**PHYSICS**

**SECTION A: (OBJECTIVES)**

1. The rising of a liquid in an open ended glass tube of narrow bore is

A. Osmosis B. Adhesion C. Capillarity D. Surface Tension.

1. Which of the following units is equivalent to the Watt?

A. *kgms-2* B. *kgm2s-3* C. *kgm2s-2* D. *kgm2s-1*

1. Which of the following statements about pressure in a liquid is **correct**?

A. The pressure in a liquid increases with depth B. The higher the density of a liquid, the lower the pressure it exerts C. Pressure in a liquid acts only in a direction perpendicular to the sides of the containing vessel D.Pressure in independent of the acceleration due to gravity.

**F**

**P = 40N**

**5kg**

1. .

A block of wood of mass 5*kg* is pulled on a platform by a force of 40N as illustrated in the diagram above. If the frictional force, **F** experienced by the block 12N, calculate the magnitude of the acceleration of the block.

A. 2.4ms-2 B. 5.6ms-2 C. 8.0 ms-2 D. 10.4 ms-2

1. Solid friction, like viscosity is

A. Independent of the surface areas in contact B. Independent of the relative motion between layers C. Dependent on normal reaction D. In opposition to motion

1. The slope of linear distance-time graph represents

A. Acceleration B. Displacement C. Speed D. Velocity

1. A body of mass 2kg is released from rest on a smooth plane at an angle of 600 to the horizontal. Calculate the acceleration of the body down the plane. (g = 10ms-2)

A. 3.1 ms-2 B. 5.2 ms-2 C. 6.0 ms-2 D. 8.7 ms-2

1. The total area under a force-velocity graph represents

A. Energy B. Momentum C. Power D. Pressure

**Use the following information to answer questions 9 and 10.**

A body of mass 20g projected vertically upwards in vacuum return to the point of projection after 1.2s. (g = 10ms-2)

1. Calculate the speed of projection.
   1. A. 0.6ms-1 B. 1.2ms-1 C. 6.0ms-1 D. 12.0ms-1
2. Determine the potential energy of the body at the maximum height of its motion. A. 0.36J B. 0.72J C. 360.00J D. 720.00J

**17N**

**10N**

**20N**

**6N**

1. Four co-planar forces of magnitudes 10N, 17N, 6N and 20N act at point **O** as shown in the diagram above. Determine the magnitude of the resultant force. A. 53.0N B. 21.0N C. 7.0N D. 5.0N
2. The maximum displacement on either side of the equilibrium position of an object in simple harmonic motion represents.

A. Period B. Amplitude C. Wavelength D. Frequency

1. From Newton’s first law of motion.

A. A body can only undergo translational motion B. Once a body remains at rest no force act on it C. The net force acting on a body in uniform linear motion is zero D. A body’s inertia is its weight.

1. A body of mass 11kg is suspended from a ceiling by an aluminum wire of length 2m and diameter 2mm. calculate the elastic energy stored in the wire. (Young’s modulus of aluminum is 7.0 X 1010 Nm-2; g = 10ms-2; π=3.14).

A. 1.1 x 10-1J B. 5.5 x 10-2J C. 1.1 x 10-4J D. 5.5 x 10-5J

1. The velocity ratio of an inclined plane. A. Increases with increase in the angle of inclination B. Increases with decrease in the angle of inclination C. Decreases with decrease in the angle of inclination

D. Is dependent of the angle of inclination.

1. Which of the following types of thermometer is used for the calibration of other thermometer? A. Liquid-in-glass thermometer B. Constant volume gas thermometer C. Optical pyrometer D. Thermocouple.
2. The magnitude of the expansion or contraction of a substance depends on the l. Temperature ll. Nature of the substance lll. Size of the substance

A. I and ll only B. II and lll only C. I and lll only D. l, ll, and lll.

1. Highly polished slivery surfaces are A. Poor absorbers and poor emitters of radiation B. Good absorber and good emitters of radiation C. Good absorbers but poor emitters of radiation D. Poor absorbers but good emitters of radiation.
2. The volume of given mass of gas at 200C and 800 mmHg is 76cm3. Calculate its volume at s.t.p.

