, from rest with a constant acceleration of 5 m per sec. The distance covered in 5 sec is most nearly
a) 38 m
b) 62.5 m
c) 96 m
d) 124 m

14. D' Alembert's principle is used for
a) Reducing the problem of kinetics to equivalent statics problem
b) Determining stresses in the truss
c) Stability of floating bodies
d) Designing safe structures

15. Two bodies of masses m_1 and m_2 are hung from the ends of a rope, passing over a frictionless pulley as shown in the figure below. The acceleration of the string will be
a) $g (m_1 - m_2)/(m_1 + m_2)$
b) $2g (m_1 - m_2)/(m_1 + m_2)$
c) $g (m_1 + m_2)/(m_1 - m_2)$
d) $2g (m_1 + m_2)/(m_1 - m_2)$



16. Moment of inertia of a triangular section of base (*b*) and height (*h*) about an axis passing through its vertex and parallel to the base, is _____ than that passing through its C.G. and parallel to the base.
a) Nine times
b) Six times
c) Four times
d) Two times

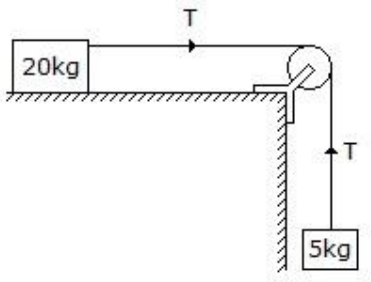
17. A particle moves along a straight line such that distance (x) traversed in *'t'* seconds is given by $x = t^2 (t - 4)$, the acceleration of the particle will be given by the equation
a) $6t^2 - 8t$
b) $3t^2 + 2t$
c) 6f - 8
d) 6f - 4

18. The maximum frictional force which comes into play when a body just begins to slide over another surface is called
   a) Limiting friction
   b) Sliding friction
   c) Rolling friction
   d) Kinematic friction

19. The resultant of two forces *P* and *Q* acting at an angle θ is
   a) $\sqrt{(P^2 + Q^2 + 2PQ \sin\theta)}$
   b) $\sqrt{(P^2 + Q^2 + 2PQ \cos\theta)}$
   c) $\sqrt{(P^2 + Q^2 - 2PQ \cos\theta)}$
   d) $\sqrt{(P^2 + Q^2 - 2PQ \tan\theta)}$

20. The ratio of limiting friction and normal reaction is known as
   a) Coefficient of friction
   b) Angle of friction
   c) Angle of repose
   d) Sliding friction

21. A block of mass 20 kg lying on a rough horizontal plane is connected by a light string passing over a smooth pulley to another mass 5 kg, which can move freely in the Vertical direction, as shown in the below figure. The tension in the string will _____ with the increase in coefficient of friction.

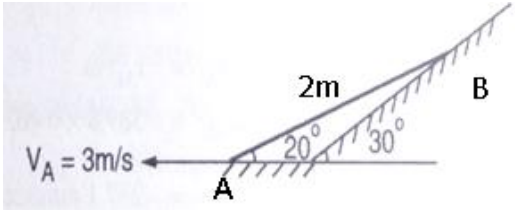


   a) Increase
   b) Decrease
   c) Not be effected
   d) None of these

22. The coefficient of restitution for inelastic bodies is
   a) Zero
   b) One
   c) Between zero to one
   d) More than one

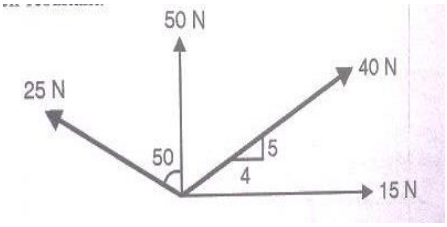
23. A bar AB 2m long slides down a plane as shown. The end A slides on a horizontal floor with a velocity of 3m/sec. Determine the angular velocity of the rod AB .

   a) 0.58 rad/sec
   b) 0.76 rad/sec
   c) 0.85 rad/sec
   d) 0.48 rad/sec



24. Four concurrent forces act at a point as shown in figure. Find their resultant

a) 85.02N
b) 90.15N
c) 94.28N
d) 102.12N



25. Two spheres rest in a smooth trough as shown. Find reaction at point of contact at A.

a) 120.20N
b) 141.56N
c) 159.42N
d) 185.68N