

DELHI PUBLIC SCHOOL, JAMMU  
ASSIGNMENT  
SESSION 2021-22

CLASS XI

SUBJECT: PHYSICS

Attempt the following numerical problems and conceptual questions and derivations :

1. Explain why
  - (a) The blood pressure in humans is greater at the feet than at the brain.
  - (b) Atmospheric pressure at a height of about 6 km decreases to nearly half of its value at the sea level, though the height of the atmosphere is more than 100 km.
  - (c) Hydrostatic pressure is a scalar quantity even though pressure is force divided by area.
  
2. Explain why
  - (a) The angle of contact of mercury with glass is obtuse, while that of water with glass is acute.
  - (b) Water on a clean glass surface tends to spread out while mercury on the same surface tends to form drops. (Put differently, water wets glass while mercury does not.)
  - (c) Surface tension of a liquid is independent of the area of the surface.
  - (d) Water with detergent dissolved in it should have small angles of contact.
  - (e) A drop of liquid under no external forces is always spherical in shape.
  
3. Explain why
  - (a) To keep a piece of paper horizontal, you should blow over, not under, it.
  - (b) When we try to close a water tap with our fingers, fast jets of water gush through the openings between our fingers.
  - (c) The size of a needle of a syringe controls flow rate better than the thumb pressure exerted by a doctor while administering an injection.
  - (d) A fluid flowing out of a small hole in a vessel results in a backward thrust on the vessel.
  - (e) A spinning cricket ball in air does not follow a parabolic trajectory.
  
4. (a) State Pascal's law.
  - (b) Explain any one of its applications.
  - (c) A hydraulic automobile lift is designed to lift cars with a maximum mass of

3000 kg. The area of cross-section of the piston carrying the load is 425 cm<sup>2</sup>. What maximum pressure would the smaller piston have to bear?

5. State capillarity. Derive Ascent formula.

6. Explain why

(a) Two bodies at different temperatures  $T_1$  and  $T_2$ , if brought in thermal contact do not necessarily settle to the mean temperature  $(T_1 + T_2)/2$  ?

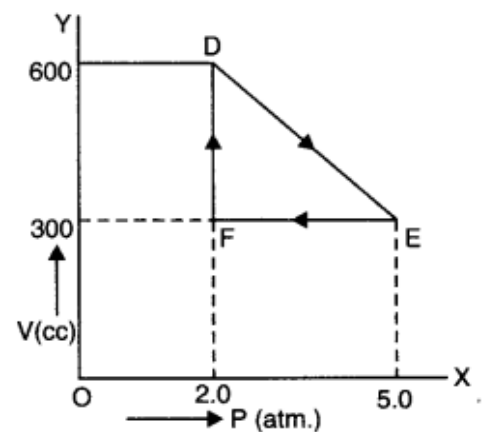
(b) The coolant in a chemical or nuclear plant (i.e., the liquid used to prevent different parts of a plant from getting too hot) should have high specific heat. Comment.

(c) Air pressure in a car tyre increases during driving. Why?

(d) The climate of a harbour town is more temperate (i.e., without extremes of heat and cold) than that of a town in a desert at the same latitude. Why?

7. In changing the state of a gas adiabatically from an equilibrium state A to another equilibrium state B, an amount of work equal to 22.3 J is done on the system. If the gas is taken from state A to B via a process in which the net heat absorbed by the system is 9.35 cal, how much is the net work done by the system in the latter case? (Take 1 cal = 4.19 J)

8. A thermodynamic system is taken from an original state to an intermediate state by the linear process shown in Fig. Its volume is then reduced to the original value from E to F by an isobaric process. Calculate the total work done by the gas from D to E to F.



$$10^5) = 45 \text{ J}$$

9. State Zeroth law, first law and seco

## 10. Derive expressions for escape velocity and orbital velocity.

### **Instructions:**

1. Send your Holidays Homework on the email ID of your respective subject teachers

Section XII A Sub Teacher: Mr. Mandeep Singh (email ID : [mandy.7104@gmail.com](mailto:mandy.7104@gmail.com))

Section XII B Sub Teacher: Ms Jyoti Pallilia (email ID : [jyotijamwal50@gmail.com](mailto:jyotijamwal50@gmail.com))

Section XII C Sub Teacher: Mr. Parshant Verma (email ID: [prashant.v85@gmail.com](mailto:prashant.v85@gmail.com))

Section XII D Sub Teacher: Ms Manika Verma (email ID: [manikavermawork@gmail.com](mailto:manikavermawork@gmail.com))

Students must mention their name, class/section in their Holidays Homework.