A. 100.0cm3 B. 72.8cm3 C. 60.0cm3 D. 36.4cm3.

1. Which of the following assumptions is not valid for an ideal gas?

A. Molecules of a particular gas are identical B. Molecules move freely throughout the volume of the container C. Force of attraction between molecules is negligible D. Molecules move at constant speed between collisions

1. A body is pulled over a distance of 500m by a force of 20N. If the power developed is 0.4kw, calculate the time interval during which the force is applied A. 0.2s B. 2.5s C. 25.0s D. 250.0s
2. A metal of mass 200g at a temperature of 1000c is placed in 100g of water at 250c in a container of negligible heat capacity. If the final steady temperature is 300c, calculate the specific heat capacity of the metal. (Specific heat capacity of water is 4200 Jkg-1 K-1) A. 150 Jkg-1 K-1  B. 300 Jkg-1 K-1 C. 320 Jkg-1 K-1 D. 1960 Jkg-1 K-1
3. Ether produces a cooling effect when it is poured on the hand because it has

A. low conductivity B. high conductivity C. high latent heat of vaporization D. low latent heat of vaporization

1. Which of the following statements about the image formed by a plane mirror is not correct? A. It is laterally inverted B. It has unit magnification

C. It is formed by actual intersection of rays D. Its distance from the mirror is equal to that of the object from the mirror

1. The image by a convex mirror is always

A. real, erect and diminished B. real, inverted and diminished

C. virtual, inverted and diminished D. virtual, erect and diminished

1. A ray undergoes a minimum of deviation at 400 when it is incident on an equilateral triangular glass prism. Calculate the refractive index of the prism.

A. 1.48 B. 1.50 C. 1.53 D. 1.67

1. Total internal reflection occurs in an optical prism when light rays

A. travel from the prism into an optically denser medium B. are incident in the prism at an angle greater than the critical angle C. are incident normally in the prism D. travel from the prism to air

1. The speed of light in a certain medium is V while its speed in a vacuum is C. The absolute refractive index of the medium is

A. C + V B. C C. V D. C – V

V C

1. An object is placed 20.0cm in front of a converging lens of focal length 15.0cm. Calculate its image distance

A. 1.3cm B. 8.6cm C. 35.0cm D. 60.0cm

1. Presbyopia is a defect of the eye resulting from

A. weak ciliary muscles B. short eyeball C. loss of sphericity of the lens D. long eyeball

1. The focal length of the eye-piece of an astronomical telescope is f1, while the focal length of the objective is f2. For normal adjustment, the angular magnification is given by

A. f2 B. 1 – f2 C. f2 – 1 D. f1

f1 f1 f1 f2

1. Two sound waves have frequencies of 12Hz and 10Hz. Calculate their beat period A. 0.5s B. 1.0s C. 1.2s D. 2.0s
2. The main difference between echo and reverberation is that A. reverberation is reflected sound while echo is refracted sound B. the time interval between incident sound and reflected sound is shorter for reverberation C. the amplitude of an echo is greater D. reverberation is from acoustic speakers while echo comes from cliffs.
3. Which of the following statements about the electromagnetic waves is correct? A. radio waves have longer frequencies than X-rays B. X-rays have the longest wavelength C. Some of the waves travel at 3.0 x 108ms-1

D. White light occupies a region beyond ultraviolet rays.

1. The correct relationship between “G” and “g” in a gravitational field is given by the equation (Where the symbols have their usual meanings)

A. g = GM B. g = GM C. g = GM2 D. g = GM2

R R2 R R2

1. The capacitance of a parallel plate capacitor A. decreases when the separation between the plates decreases B. increases when the potential difference between the plates is increased C. is greater without a dielectric material; between the plates than with a dielectric D. is greater with a dielectric between the plates than without a dielectric
2. When the pointed end of an uncharged optical pin is brought near the cap of a positively charged electroscope, it is observed that the gold leaves A. collapse slowly B. vibrate C. are not affected D. diverge rapidly.

**Use the circuit diagram below to answer questions 38 and 39**

2μF

2μF

6μF

10V

1. Calculate the total charge in the circuit

A. 80μC B. 35μC C. 20μC D. 16μC

1. Calculate the potential difference across the capacitors in parallel

A. 10.0V B. 8.0V C. 6.7V D. 2.0V

1. Which of the following substances does not conduct electricity?

A. Graphite B. Glass C. Sulphuric acid D. Table salt solution

1. The unit of capacitance is

A. Farad B. Coulomb C. Henry D. Ohm

1. The instrument used for measuring electric current is

A. Voltmeter B. Ammeter C. Voltammeter D. Wheatstone bridge

1. Which of the following is not a primary cell?

A. Voltaic cell B. Daniel cell C. Leclanche cell D. Accumulators

1. The formation of hydrogen bubbles on the copper electrode causes

A. Local action B. Polarization C. Discharging of the cell D. Heating

1. Which of the following are magnetic materials?

A. Copper, steel, iron B. Iron, lead, brass C. Steel, glass, lead

D. Nickel, Steel, Iron

1. The angle which the earth’s magnetic field makes with the horizontal; is called the A. magnetic declination B. magnetic meridian C. angle of dip

D. angle of deviation.

1. The angle between the geographic and the magnetic meridian at a point on the earth surface is called the A. angle of inclination B. angle of dip

C. angle of declination D. longitude of the point

1. Which of the following devices converts sound into electrical energy?

A. Telephone earpiece B. microphone C. horn D. electric bell

1. The operation of a moving coil galvanometer is based on

A. electromagnetic induction B. electrochemical effects C. magnetic effect of electric current D. Force on a current carrying conductor in a magnetic field.

