

NEW STANDARD ACADEMY

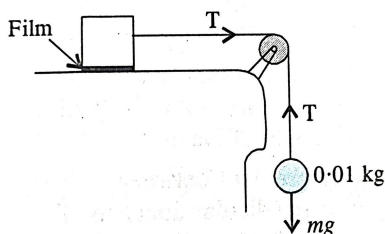
Date : 24-11-25

CLASS : 11TH

Marks: 60
Time: 3 hours

PHYSICS

1. A plate of dimensions $(4\text{m} \times 4\text{m})$ and 0.01 m away from a fixed plate moves at 0.4 m s^{-1} . A force of 1 N is required to maintain this speed. Determine the coefficient of viscosity of the fluid between the plates.
2. A fluid moves along a surface at a height 0.75 with a velocity of 3 m s^{-1} . If the shearing stress is 3 N m^{-2} find the coefficient of viscosity.
3. A metal block of area 0.10 m^2 is connected to a 0.010 kg mass via string that passes over an ideal pulley (considered massless and frictionless) as shown in figure. A liquid with film thickness of 0.30 mm is placed between the block and the table. When released the block moves to the right with constant speed of 0.085 m s^{-1} . Find the coefficient of viscosity of the liquid.



4. Find the velocity gradient between two layers of a liquid separated by a perpendicular distance of 1 mm and having a relative velocity of 0.05 m s^{-1} .
5. A vessel containing alcohol is fitted horizontally with a capillary tube of radius 0.5 mm and length 0.2 m . The coefficient of viscosity of alcohol is $1.2 \times 10^{-3}\text{ Pa s}$ and its density is 800 kg m^{-3} . If the depth of capillary tube below the free surface of alcohol is 0.3 m , find the amount of alcohol flowing out in 5 minutes . Take $g = 9.8\text{ m s}^{-2}$.
6. Two balls A and B are dropped in a viscous medium of coefficient η . If the diameter of ball B is double the diameter

of ball A, find the ratio of the terminal velocity of B to that of A. Assume that the densities of both balls are equal.

7. The terminal velocity of a copper ball of radius 2.0 mm falling through a tank of oil at 20°C is 6.5 cm s^{-1} . Compute the viscosity of the oil at 20°C . Density of oil is $1.5 \times 10^3\text{ kg m}^{-3}$, density of copper is $8.9 \times 10^3\text{ kg m}^{-3}$.
8. What should be the maximum average velocity of flow of water through a tube of internal diameter 20 mm so that the flow is laminar? Viscosity of water is $1 \times 10^{-3}\text{ Pa s}$. Assume that Reynolds number for laminar flow of water is 1000 .
9. A fluid of coefficient of viscosity 0.56 Pa s and density 0.75 g cm^3 flows through a pipe of diameter 10 mm with a velocity of 3 m s^{-1} . Find the Reynolds number for the flow of fluid. What is the type of flow?
10. Find the average velocity of flow of glycerine through a tube of diameter 10 mm so that the flow is (a) laminar (b) turbulent. The viscosity of glycerine is 0.950 Pa s and its specific gravity is 1.26 .

CHEMISTRY

1. Assign oxidation number to the underlined elements in each of the following species:
(a) $\text{H}_4\text{P}_2\text{O}_7$ (b) K_2MnO_4
(c) NaBH_4
(d) $\text{KAl(SO}_4)_2 \cdot 12\text{H}_2\text{O}$
2. What are the oxidation number of the underlined elements in each of the following and how do you rationalise your results?
(a) KI_3 (b) $\text{H}_2\text{S}_4\text{O}_6$
(c) Fe_3O_4 (d) $\text{CH}_3\text{CH}_2\text{OH}$
(e) CH_3COOH
3. Justify that the following reactions are redox reactions:
(a) $\text{CuO(s)} + \text{H}_2\text{(g)} \rightarrow \text{Cu(s)} + \text{H}_2\text{O(g)}$
(b) $\text{Fe}_2\text{O}_3\text{(s)} + 3\text{CO(g)} \rightarrow 2\text{Fe(s)} + 3\text{CO}_2\text{(g)}$

- Fluorine reacts with ice and results in the change:

$$\text{H}_2\text{O(s)} + \text{F}_2(\text{g}) \rightarrow \text{HF(g)} + \text{HOF(g)}$$
 Justify that this reaction is a redox reaction.
- While sulphur dioxide and hydrogen peroxide can act as an oxidising as well as reducing agents in their reactions, ozone and nitric acid act only as oxidants. Why?
- Justify giving reactions that among halogens, fluorine is the best oxidant and among hydrohalic compounds, hydroiodic acid is the best reductant?
- Balance the following redox reactions by ion-electron method.
 (a) $\text{MnO}_4^- + \text{I}^- \rightarrow \text{MnO}_2 + \text{I}_2$ (in basic medium)
 (c) $\text{H}_2\text{O}_2 + \text{Fe}^{2+} \rightarrow \text{Fe}^{3+} + \text{H}_2\text{O(l)}$ (in acidic solution)
- Balance the following equation in basic medium by ion electron method and identify the oxidising agent and the reducing agent.

$$\text{N}_2\text{H}_4 + \text{ClO}_3^- \rightarrow \text{NO} + \text{Cl}^-$$
- Consider the elements: Cs, Ne, I and F;
 (a) Identify the element that exhibits only negative oxidation state.
 (b) Identify the element that exhibits only positive oxidation state.
 (c) Identify the element that exhibits both positive and negative oxidation states.
 (d) Identify the element which exhibits neither the negative nor does the positive oxidation state.
- Using the standard electrode potentials predict if the reaction between the following is feasible:
 Ag^+ (aq) and Cu (s)

BIOLOGY

- Draw label diagram ,TS of muscle
- Give the characteristic feature of cardiac muscle
- What is a sarcomere explain
- Explain sliding mechanism of muscle fibre
- How many bones are present in fore limb give the name
- What is a joint give the example of ball and socket joint
- How many number of vertebra present in cervical, thoracic, lumbar, sacral and coxy reason of vertebral column

- Give the difference between fibrous and synovial joint with example
- How many bones are present in cranium ,in face and ear,give name of ear bone.
- What is the rib cage explain how many bones are present

MATH'S

- The equation of the circle whose Centre is (1,-3) and which touches the line $2x-y-4=0$ is
- If the radius of the circle $x^2+y^2-18x+12y+k=0$ is 11 units then $k=$
- If the length of tangent drawn from the point (5,3) to the circle $x^2+y^2+2x+ky+17=0$ be 7 then $k=$
- If OA and OB are the tangents to the circle $x^2+y^2-6x-8y+21=0$ drawn from the origin O then $AB=$
- Circle $x^2+y^2-4x-8y-5=0$ will intersect the line $3x-4y=m$ in two distinct points if
- The area bounded by the circles $x^2+y^2=1$, $x^2+y^2=4$ and the pair of lines $\sqrt{3}(x^2+y^2)=4xy$, is equal to
- The angle between the pair of tangents from the point (1,1/2) to the circle $x^2+y^2+4x+2y-4=0$ is
- A pair of tangents are drawn to a unit circle with centre at the origin and these tangents intersect at A enclosing an angle of 60° . The area enclosed by these tangents and the arc of the circle is
- The shortest distance from the line $3x+4y=25$ to the circle $x^2+y^2=6x-8y$ is equal to
- If the straight line $ax+by=2$; $b \neq 0$, touches the circle $x^2+y^2-2x=3$ and is normal to the circle $x^2+y^2-4y=6$ then the values of a and b are