

FACULTY SELECTION TEST
PRE-FOUNDATION
PHYSICS
SAMPLE PAPER

Time: 90 mins.

Max. Marks: 240

GENERAL INSTRUCTIONS

1. Write your Name in the Space Provided in the Bottom of this Booklet.
2. The question paper consists of '60' objective type questions.
3. Each question has four choices (1), (2), (3) and (4) out of which **ONLY ONE** is correct.
4. Each correct answer carries **4 marks** and each wrong answer **(– 1) Mark**.
5. Use **Black or Blue Ball Point Pen** only for filling particulars.
6. Use of Blank Papers, Clip Boards, Calculator, Log Table, Slide Rule and Mobile or any electronic gadgets in any form is not allowed.
7. In case of any dispute, the answer filled in the OMR sheet available with the institute shall be final.
8. After completion submit the Question Paper back along with the Answer Sheet.

Name: _____

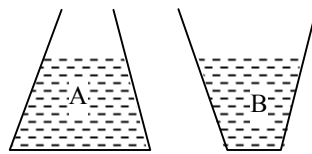
Q.1 Calculate the kinetic energy of a body of mass 2kg moving with velocity of 0.2 m/sec.

- (1) 40 J (2) 0.4 J (3) 0.04 J (4) 4 J

Q.2 A man carrying a bag of mass 25kg climbs up to a height of 10m in 50 seconds. Calculate the power delivered by him to the bag. ($g = 9.8 \text{ m/s}^2$)

- (1) 49 W (2) 59 W (3) 69 W (4) None of these

Q.3 Two vessels A and B of cross sections as shown contain same liquid up to the same height. The liquid pressures at the bottom are –



- (1) more in A, less in B (2) more in B, less in A
(3) equal in both A and B (4) can't say

Q.4 A frictionless sloping plank is 6m long. An oil drum of 300 N is raised up the sloping plank by an effort of 15N. Calculate the height to which the oil drum rises.

- (1) 2 m (2) 7 m (3) 3 m (4) 0.3 m

Q.5 A rectangular glass block of refractive index 1.5 is kept above a postage stamp. The image of the stamp is observed to be raised by 7mm. what is the thickness of the glass block ?

- (1) 31mm (2) 21mm (3) 27mm (4) None of these

Q.6 Calculate the density of a block of wood that floats in water with 10% of it above the surface. Density of water = 10^3 kg/m^3 .

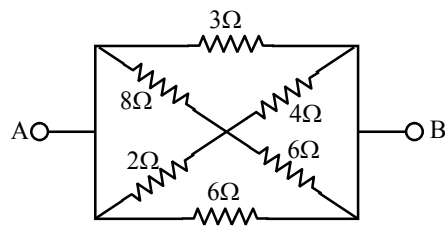
- (1) $0.9 \times 10^1 \text{ kg/m}^3$ (2) $0.9 \times 10^3 \text{ kg/m}^3$ (3) $0.7 \times 10^2 \text{ kg/m}^3$ (4) none of these

Q.7 Two lenses of power + 12D and –2D are put in contact. What is their equivalent focal length?

- (1) 10 cm (2) 12.5 cm (3) 16.6 cm (4) 8.33 cm



Q.8 The equivalent resistance between A and B in the network in the figure is -

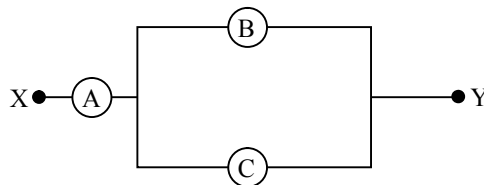


- (1) $\frac{4}{3} \Omega$ (2) $\frac{3}{2} \Omega$ (3) 3Ω (4) 2Ω

Q.9 A monkey of mass 40 kg climbs on a massless rope of breaking strength 600 N. The rope will break if the monkey

- (1) Climbs up with a uniform speed of 5 m/s
 (2) Climbs up with an acceleration of 5 m/s^2
 (3) Climbs down with an acceleration of 5 m/s^2
 (4) Climbs down with a uniform speed of 5 m/s

Q.10 A, B and C are voltmeters of resistance R, 1.5 R and 3R, respectively. When some potential difference is applied between X and Y, the voltmeter readings are V_A , V_B and V_C , respectively.