1. Which of the following particles are termed nucleons in a neutral atom?

A. Protons and neutrons B. Neutrons and electrons C. Protons and electrons

* 1. D. Protons, electrons and neutrons.

1. Which of the following observation is not an effect of surface tension? (a) droplets of water dripping slowly from a tap (b) mercury spilled on a clean glass plate forms small spherical droplets (c) an insect walking across the surface of a pond (d) water flowing out more easily than engine oil from a container.
2. Which of the following physical quantities is correctly paired with its corresponding S.I unit? (a) Density (kg m3) (b) power (J s-1) (c) specific latent heat (J kg-1 K-1) (d) pressure (N m-1).
3. A liquid of volume 2.00m3 and density 1.00 x 103 kg m-3 of another liquid of density 8.00 x 103 kg m-3. Calculate the density of the mixture. (Assume there is no chemical reaction) (a) 5.20 x 102kg m-3 (b) 8.80 x 102kg m-3 (c) 1.13 x 103 kg m-3 (d) 5.20 x 103 kg m-3.
4. A man of mass m, experience a viscous drag, F and an upthrust, U as he descends towards the ground as a steady velocity, using a parachute. If the acceleration of free fall is g, which of the following expressions is correct? (a) FU = mg (b) U + F – mg = 0 (c) U – F =mg (d) F - U - mg = 0.
5. A body moving at a constant speed accelerates when it is in (a) rectilinear motion (b) translational motion (c) circular motion (d) vibrational motion.
6. An object of mass 2kg moves with a uniform speed of 10ms-1 for 5s along a straight path. Determine the magnitude of its acceleration. (a) 0 ms-2 (b) 1 ms-2 (c) 3 ms-2 (d) 4 ms-2.
7. A body accelerates uniformly from rest at 2 ms-2. Calculate the magnitude of its velocity after travelling 9m. (a) 4.5 ms-1 (b) 6.0 ms-1 (c) 18.0 ms-1 (d) 36.0 ms-1.
8. A block of mass 4.0kg causes a spiral spring to extend by 0.16m from its unstretched position. The block is removed and another body of mass 0.50kg is hung from the same spiral spring. If the spring is then stretched and released, what is the angular frequency of the subsequent motion? (g = 10ms-2). (a) 10√5 rad s-1 (b) 5√2 rad s-1 (c) 5 rad s-1 (d) √5 rad s-1.
9. An external force of magnitude 100N acts on a particle of mass 0.15kg for 0.03s. Calculate the change in the speed of the particle. (a) 50 ms-1 (b) 25 ms-1 (c) 20 ms-1 (d) 5 ms-1.
10. A car of mass 800kg moves from rest on a horizontal track and travels 60m in 20s with uniform acceleration. Assuming there were no frictional forces, calculate the accelerating force. (a) 240N (b) 800N (c) 1600N (d) 2400N.
11. A plane inclined at 300 to the horizontal has an efficiency of 50%. Calculate the force parallel to the plane required to push a load of 120N uniformly up the plane. (a) 50.0N (b) 120.0N (c) 200.0N (d) 240.0N.
12. Which of the following surfaces will radiate heat energy best? (a) Red surface (b) white surface (c) black surface (d) yellow surface.
13. A body mass 200g and specific heat capacity 0.4Jg-1K-1 cools from 370C to 310C. Calculate the quantity of heat released by the body. (a) 4800 J (b) 1200 J (c) 480 J (d) 202 J.
14. The pressure of a fixed mass of an ideal gas at 270C is 3 Pa. the gas is heated at a constant volume until its pressure is 5 Pa. Determine the new temperature of the gas. (a) 1000C (b) 2270C (c) 2730C (d) 5000C.
15. Which of the following waves is electromagnetic? (a) X-rays (b) sound waves (c) water waves (d) tidal waves.
16. An object is placed 10cm in front of a plane mirror. If it is moved farther way from the mirror, determine the distance of the final image from the mirror. (a) 2cm (b) 9cm (c) 16cm (d) 18cm.
17. When an object is placed at the centre of a curvature of a concave mirror, its image is formed at (a) the focus (b) infinity (c) the centre of curvature (d)a distance
18. Which of the following statements about sound waves is nor correct? Sound waves can be (a) reflected (b) refracted (c) diffracted (d) polarized.
19. Which of the following components is used for storing electric charges? (a) Inductor (b) resistor (c) capacitor (d) electrometer.
20. A bulb marked 240V. 40W is used for 30minutes. Calculate the heat generated. (a) 320J (b) 400J (c) 10800J (d) 72000J.
21. Five 80-W and three 100-W lamps are run for 8hours. If the cost of energy is N5.00 per unit, calculate the cost of running the lamps. (1 unit = 1kWh). (a) N280.00 (b) N28.00 (c) N7.20 (d) N1.44.
22. In a nuclear reactor, chain reaction results from the release of (a) electrons (b) photons (c) neutrons (d) protons.
23. Bohr’s theory provides evidence for the (a) structure of the atom (b) positive charge of an electron (c) existence of energy levels in the atom (d) positive charge on a proton.
24. Calculate the inductance of an inductor whose reactance is one ohm at 50 Hz. (a) 2.00 x 10-2 H (b) 6.36 x 10-3 H (c) 3.18 x 10-3 H (d) 4.55 x 10-4 H.
25. An inductor of inductance 10H carries a current of 0.2A. Calculate the energy stored in the inductor. (a) 0.1J (b) 0.2J (c) 1.0J (d) 2.0J.
26. A device used to prevent wearing away of the make-and-break contacts of an induction coil is called (a) fuse (b) electroscope (c) resistor (d) capacitor.
27. The capacitance of a parallel-plate capacitor is increased by making the area of the plates (a) small and their separation large (b) large and their separation small (c) and their separation small (d) and their separation equal.
28. The factor which enables the ear to distinguish between a note played on different instruments is the (a) pitch (b) speed (c) harmonics (d) loudness.
29. In which of the following media does sound travel fastest? (a) Water (b) brass (c) air (d) wood.
30. When white light asses through a triangular glass prism, there is dispersion because of (a) diffraction of light (b) polarization of light (c) the difference in speed of the components of light (d) the interference of light waves in glass.
31. A piece of metal of mass 50g is cooled from 800C to 200C. Calculate the amount of heat lost. (Specific heat capacity of the material of metal = 450 J kg-1 k-1). (a) 4.50 x 103 J (b) 2.25 x 103 J (c) 1.80 x 103 J (d) 1.35 x 103 J.
32. A machine of efficiency 80% is used to raise a body of mass 75kg through a vertical height of 3m in 30s. Calculate the power input. (g = 10ms-2 (a) 9.4 W (b) 60.0 W (c) 75.0 W (d) 93.8 W.
33. The period of oscillation of a particle executing simple harmonic motion is 4 seconds. If the amplitude of oscillation is 3.0m, calculate the maximum speed of the particle. (a) 1.5ms-1 (b) 3.0ms-1 (c) 4.5ms-1 (d) 6.0ms-1.
34. The bob of a simple pendulum takes 0.25s to swing from its equilibrium position to one extreme end. Calculate its period. (a) 0.25s (b) 0.50s (c) 0.75s (d) 1.00s.
35. The resultant of two forces acting on an object is maximum when the angles between them is (a) 1800 (b) 900 (c) 450 (d) 00.
36. A uniform meter rule of mass 90g is pivoted at the 40cm mark. If the rule is in equilibrium with an unknown mass m placed at the 10cm mark and a 72g mass at the 70cm mark, determine m (a) 72g (b) 102g (c) 198g (d) 504g.
37. A bus travelling at 15ms-1 accelerates uniformly at 4ms-2. What is the distance covered in 10s? (a) 150m (b) 170m (c) 350m (d) 600m.
38. A wooden block of mass 1.6kg rests on a rough horizontal surface. If the limited frictional force between the block and the surface is 8N, calculate the coefficient of friction. (g = 10ms-2) (a) 0.6 (b) 0.5 (c) 0.3 (d) 0.2.
39. When the surface of a piece of chalk is scrapped the tiny particles that flake off are known as (a) matter (b) molecules (c) elements (d) atoms.
40. An alternating current which produces heat at the same rate as a direct current of 2 A has an effective value of (a) 2.0A (b) 0.4A (c) 0.14A (d) 1.4A
41. The e.m.f of a cell is the potential difference across the terminals of the cell (a) in a closed circuit (b) in an open circuit (c) when the internal resistance is high (d) when the cell is charging.
42. A resistor of resistance R is connected in parallel with a 12Ω resistor. If the effective resistance is 6Ω . Calculate the value of R. (a) 2 (b) 4 (c) 6 (d) 12
43. Two bulbs of resistances 80Ω and 100Ω are connected in parallel across a 240V a.c. mains supply. Calculate the difference in the values of electrical power consumed by the bulbs. (a) 144 W (b) 320 W (c) 1296 w (d) 2880 W.
44. Which of the following forces is not a field force? (a) Frictional force (b) gravitational force (c) electrical (d) magnetic force.
45. The power of a lens is +2.5 D. Calculate the focal length of the lens (a) 2.5cm (b) 4.0cm (c) 25.0cm (d) 40.0cm.
    1. *Use the information below to answer questions* ***96*** *and* ***97****.*
    2. The magnitude y of the displacement of a progressive wave is given by y = 2sin (3t – 4x), where y and x are in centimeters and t is in seconds.
46. Determine the wavelength of the wave. (a) 4cm (b) 3cm (c) 2 cm (d) .
47. Determine the period of the wave. (a) 2(b) 3s (c) 4s (d) 3s/2.
48. Which of the following thermometric properties is used in mercury-in-glass thermometers? (a) Current flow (b) volume (c) resistance (d) pressure.
49. The total mechanical energy of a body as it falls towards the ground from a given height (a) decreases (b) increases (c) remains unchanged (d) decreases and later increases.
50. Which of the following quantities has the same unit of measurement as work? (a) Momentum (b) moment (c) power (d) pressure.

