

AA(1) — Phy (1)
Sub / Gen

2019

Time : 3 hours

Full Marks : 75

Candidates are required to give their answers in their own words as far as practicable.

The questions are of equal value.

Answer **five** questions, selecting at least **one** from each of the Group – B, C and D, in which Group – A is compulsory.

Group – A

1. Choose the correct answer from the given alternatives :

(a) Which of the statements is correct for the case of planetary motion ?

- (i) Linear velocity is constant
- ~~(ii)~~ Areal velocity is constant

(iii) Linear as well as areal velocity

(iv) None of these

(b) The theoretical limiting values for Poisson's ration (σ) are :

(i) -1 and $+1$

~~(ii)~~ -1 and $+\frac{1}{2}$

(iii) $-\frac{1}{2}$ and $+\frac{1}{2}$

(iv) 0 and $+\frac{1}{2}$

(c) With the increase of temperature, the coefficient of viscosity of a liquid :

~~(i)~~ Increases

~~(ii)~~ Decreases

(iii) Remains constant

(iv) May decrease or increase depending on the nature of the liquid

(d) The Poiseuille's formula for the rate of flow (volume / see) through a capillary tube is given by $V =$:

(i) $\frac{\pi Pr}{8\eta l}$

(ii) $\frac{\pi Pr^2}{8\eta e}$

(iii) $\frac{\pi Pr^3}{8\eta e}$

(iv) $\frac{\pi Pr^4}{8\eta e}$

(e) The value of $r (= C_p/C_v)$ for Triatomic gas

is equal to :

(i) 1.33

(ii) 1.40

(iii) 1.67

(iv) 1

(f) Critical volume of a Vander Waal gas is equal to :

(i) b

(ii) 2b

(iii) 3b

(iv) 4b

(g) The path difference between two consecutive nodes or antinodes is equal to :

(i) λ

(ii) $\lambda/2$

(iii) $\frac{\lambda}{4}$

(iv) $\frac{3\lambda}{2}$

(h) The efficiency of a Carnot engine working between two temperatures T_1 and T_2 ($T_1 > T_2$) is given as $\eta =$:

(i) $\frac{T_1 - T_2}{T_2}$

(ii) $\frac{T_1 - T_2}{T_1}$

(iii) $\frac{T_1}{T_2}$

(iv) $\frac{T_2}{T_1}$

(i) A sound wave has an intensity of 10^{-10} Wm^{-2} . It may also be expressed in decibel (dB) as equal to :

(i) 10 dB

- (ii) 20 dB
- (iii) 30 dB
- (iv) 40 dB

(j) Velocity of gravity waves is given by $U =$

- (i) $\sqrt{\frac{\lambda g}{\pi}}$
- (ii) $\frac{\lambda g}{\pi}$
- (iii) $\sqrt{2\pi \lambda g}$
- (iv) $\sqrt{4\pi \lambda g}$

Group – B

2. Describe Michelson-Morley experiment and discuss its negative results
3. Obtain the relationship between different elastic constants
4. Define surface tension and surface energy. Describe, with necessary theory, the ripples

method for the determination of surface tension of a liquid

5. Derive Poiseuille's formula, with necessary corrections explained, for the rate of flow of liquid through a horizontal capillary tube.

Group – C

6. Deduce the equation for progressive waves and hence obtain and differential equation for the wave motion <https://www.tmbuonline.com>
7. What is reverberation time ? Derive Sabine's formula for the reverberation time for sound in a hall

Group – D

8. State and explain the law of equipartition of energy and hence find the ratio of specific heat capacities for monoatomic, diatomic and triatomic gases.
9. Deduce Maxwell's law of distribution of velocity of gas molecules and deduce the expressions for r.m.s. and mean speeds.

- 10 State and prove Stefan-Boltzmann law of black body radiation.
11. Discuss porus plug experiment and hence deduce an expression for the inversion temperature of the gas.



<https://www.tmbuonline.com>

Whatsapp @ 9300930012

Send your old paper & get 10/-

अपने पुराने पेपर्स भेजे और 10 रुपये पायें,

Paytm or Google Pay से

UY - 100/4 (1,500) (7) AA(1) — Phy (1)
<https://www.tmbuonline.com> Sub / Gen