- (1) $V_A = V_B = V_C$ (2) $V_A \neq V_B = V_C$ (3) $V_A = V_B \neq V_C$ (4) $V_B \neq V_A = V_C$

Q.11 A rider on horse back falls when horse starts running all of a sudden because -

- (1) Rider is taken back
 (2) Rider is suddenly afraid of falling
 (3) Inertia of rest the upper part of body at rest whereas lower part of the body moves forward with the horse
 (4) None of the above



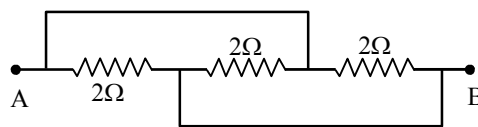
Q.12 Two thin lenses of focal lengths f_1 and f_2 are placed in contact with each other. The focal length of the combination will be given by-

- (1) $\frac{f_1 f_2}{f_1 - f_2}$ (2) $\sqrt{f_1 f_2}$ (3) $\frac{f_1 f_2}{f_1 + f_2}$ (4) $\frac{f_1 + f_2}{2}$

Q.13 The length of an astronomical telescope for normal adjustment is-

- (1) $f_o \times f_e$ (2) $f_o + f_e$ (3) $\frac{f_o}{f_e}$ (4) $\frac{f_o f_e}{f_o + f_e}$

Q.14 The electrical resistance between points A and B of the figure shown is –

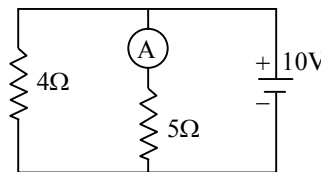


- (1) $\frac{2}{3}\Omega$ (2) 2Ω (3) $\frac{3}{2}\Omega$ (4) 6Ω

Q.15 A stone thrown vertically upward takes 3 s to attain the maximum height. Calculate (i) the initial velocity of the stone (ii) the maximum height attained by the stone. Take $g = 9.8 \text{ m/s}^2$.

- (1) 32 m/s, 44.1m (2) 29.4m/s, 40 m (3) 20 m/s, 44.1 m (4) 29.4m/s, 44.1m

Q.16 In the circuit shown, the reading of the ammeter is (1 assume internal resistance of the battery be zero)



- (1) $\frac{40}{29} \text{ A}$ (2) $\frac{10}{9} \text{ A}$ (3) $\frac{5}{3} \text{ A}$ (4) 2 A

Q.17 Echo is the effect produced due to-

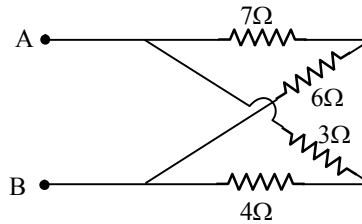
- (1) Reflection of sound (2) Dispersion of sound
(3) Absorption of sound (4) Refraction of sound



Q.18 Two satellites of masses m_1 and m_2 ($m_1 > m_2$) are revolving around the earth in a circular orbit of radii r_1 and r_2 ($r_1 > r_2$), respectively. Which of the following statements is true regarding their speeds v_1 and v_2 ?

- (1) $v_1 = v_2$ (2) $v_1 > v_2$ (3) $v_1 < v_2$ (4) $\frac{v_1}{r_1} = \frac{v_2}{r_2}$

Q.19 The equivalent resistance between A and B (1s shown) is



- (1) 4.5 Ω (2) 12 Ω (3) 5.4 Ω (4) 20 Ω

Q.20 Charges of each of the two point charges are doubled and their distance is halved. Force of interaction becomes n times of previous value, where n is -

- (1) 4 (2) 1 (3) 1/16 (4) 16

Q.21 A piece of wire of resistance R is cut into five equal parts. These parts are then connected in parallel. If the equivalent resistance of this combination is R' then the ratio R/R' is -

- (1) 1/25 (2) 1/5 (3) 5 (4) 25

Q.22 Refractive index of a medium depend upon -

- (1) Wavelength (2) Velocity of light in medium
(3) Temperature (4) All of these

Q.23 A diminished virtual image can be formed only in -

- (1) Plane mirror (2) A concave mirror (3) A convex mirror (4) None of these

Q.24 1 kwh is equal to-

- (1) 3.6 kJ (2) 36 J (3) 3.6 mJ (4) 3.6 MJ



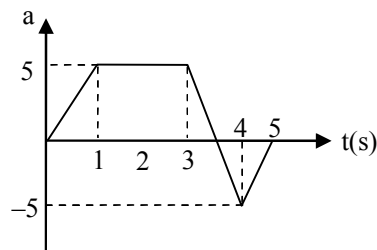
Q.25 Non-mechanical waves can travel -

- (1) in vacuum as well as in a medium (2) in vacuum but not in a medium
 (3) in a medium but not in vacuum (4) neither in a medium nor in vacuum

Q.26 A person A does 500 J of work in 10 minutes another person B does 600 J of work in 20 minutes. Let the average power delivered by A and B be P_1 and P_2 respectively then-

- (1) $P_1 = P_2$ (2) $P_1 > P_2$
 (3) $P_1 < P_2$ (4) P_1 and P_2 are undefined

Q.27 The acceleration of an object, starting from rest and moving along a straight line is as shown. Other than at $t = 0$, when is the velocity of the object equal to zero ?