**PHYSICS**

**SECTION A (OBJECTIVE)**

1. A simple pendulum is made to perform 50 oscillations in one minute. Determine its period of oscillation. O. 02s (b) O.20s. (c) O.83s. (d) 1.20s.
2. Which of the following statements is correct about a body in simple harmonic motion? The (a) amplitude is constant. (b) Frequency is equal to period (c) acceleration is proportional to the displacement from a fixed point. (d) Period is directly proportional to the acceleration
3. The s .I. unit of heat is (a) joule (b) Kelvin (c) watt (d) ampere.
4. An object is dropped from the top of a tower if it takes 4 seconds to reach the ground, calculate the height of the tower. (g= 10m/s2) (a) 20m (b) 40m (c) 80m (d) 160m.
5. When a body is slightly tilted, it is found that its centre of gravity is slightly raised. What is the state of the equilibrium of the body?

(a) Unstable (b) stable (c) Neutral (d) Shaking.

1. A car moves with a speed of 30ms -! Calculate the distance traveled in 30 seconds. (a)30m (b) 60m (c) 450m (d) 900m.
2. Two forces 6N and 8N, act eastwards and northwards respectively on a body. Calculate the magnitude of their equilibrant. (a) 2N (b) 7N (c) 10N (d) 14N.
3. The mass of an object can be measured using the following instruments except
   * 1. spring balance (b) lever balance (c) metre rule (d) beam balance.
4. A turkey stands and makes 4x10-2 m 2 of contact with the ground. If the pressure it exerts on the ground is 2.8 x 103 Pa, calculate its weight. (a) 11.2N (b) 102. 0N

(c) 112.0N (d) 140.ON

1. Which of the following types of motion does a body undergo when acted upon by a couple? (a) Vibrational (b) Translational (c) Rotational (d) Random
2. A body starts from rest and accelerates uniformly at 5m/s2 until it attains a velocity of 25m/s. Calculate the time taken to attain this velocity (a) 2.5sec (b) 5.0sec

(c) 10.0sec (d) 125.0sec

1. A piece of stone is projected vertically upward with a speed of 25m/s. Determine its speed at the highest point. (g = 10m/s2) (a) 5m/s (b) 25m/s (c) 2.5m/s (d) 0 m/s
2. A stone slips off a building and falls through a distance h in 3 seconds. Calculate h. (g=10m/s2) (a) 15m (b) 30m (c) 45m (d) 90m
3. An orange is dropped from a height of 100m above the ground level. Calculate the velocity of the orange just before it strikes the ground (g=10m/s2) (a) 31.6m/s

(b) 44.7m/s (c) 100.0m/s (d) 141.4m/s

1. An object of mass 0.5kg moving with a velocity of 10m/s collides with another object of equal mass at rest. If the two objects move off together after the impact, calculate their common velocity (a) 0.5m/s (b) 5.0m/s (c) 10.0m/s (d) 20.0m/s
2. Which of the following set of quantities are fundamental? (a) Area, volume, acceleration (b) Speed, time, distance (c) Length, time, speed (d) Length, mass , time
3. A rectangular block of dimensions 2.0 x1.0 x 0.5 metres weighs 200N. Calculate the maximum pressure exerted by the block on a horizontal floor (a) 100N/m2

