Physics.

PART - A

1) d) 7%.

2) a) Torque and work done

3) a) Increase

4) b) $g = 25 ms^{-2}$

5) b) $20 kg$

6) c) greater than 1

7) c) Static friction is not zero and kinetic friction zero

8) c) $\sqrt{5 gR}$

9) c) $0 < e < 1$

10) b) $25 \, rad\, s^{-2}$

11) c) Decreases in month of July and Increases month of January.

12) d) 0.5

13) c) $\Delta U > 0, \, Q > 0$

14) b) 20%.

15) b) $10R$.

PART - B.

16) Limitation of dimensional analysis :-

(i) This method gives no information about the dimentionless constants in the formula like $1, 2, \cdots \pi, e$ etc.

(ii) This method cannot decide whether the given Quantity is a vector (or) a Scalar.

(iii) This method is not suitable to derive relations involving trignometric, exponential and logarithmic function.

17)

Scalar	Vector
(i) It is a quantity which is described by only magnitude	(i) It is a quantity which is described by both magnitude and direction.
(ii) Distance, mass, Temparature	(ii) Force, velocity, displacement.

18) Types of friction :-

(i) Static friction (ii) Kinetic friction,

Method of Reducing friction :-

(i) Lubrication (ii) Ball bearings (iii) Avoiding moistures.

19)

Elastic Collision	Inelastic Collision,
(i) Total momentum is conserved.	(i) Total momentum conserved.
(ii) Total K.E conserved	(ii) Total K.E is not conserved,
(iii) Mechanical Energy is not dissipated	(iii) Mechanical Energy is dissipated into heat, light, sound etc

20). Ans

$F = 30N$; $S(m) h = 10m$; $m = 2kg$

$W = F.S = 30 \times 10 = 300 J$.

21)

Stable Equilibrium	unstable Equilibrium.
(i) Linear momentum & angular momentum is zero	Linear momentum & angular momentum is zero,
(ii) Potential Energy of the body is minimum and it increases if disturbed.	Potential Energy of the body is not minimum and it decreases if disturbed,

22) The negative sign in the total energy implies that the satellite is bound to the Earth's gravitational force and it cannot be escape from the Earth.
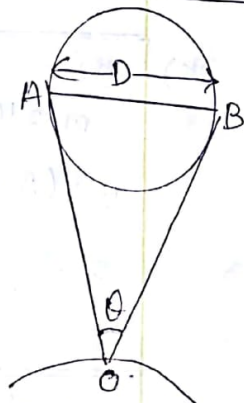
23) **Hooke's Law** :-

   Small deformation when the stress and strain are proportional to each other.

PART- III

25)   Since $\theta = \dfrac{Arc}{radius} = \dfrac{D}{S}$

   $$D = S\theta$$

   Linear diameter = Distance × Angular diameter.

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26) **Vector product between two vectors** :-

   The vector product (or) cross product of two vectors defined as another vector having a magnitude equal to the product of the magnitudes of two vectors and the sine of the angle between them. The direction of the product vector is perpendicular to the plane containing the two vectors.

27) **Inertia** :- Inability of object to move on its own or change in state of motion is called Inertia. Inertia means resistance to change its state.
   (i) Inertia of rest (ii) Inertia of motion
   (iii) Inertia of Direction.

28)

Conservative force	Non-Conservative force.
(i) workdone is independent of the path	(i) workdone is depends up on the path.
(ii) workdone in a round trip is zero	round trip is not zero.
(iii) Total Energy remains constant	Energy dissipated heat energy.
(iv) work done is completely recoverable.	work done is not completely recoverble
(v) Eg : Electrostatic force	eg : viscous force.

29)

$m_1 = 10 kg$; $m_2 = 5 kg$; $\vec{r_1} = (-3\hat{i} + 2\hat{j} + 4\hat{k})m$

$\vec{r_2} = (3\hat{i} + 6\hat{j} + 5\hat{k})m$,

$\vec{r} = \dfrac{m_1\vec{r_1} + m_2\vec{r_2}}{m_1 + m_2}$ $\Rightarrow$ $\vec{r} = (-\hat{i} + \dfrac{10}{3}\hat{j} + \dfrac{13}{3}\hat{k})m$

30) Kepler's Law :-

1st Law! All the planets in the Solar system orbit the sun in elliptical orbits with the sun at one of the foci.

IInd Law :- The radial vector line joining the Sun to a Planet Sweeps equal areas in equal Intervals of time.

IIIrd Law :- The ratio of square of the time period of the planet to the cubic power of semi major axis is constant for all the planets in the solar system.

31)	Streamlined flow	Turbulent flow,
	when a liquid flows such that each particle of the liquid passing through a point moves along the same path with the same velocity as its predecessor then the flow of liquid is said to be a streamline flow.	(i) when a speed of the moving fluid exceeds the critical speed, V_c the motion becomes turbulent. The velocity changes both magnitude and direction from particle to particle.

32) Boyle's Law :- constant Temparature, the pressure of the gas inversely proportional to the volume

$P \propto \frac{1}{V}$.

Charles Law: constant pressure, the volume of the gas is directly proportional to absolute Temparature. $V \propto t$.

By combing, we have $\quad PV = CT$

'C' — Positive Constant.

33) A

Car moving speed $= 40 km/hr.$

distance $= 2m.$

Same car speed $= 80 km/hr$

distance $= ?$

$$\frac{\text{before speed}}{\text{distance}} = \frac{\text{speed}}{\text{distance}}$$

$$\frac{4020}{2} = \frac{80}{x}$$

$$x = \frac{80}{20} \implies 4.m$$

PART-D.

34) (a) Page.No: 30 - 33 (Volume one)
              (OR)
       (b) Page No: 111 (3rd unit) (volume I)

35) (a) Page No: 53 and (55-56) (2nd Lesson) (V-I)
              (OR)
       (b) Page No: 84 - 86 (2nd Lesson) (V-I)

(36) (a) Page No: 187-190 (4th Lesson) (V-I)
              (OR)
       (b) Page No: 239-240 (5th Lesson) (V-I)

37) (a) page No: 22 - 23} (6th Lesson) (V-II)
              (OR)
       (b) Page No: (82-83) (7th Lesson) (V-II)

(38) Page No: (107 - 109) (8th Lesson) (V-II)
              (OR)
       Page No: 124   (8th Lesson) (V-II)

E. DEVADINESH M.Sc, BEd. CLP
PG Asst in PHYSICS
SARASWATHI VIDYALAYA
HR. SEC. SCHOOL
VARISAIPATTI
PERAMBALUR (Dt)
CELL: 9524220942 (whatsapp)
Email: devadineshphy93 @ gmail. com.