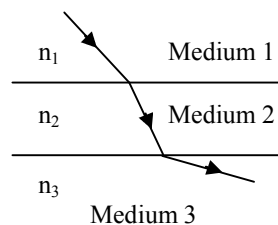


- (1) At $t = 3.5$ s (2) During the interval from 1s to 3s
 (3) At $t = 5$ s (4) None of these

Q.28 The temperature of a gas is raised while its volume remains constant, the pressure exerted by the gas on the walls of the container increases because its molecules

- (1) lose more kinetic energy to the wall
 (2) are in contact with the wall for a shorter time
 (3) strike the wall more often with higher velocities
 (4) collide with each other with less frequency

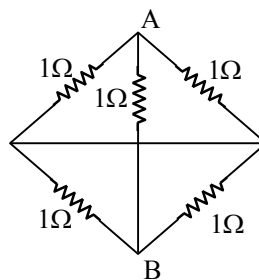
Q.29 A beam of light passes from medium 1 to medium 2 to medium 3 as shown. What may be concluded about the three indices of refraction, n_1 , n_2 and n_3 ?



- (1) $n_3 > n_1 > n_2$ (2) $n_1 > n_3 > n_2$ (3) $n_2 > n_3 > n_1$ (4) $n_2 > n_1 > n_3$



- Q.30** To get an image larger than the real object, one can use ?
 (1) a convex mirror but not a concave mirror
 (2) a concave mirror but not a convex mirror
 (3) either a convex mirror or a concave mirror
 (4) a plane mirror
- Q.31** If two plane mirrors are kept at 60° to each other, then the number of images formed by them is-
 (1) 5 (2) 6 (3) 7 (4) 8
- Q.32** The minimum distance between the object and the image formed by a concave mirror can be (f is the focal length of the mirror) -
 (1) zero (2) f (3) 2f (4) 4f
- Q.33** When all the resistance in the circuit are 1Ω each, then the equivalence resistance across point A & B will be -



- (1) $\frac{5}{6} \Omega$ (2) $\frac{1}{2} \Omega$ (3) $\frac{2}{3} \Omega$ (4) $\frac{1}{3} \Omega$
- Q.34** LPG is mostly liquefied
 (1) hydrogen (2) oxygen (3) butane (4) methane.
- Q.35** The ratio of the radius of the earth to that of the moon is 10. The ratio of g on earth to the moon is 6. The ratio of the escape velocity from the earth's surface to that from the moon is approximately
 (1) 10 (2) 8 (3) 4 (4) 2
- Q.36** The resistance of a coil is 5 ohm and a current of 0.2 A is induced in it due to a varying magnetic field. The rate of change of magnetic flux in it will be –
 (1) 0.5 Wb/s (2) 0.05 Wb/s (3) 1 Wb/s (4) 20 Wb/s



- Q.37** If a satellite is revolving near the earth's surface, then its orbital velocity does not depend upon
(1) The mass of the satellite (2) The radius of the earth
(3) The radius of the orbit (4) The mass of the earth
- Q.38** Distance-time graph is a straight line parallel to the time axis. Then, the body is -
(1) in linear motion (2) in circular motion (3) at rest (4) in periodic motion
- Q.39** Propagation of a sound wave in a gas is quite close to :
(1) an isothermal process
(2) an adiabatic process
(3) an isobaric process
(4) a process that does not exhibit properties close to any of the three given in (1),(2),(3)
- Q.40** A block of mass 10 kg is lying on the ground. The force exerted by the block on the earth is-
[Neglect the effect of rotation of the earth about its own axis and its revolution around the sun]
(1) 1000 N (2) 10 N (3) greater than 100 N (4) none of these
- Q.41** Which one of the following cannot be explained on the basis of Newton's third law of motion?
(1) rowing of boat in a pond (2) motion of jet in the sky
(3) rebounding of a ball from a wall (4) returning back of body thrown above
- Q.42** A rigid body is acted upon by a horizontal force which is inversely proportional to the distance covered 's'. The work done by this force will be proportional to :
(1) s (2) s^2 (3) \sqrt{s} (4) None of these
- Q.43** Waves on the water surface are -
(1) longitudinal
(2) transverse
(3) combination of longitudinal and transverse
(4) none of these



