LGS GROUP OF COLLEGES
A PROJECT OF LAHORE GRAMMAR SCHOOL

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Subject: Physics Test No. _____ Date: 20-11-24

	A	B	C	D		A	B	C	D		A	B	C	D		A	B	C	D
1	○	○	○	○	6	○	○	○	○	11	○	○	○	○	16	○	○	○	○
2	○	○	○	○	7	○	○	○	○	12	○	○	○	○	17	○	○	○	○
3	○	○	○	○	8	○	○	○	○	13	○	○	○	○	18	○	○	○	○
4	○	○	○	○	9	○	○	○	○	14	○	○	○	○	19	○	○	○	○
5	○	○	○	○	10	○	○	○	○	15	○	○	○	○	20	○	○	○	○

Marks Obtained

QNO1:

Ans: $P.E = K.E$

$$mgh = \frac{1}{2}mv^2 + \frac{1}{2}I\omega^2$$

$$mgh = \frac{1}{2}m(\omega R)^2 + \frac{1}{2}\cdot\frac{2}{5}MR^2\omega^2$$

$$mgh = \frac{1}{2}R^2 + \frac{1}{5}R^2$$

$$mgh = \frac{7}{10}R^2$$

Dividing both sides by $\frac{7}{10}R^2$

$$v^2 = \frac{10}{7}gh$$

Taking square roots on both sides

$$\sqrt{v^2} = \sqrt{\frac{10}{7}gh}$$

$$v = \sqrt{\frac{10}{7}gh}$$

QNO2: Prove 7.9 km/s

$$g = \frac{v^2}{R}$$

$$\sqrt{v^2} = \sqrt{gR}$$

$$v = \sqrt{gR}$$

$R = 6.4 \times 10^6 m$, $g = 9.8 m/s^2$

$V = \sqrt{9.8 \times 6.4 \times 10^6}$

$V = 7.9 km/s$

Hence proved that critical velocity is equal to 7.9km/s.

QNO3:

Ans : When a elevator accelerates upward the apparent weight of person inside the elevator increases. It will be calculated as

$$R = mg + ma$$

When it accelerates upwards with an equal acceleration the apiparent weight will became following

$$R = mg + mg$$

$$R = 2mg$$

$$R = 2w$$

Hence proved.

QNO4:

given :- $v = 1.01 km/s$

$r = 390400 km$

days = ?

rev = 1

$$S = 2\pi r$$

$$T = \frac{2\pi r}{v}$$

$$= \frac{2(3.14)(1.01)(390400)}{(1.01)}$$

$$= 1.49 days$$

QNO58

$T = 24h = 86400s$

$R = 6400000m$

M of Earth $= 5.97 \times 10^{24} kg$

$$T = 2\pi \sqrt{\frac{(R+h)^3}{GM}}$$

$$86400 = 2\pi \sqrt{\frac{(R+h)^3}{(6.6\times10^{11})(5.97\times10^{24})}}$$

$$\Rightarrow (R+h)^3 = 7.53 \times 10^{22}$$

$$R+h = 42226910$$

$$h = 42226910 - R = 42226910 - 6400000$$

$$\Rightarrow h = 35826910\,m$$

$$= 36000\,km.$$

QNO6:

$S = 2.50m$

$\theta = 6.6\times10^{-9}\,rad$

$\gamma = ?$

$$S = \gamma\theta$$

$$\gamma = \frac{S}{\theta}$$

$$= \frac{2.50}{6.6\times10^{-8}} = 3.787\times10^{8}$$

$\gamma = 3.787\times10^{8}m$ Ans

Q.No 7:

Given: $r = 3.85 \times 10^8 \text{ m}$

$R = 1.74 \times 10^6 \text{ m}$

Find: $L_s/L_o = ?$

When $I = \frac{2}{5} MR^2$

$L_s = \frac{2}{5} MR^2\omega \rightarrow (1)$

$L_o = Mr^2\omega \rightarrow (2)$

$$\frac{L_s}{L_o} = \frac{2 \times (1.74 \times 10^6)^2}{5 \times (3.85 \times 10^8)^2}$$

$$\frac{L_s}{L_o} = 8.2 \times 10^{-6}$$