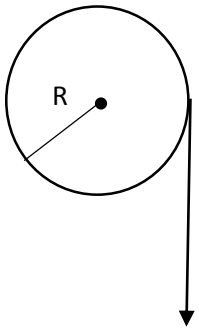
SYSTEMS OF PARTICLES AND ROTATIONAL MOTION

***General Instructions*:** Answer all the questions. If you are unable to answer any question, go through the page number that is given against that particular question in the text book. You can find the answer**.**

Test Paper-III

MAX MARKS: 30 **TIME: 90Mts**

1	State and prove Parallel axis theorem	P166	3
2	State and prove perpendicular axis theorem.	P166	3
3	What is the moment of inertia of a disc about one of its diameters?	P166	3
4	What is the moment of inertia of a rod of mass M, length l about an axis perpendicular to it through one end?	P167	2
5	What is the moment of inertia of a ring about a tangent to the circle of the ring?	P167	2
6	The angular speed of a motor wheel is increased from 1200 rpm to 3120 rpm in 16 seconds. (i) What is its angular acceleration, assuming the acceleration to be uniform? (ii) How many revolutions does the engine make during this time?	P168	3
7	a. Give the equations of motion of a body moving with an initial angular velocity ω_0 attaining an angular velocity ω after a time interval of t secs and moving a constant angular acceleration α in rotational motion . b. Obtain $\omega = \omega 0 + \alpha t$ from the first principles.	P168	3
8	Explain why in the case of rotational motion about a fixed axis only those components of torques which are along the direction of the fixed axis need to be considered	P169	2
9	A cord of negligible mass is wound round the rim of a fly wheel of mass 20 kg and radius 20 cm. A steady pull of 25 N is applied on the cord as shown in fig. The fly wheel is mounted on a horizontal axle with frictionless bearings. a. Compute the angular acceleration of the wheel. b. Find also the kinetic energy of the wheel, when 2m of the cord is unwound assuming that the wheel stars from rest.	P171	3



M=20kg
R=20cm

$F = 25N$

10	State and prove Conservation of angular momentum.	P173	2
11	Give any two applications of conservation of angular momentum	P173	2
12	Match the following Group-A 1. The centre of gravity of an extended body is 2. A rigid body is in translational equilibrium if 3. A rigid body is in rotational equilibrium if 4. In pure translational motion at any instant of time Group-B a. All particles of the body have the same velocity. b. That point where the total total gravitational torque on the body is zero. c. The total external Torque is zero d. The total external Force on it is zero.	P176 &142	2