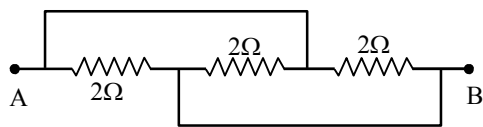
- Q.44** Two bodies A and B of equal masses are kept at heights of h and $3h$ respectively. The ratio of their potential energies is :
- (1) 1 : 1 (2) 1 : 3 (3) 1 : 9 (4) 3 : 1
- Q.45** A train passes over a 400 m long bridge. If the speed of the train is 30 m/s and the train takes 20 s to cross the bridge, then the length of the train is :
- (1) 400 m (2) 600 m (3) 800 m (4) 200 m
- Q.46** If I is the current through a wire and e is the charge of electron, then the number of electrons in t seconds will be given by -
- (1) $\frac{Ie}{t}$ (2) e/It (3) It/e (4) Ite
- Q.47** If a wire of resistance 1Ω is stretched to double its length, then the resistance will become -
- (1) $\frac{1}{2} \Omega$ (2) 2Ω (3) $\frac{1}{4} \Omega$ (4) 4Ω
- Q.48** A body is thrown horizontally from the top of a tower of height 5m. It touches the ground at a distance of 10 m from the foot of the tower. The initial velocity of the body is : ($g = 10 \text{ ms}^{-2}$)
- (1) 2.5 ms^{-1} (2) 5 ms^{-1} (3) 10 ms^{-1} (4) 20 ms^{-1}
- Q.49** A car travels half the distance with constant velocity 30 km/h and another half with a constant velocity 40 km/h along a straight line. The average velocity of car in km/h is -
- (1) 35 (2) 34.3 (3) 0 (4) $\sqrt{(30 \times 40)}$
- Q.50** A driver accelerates his car first at the rate of 2.4 m/s^2 and then at the rate of 1.6 m/s^2 . The ratio of the two forces exerted by the engine in the two cases will be -
- (1) 1 : 2 (2) 2 : 1 (3) 2 : 3 (4) 3 : 2
- Q.51** A ball is thrown vertically upward and after ascending a height of 15m it comes back to the same point. The total displacement of the ball is -
- (1) zero (2) 15 m (3) 30 m (4) 98 m



- Q.52** Pressure varies with area A as -
 (1) A (2) A^{-1} (3) A^2 (4) A^{-2}
- Q.53** Which is not true for a wave ?
 (1) Wave velocity, $v = n\lambda$ (2) Energy is transferred during wave motion
 (3) All waves can pass through vacuum (4) Unit of wave velocity is m/s
- Q.54** The magnetic field inside a solenoid is—
 (1) zero (2) Non-uniform (3) uniform (4) none
- Q.55** A transformer is based on the principle of
 (1) mutual inductance (2) self inductance
 (3) Amper's law (4) Lenz's law
- Q.56** The combination responsible for admitting different amount of light into the eye is.
 (1) ciliary muscles and the eye lens (2) ciliary muscles and pupil
 (3) iris and pupil (4) cornea and pupil
- Q.57** work of electric motor is—
 (1) To convert ac into dc. (2) To convert dc into ac
 (3) Both (1) and (2) (4) To convert ac into mechanical work.
- Q.58** A stone dropped from the top of a tower, takes 5 second to reach the ground level. Calculate
 (i) the velocity of the stone on reaching the ground and (ii) the height of the tower.
 [Take $g = 9.8 \text{ m/s}^2$]
 (1) 59m/s, 130m (2) 49 m/s, 122.5m (3) 49m/s , 138 m (4) 49m/s , 133m
- Q.59** A packet, dropped from a stationary helicopter, hovering at a height 'h' from the ground level, reaches the ground in 12 s. Calculate (i) the value of h (ii) the final velocity of the packet on reaching the ground.
 [Take $g = 9.8 \text{ m/s}^2$]
 (1) 705.6m, 117.6 m/s (2) 600 m, 117.6m/s
 (3) 705.6 m, 130 m/s (4) None of these



Q.60 The electrical resistance between points A and B of the figure shown is –



(1) $\frac{2}{3}\Omega$

(2) 2Ω

(3) $\frac{3}{2}\Omega$

(4) 6Ω