(b) 200N/m2 (c) 300N/m2 (d) 400N/m2

1. Which of the following quantities is a vector? (a) Speed (b) Distance (c) Energy

(d) Momentum

1. Uniform speed occur when there is equal changes of (a) Distance in equal time

(b) Displacement in equal time (c) Velocity in equal time (d) Acceleration in equal time

1. A solid body will float in a liquid if its (a) Density is less than that of the liquid (b) Mass is equal to that of the liquid (c) Density is greater than that of the liquid (d) Mass is less than that of the liquid
2. A body is projected horizontally from the top of hill with a velocity of 20m/s, if it reaches the ground 4 second later. Calculate the height of the hill (g = 10m/s2)
   * 1. 20m (b) 40m (c) 80m (d) 160m
3. The atmospheric pressure can support a column of mercury in the simple barometer equivalent to (a) 760mHg (b) 760cmHg (c) 760mmHg (d) 860mmHg
4. The instrument used for measuring gas pressure is called (a) Barometer

(b) Manometer (c) Fortins barometer (d) None of the above

1. A uniform half-metre rod AB, pivoted at a point 20cm from A, is balanced horizontally by placing a 35g mass at A. Calculate the mass of the rod (a) 140g (b) 175g (c) 233g (d) 350g
2. Which of the following quantities has the same unit as energy? (a) Power (b) Work

(c) Force (d) Momentum

1. A wooden box is pushed toward the East: The friction between the box and the surface A. North B. West C. South D. East
2. Which of the following source of energy is renew able?

A. Sum B. Petroleum C. Coal D. Uranium

1. An object of mass 2kg moving with a velocity of 3m/s collides head- on with another object of mass 1kg, moving in the opposite direction with a velocity of 4m/s. if the objects stick together after collision, calculate their common speed.
   1. A. 0.60m/s B. 0.67m/s C. 2.00m/s D.3.33m/s
2. Jet and rocket repulsions are based on

