

PYQSide

NEET MECHANICAL PROPERTIES OF FLUIDS — SURFACE TENSION AND SURFACE ENERGY — PYQS

Max. Marks: 24

Questions: 6

Section A (MCQ)

Q.1 A balloon is made of a material of surface tension S and its inflation outlet (from where gas is filled in it) has small area A . It is filled with a gas of density ρ and takes a spherical shape of radius R . When the gas is allowed to flow freely out of it, its radius r changes from R to 0 (zero) in time T . If the speed $v(r)$ of gas coming out of the balloon depends on r as r^a and $T \propto A^\beta \rho^\gamma R^\delta$ then [NEET (UG) 2025]

$$(1) a = -\frac{1}{2}, \alpha = -\frac{1}{2}, \beta = -1, \gamma = \frac{1}{2}, \delta = \frac{7}{2}$$

$$(2) a = \frac{1}{2}, \alpha = \frac{1}{2}, \beta = -\frac{1}{2}, \gamma = \frac{1}{2}, \delta = \frac{7}{2}$$

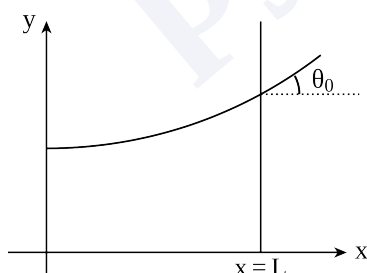
$$(3) a = \frac{1}{2}, \alpha = \frac{1}{2}, \beta = -1, \gamma = +1, \delta = \frac{3}{2}$$

$$(4) a = -\frac{1}{2}, \alpha = -\frac{1}{2}, \beta = -1, \gamma = -\frac{1}{2}, \delta = \frac{5}{2}$$

Scan or tap for the full solution



Q.2 Consider a water tank shown in the figure. It has one wall at $x = L$ and can be taken to be very wide in the z direction. When filled with a liquid of surface tension S and density ρ , the liquid surface makes angle θ_0 ($\theta_0 \ll 1$) with the x -axis at $x = L$. If $y(x)$ is the height of the surface then the equation for $y(x)$ is:



(take $\theta(x) = \sin \theta(x) = \tan \theta(x) = \frac{dy}{dx}$, g is the acceleration due to gravity) [NEET (UG) 2025]

$$(1) \frac{d^2y}{dx^2} = \sqrt{\frac{\rho g}{S}}$$

$$(2) \frac{dy}{dx} = \sqrt{\frac{\rho g}{S}} x$$

$$(3) \frac{d^2y}{dx^2} = \frac{\rho g}{S} x$$

$$(4) \frac{d^2y}{dx^2} = \frac{\rho g}{S} y$$

Scan or tap for the full solution



Q.3 A thin flat circular disc of radius 4.5 cm is placed gently over the surface of water. If surface tension of water is 0.07 N m^{-1} , then the excess force required to take it away from the surface is

[NEET (UG) 2024]

$$(1) 19.8 \text{ mN}$$

$$(2) 198 \text{ N}$$

$$(3) 1.98 \text{ mN}$$

$$(4) 99 \text{ N}$$

Scan or tap for the full solution



Q.4 The amount of energy required to form a soap bubble of radius 2 cm from a soap solution is nearly: (surface tension of soap solution = 0.03 N m^{-1})

[NEET (UG) 2023]

$$(1) 5.06 \times 10^{-4} \text{ J}$$

$$(2) 3.01 \times 10^{-4} \text{ J}$$

$$(3) 50.1 \times 10^{-4} \text{ J}$$

$$(4) 30.16 \times 10^{-4} \text{ J}$$

Scan or tap for the full solution



Q.5 A rectangular film of liquid is extended from $(4 \text{ cm} \times 2 \text{ cm})$ to $(5 \text{ cm} \times 4 \text{ cm})$. If the work done is $3 \times 10^{-4} \text{ J}$, the value of the surface tension of the liquid is

[NEET 2016 (Phase 2)]

$$(1) 0.250 \text{ N m}^{-1}$$

$$(2) 0.125 \text{ N m}^{-1}$$

$$(3) 0.2 \text{ N m}^{-1}$$

$$(4) 8.0 \text{ N m}^{-1}$$

Scan or tap for the full solution



Q.6 A certain number of spherical drops of a liquid of radius r coalesce to form a single drop of radius R and volume V . If T is the surface tension of the liquid, then

[AIPMT 2014]

$$(1) \text{ energy} = 4VT \left(\frac{1}{r} - \frac{1}{R} \right) \text{ is released.}$$

$$(2) \text{ energy} = 3VT \left(\frac{1}{r} + \frac{1}{R} \right) \text{ is absorbed.}$$

$$(3) \text{ energy} = 3VT \left(\frac{1}{r} - \frac{1}{R} \right) \text{ is released.}$$

$$(4) \text{ energy is neither released nor absorbed.}$$

Scan or tap for the full solution



ANSWER KEY

Ques.	1	2	3	4	5	6					
Ans.	1	4	1	2	2	3					