

PHYSOL-3 EXAMINATION SERIES

CHAPTERS-1,2 &3

SUNDAY 01-05-2022 @ 5.00pm

P3ES - 01

TIME: 1 HOUR

MAXIMUM SCORE:30

General Instructions to Students

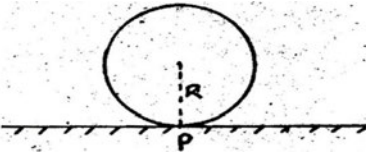
- There is a 'cool-off time' of 15 minutes in addition to maximum writing time
- Use cool-off time to get familiarise with questions and their answers
- **Read questions and instructions carefully before answering**
- Calculations, figures, graphs should be shown in the answer sheet itself
- **You can write questions as per instruction in each section to get a maximum score of 30**
- Electronic devices except **non-programmable calculators** are not allowed in the examination

Answer any 3 questions from 1 to 4. Each carries 1 score

1	The weakest force in nature (i)Strong nuclear force (ii) weak nuclear force (iii)Gravitation force (iv) electromagnetic force	1
2	Find the odd one (mass, luminous intensity, charge, temperature)	1
3	The ratio of speed to velocity of a moving body is always ----- a) =1 b) >1 c) <1 d) ≥1	1
4	The area under the velocity-time graph gives ----- (Displacement ,Velocity ,Acceleration ,None of the these)	1

Answer any 5 questions from 5 to 10. Each carries 2 score

5	Give four pairs of physical quantities having the same dimensions.	2
6	Using the principle of homogeneity of equations, check whether the equation is correct. $T = 2\pi\sqrt{\frac{g}{l}}$ <i>T-time period, g-acceleration due to gravity, l-is the length of the pendulum</i>	2
7	If radius of earth is reduced by 4% of its original value with out change in mass. Find the percentage change in acceleration due to gravity?	2
8	Draw the position time graph for a) State of rest b) State of motion	1 1

9	In the figure the point 'P' on a wheel of radius 'R' is in contact with the ground. What is the distance and displacement of the point 'P' when the wheel rolls a half revolution? 	
10	Show that the slope of position-time graph gives velocity.	2

Answer any 3 questions from 11 to 14, Each carries 3 score

11	Match the following										
	<table border="1"> <tr> <td>Coefficient of viscosity</td> <td>Force/area x number</td> <td>$[ML^{-1}T^{-2}]$</td> </tr> <tr> <td>Gravitational constant</td> <td>Force/area x velocity gradient</td> <td>$[ML^{-1}T^{-1}]$</td> </tr> <tr> <td>Modulus of elasticity</td> <td>Force x (distance)²/(mass)²</td> <td>$[M^{-1}L^3T^{-2}]$</td> </tr> </table>	Coefficient of viscosity	Force/area x number	$[ML^{-1}T^{-2}]$	Gravitational constant	Force/area x velocity gradient	$[ML^{-1}T^{-1}]$	Modulus of elasticity	Force x (distance) ² /(mass) ²	$[M^{-1}L^3T^{-2}]$	3
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12	The centripetal force on a body depends on mass of the body, velocity and radius of circular path. Find the expression for centripetal force acting on the body by using principle of dimensional analysis. (Take constant $k = 1$)	3									
13	A car travels from A to B at 60 km/hr and returns to A at 90 km/hr. What is its average velocity and average speed?	3									
14	When brakes are applied on a moving vehicle, it stops after travelling a distance. This distance is called stopping distance. a) Derive an expression for stopping distance in terms of initial velocity (u) and retardation (a). b) If the initial speed is doubled keeping the retardation same, by how much will the stopping distance change?	2 1									

Answer any 2 questions from 15 to 17. Each carries 4 score

15	a) Explain Principle of Homogeneity b) "Velocity can not be added to temperature" (i) This is in accordance with which law of physics? (ii) Check the dimensional correctness of the equation $PV = Fx$ where P is the pressure, V is the volume, F is the force and x is the displacement.	1 1 2
16	An object moving along a straight line covers equal distances in equal intervals of time, it is said to be in uniform motion along a straight line. a) The position - time graph of an object in uniform motion is..... i) a straight line parallel to the time axis. ii) a straight line parallel to the position axis. iii) a straight line inclined to the time axis. iv) a parabola.	1

	<p>b) Derive the relation $s = ut + \frac{1}{2}at^2$ for uniformly accelerated motion with the help of velocity-time graph.</p> <p>c) Which of the following statements is/are TRUE?</p> <p>i) An object with constant velocity has always constant speed.</p> <p>ii) An object with constant speed has always constant velocity.</p> <p>iii) An object with zero velocity has always zero acceleration.</p> <p>iv) An object with zero acceleration has always zero velocity</p>	<p>2</p> <p>1</p>
17	<p>Derive the following equations of motion for a body moving with uniform acceleration in a straight line.</p> <p>a) $v = u + at$</p> <p>b) $v^2 = u^2 + 2as$</p>	<p>2</p> <p>2</p>