A. Newton’s first law of motion B. Principles of moment

C. Newton’s third law of motion D. Newton’s second law of motion

1. The S.I unit of temperature is

A. C B. F C. K D. A

1. A boy pulls a box along a horizontal table with a rope inclined to the horizontal at an angle 60o. If the tension in the rope is 40N, what is the effective horizontal force? (a)20N (b) 20√3N (c) 40√3N (d)40/√3N
2. Which of the following is not vector quantity? (a) Force (b)Altitude (c)Weight (d) displacement
3. A boy walks 10m due west and then 10m due South. His displacement is (a) 10m, S30oW (b) 10m, S60oW (c) 10√2m, S45oW (d) 10m, S60W
4. A body falls from rest to the ground in 0.5s. Calculate the height from which it falls (g=10ms-2) (a)0.125m (b) 0.5m (c) 1.0m (d) 1.25m
5. A body accelerates uniformly from rest at 3ms-2. Its velocity after a distance of 24m is (a) 144ms-1 (b)72ms-1 (c) 36ms-1 (d) 12ms-1
6. A motor vehicle is brought to rest from a speed of 15ms-1 in 20s. Calculate the retardation (a) 0.75ms-2 (b)1.33ms-2 (c) 5.00ms-2 (d) 7.50ms-2
7. A ball is thrown vertically upwards from the ground with initial velocity of 20ms-1. The maximum height reached by the ball is (a)7.5m (b) 10.0m (c) 20.0m (d)22.5m
8. A man runs a distance of 1.0km in 5 minutes. His average speed is (a) 20.0ms-1 (b)16.7ms-1 (c) 3.3ms-1 (d) 0.3ms-1
9. A stone projected with a velocity of 50ms-1 from the ground level hits the ground 15s later. The angle of projection is (a) 0o (b) 30o (c) 45o  (d) 60o
10. To obtain the maximum horizontal range a projectile must be fired at an angle θ to the horizontal which is equal to (a) 90o (b) 60o (c) 45o (d) 30o
11. A stone is projected horizontally from the top of a tower with a speed of 10ms-1. It lands at a horizontal distance of 20m from the foot of the tower. Calculate the height of the tower (g=10ms-2). (a) 4.9m (b) 9.8m (c) 10.0m (d) 20.0m
12. An objected is projected with a velocity 80ms-1 at an angle of 300 to the horizontal. The maximum height reached is (a) 20m (b) 80m (c) 160m (d) 320m
13. Weights of 0.2N and 0.5N are placed at the 30cm and 80cm marks on a uniform meter rule. If the meter rule balances horizontally on a knife edge at the 60cm marks, the weight of the meter rule is (a) 0.1N (b) 0.3N (c) 0.4N (d) 0.7N
14. A meter rule pivoted at its centre has masses m1 and m2 placed at the 20cm and 65cm marks. If the meter rule balances horizontally, the ratio of m2/m1 is (a)2 (b) 3/2 (c) 2/3 (d) ½
15. Which of the following combinations will increase the stability of an object? (a)wide base and low C. G (b)Narrow base and low C.G (c) Narrow base and high C.G (d) wide base and high C.G.
16. A uniform meter rod of weight 40N has a piece of metal of weight 20N attached to one of its ends. The centre of gravity of the system from the weighted end is (a) 8.4cm (b) 16.7cm` (c) 25.0cm (d) 33.3cm
17. A particle executing a simple harmonic motion has a frequency of 50Hz and an amplitude of 8.0 x 10-3m. Calculate the maximum velocity of its motion. (a) 2.51ms-1 (b)2.20ms-1 (c) 2.00ms-1 (d) 1.50ms-1
18. A vibrating diving board has a frequency of 20Hz. What is the angular velocity of the board? (a) 2πrad.s-1 (b) 2.20πrad.s-1 (c) 30 πrad.s-1 (d)40 πrad.s-1
19. Which of the following affects the period of a simple pendulum I. Mass of the pendulum bob II. Length of the Pendulum III. Acceleration due to gravity (a) I, II & III (b) II & III only (c) I & III only (d) I & II only
20. The period of oscillation of a simple pendulum which makes 75 oscillation in one minute is (a) 0.13s (b) 0.08s (c) 1.00s (d) 1.25s
21. A simple pendulum of length 0.64m has a period of 2.4s. The period of a simple pendulum of length 0.36m is (a) 1.4s (b) 1.8s (c) 3.2s (d) 4.3s
22. The property of a body to remain at rest or to continue to move in a straight line is known as (a) force (b) impulse (c)movement (d) inertia
23. A ball of mass 0.5kg moving at 10ms-1 collides with another ball of equal mass at rest. If the two balls move together after the impact, calculate their common velocity. (a)0.2ms-1 (b) 0.5ms-1 (c) 5.0ms-1 (d) 10ms-1
24. A machine gun with a mass of 5kg fires a 50g bullet of a speed of 100ms1. The recoil speed of the machine gun is (a) 0.5ms-1 (b) 1.5ms-1 (c) 2ms-1
25. A body of mass 100g moving with a velocity of 10ms-1 collide with a wall. If after the collision, it moves with a velocity of 2.0ms-1 in the opposite direction, calculate the change in momentum. (a) 9.8Ns (b) 1.2Ns (c) 12.0Ns (d) 80.0Ns
26. A pulley system has three pulleys in the fixed block and two in the moveable block. Its velocity ratio is (a) 5 (b) 4 (c) 3 (d) 2
27. A machine requires 1000J of work to raise a load of 500N through a vertical distance of 1.5m Calculate the efficiency of the machine. (a) 80% (b) 75% (c) 50% (d) 33%
28. A pulley system has a velocity ratio of 6 and efficiency of 75%. The effort needed to lift a load of mass 135kg is (g = 10ms-2) (a) 1013N (b) 300N (c) 225N (d)30N
29. A plane which is inclined at an angle of 30o to the horizontal has a velocity ratio of (a) 2.00 (b)1.00 (c) 0.87 (c) 0.50
30. The dimension of power is (a) ML2T3 (b) MLT2 (c) ML2T2 (d) ML-2T3
31. A wave has a frequency of 2Hz and a waveleng of 30cm. The velocity of the wave is (a) 60.0ms-1 (b)6.0ms-1 (c) 1.5ms-1 (d) 0.6ms-1
32. The following types of waves are all transverse except (a) light waver (b)radio waves (c) sound waves (d) x-rays
33. The equation of a wave is y = 0.5 sin [π (0.6x – 300t) were X and Y are in meters. What is the velocity of the wave? (a) 500m-1 (b) 400ms-1 (c) 250ms-1 (d) 2500ms-1
34. Which of the following factors affects the speed of sound in air? I. Temperature II. Pressure III. Frequency (a) I only (b)II only (c)I and II only (d) II and III only
35. A man yelling out to a boy heard his voice reflected by a cliff 4 seconds later. What is the velocity of sound in air if the cliff is 680m away? (a) 170ms-1 (b) 136ms-1 (c) 340ms-1 (d) 680ms1
36. Which of the following waves are both mechanical and transverse? (a) radio (b)sound (c) water (d) X-ray
37. A wave of period 0.02 second has frequency of (a) 0.02 Hz (b) 0.2Hz (C) 5 Hz (d)50Hz
38. Which of the following electromagnetic waves has the shortest wavelength? (a)radio waves (b) X-rays (c) infra-Red rays (d) ultraviolet rays
39. A radio station transmitting at a frequency of 200KHz emits wave of wavelength 1.5km. the velocity of the radio wave is (a) 3 x 102ms-1 (b) 3 x 103ms-1 (c) 3 x 108ms-1 (d) 3 x 1010ms-1
40. Radio waves belong to the class of wave whose velocity is about (a) 340ms-1 (b) 3 x 106ms-1 (c) 3 x 108ms-1 (d) 3 x 108ms-1
41. The property of a body to remain at rest or to continue to move in a straight line is known as (a) force (b) impulse (c) momentum (d) inertia
42. A resultant force of 15N acts for 10 seconds on a body of mass 2kg. Calculate the change in momentum of the body within this period (a) 3.80kgms-1 (b)150kgms-1 (c) 380kgms-1 (d) 38kgms-1
43. A ball of mass 800g moving horizontally with a speed of 5ms-1 hits a vertical wall and rebounds with the same speed. The impulse experience by the ball is (a) ONs (b) 2Ns (c) 4Ns (d) 8Ns
44. A machine gun with a mass of 56kg fires a 50g bullet of a speed of 100ms-1. The recoil speed of the gun is (a) 0.5ms-1 (b) 1ms-1 (c) 1.5ms-1 (d) 4ms-1
45. A bullet of mass 0.2kg traveling with a velocity of 100ms-1 collides with another ball of mass 0.8kig moving at 50ms-1 in the same direction. If they stick together, what will be their common velocity? (a) 60ms-1 (b) 50ms-1 ( c) 75ms-1 (d) 20ms-1
46. A stationary block of mass 56kg is set in motion by a force of 60N. The object attains a speed of 9ms-1 in term t. the value of t is (a) 0.38sec (b) 0.50sec (c) 0.75sec (d) 7.50sec
47. Which of the following has the same unit as the moment of a force? (a) force (b) power (c) work (d) momentum
48. A uniform bar 15m long is balance on a pivot placed at its mid-point. A boy of mass 55kg sits on one arm of the bar at a point 5m away from the pivot? What mass can be placed 2m away from the other end of the bar to keep the bar horizontal? (a)5kg (b)6.9kg (c) 50kg (d) 55kg
49. Masses M1 and M2 at 20cm and 65cm marks of a uniform meter rule freely suspended at its centre of gravity, if the ruler balances horizontally, determine the ratio M2: M1 (a) 2:1 (b) 3:3 (c) 2:3 (d) 1:2
50. Which of the following quantity is a vector? (a) Speed (b) Distance (c) Energy (d) Moment of a force
51. Two Forces 6N and 8N acts east wards and northwards on a body. Calculate the magnitude of their equilibrant; (a) 2N (b)7N (c) 10N (d) 14N

12m

300

ION



Using the diagram, calculate the moment of the force of ION (a) 60√3Nm (b) 120Nm (c) 60Nm (d) 240Nm

1. Which of the following types of motion is produced by a couple (a)Rotational (b)Random (c) Oscillatory (d) Translational.
2. A body of mass 0.5kg is suspended by a string and

mg

12N

0.1

pulled by a Horizontal force of 12N as shown. Calculate the tension T in the string if the body is at equilibrium (g = 10ms-2) (a) 7N (b) 13N (c)17N (d) 3N

1. An example of scalar quantity is (a) Velocity (b) Speed (c) Weight (d) Momentum
2. A car of mass 800kg initially at rest is accelerated at the rate of 4ms-2 The kinetic energy of the car after 5 seconds is (a) 6.40 x 103J (b) 2.56 x 104J (c) 1.60 x 105 (d)6.40 x 105J
3. A hydraulic press has pistons of area 0.2m2 and 0.9m2 respectively. When a force of 300N is exerted on the small piston, the force on the large piston is (a) 66.7N (b) 270N (c)675N (d) 1350N
4. Which of the following is not a fundamental unit (a) meter (b) second (c) Newton (d)Kilogram
5. A body accelerates uniformly from rest at 2ms-2, calculate its velocity after traveling 9m (a) 36ms-1 (b) 18ms-1 (c) 6ms-1 (d) 60ms-1

Time (s)

0.6

0.3

0.5

0.4

0.2

Displacement (m)

Calculate the wave length of the wave if the wave is travelling with a velocity of 3ms-1 (a)0.6m (b) 0.9m (c) 1.4m (d) 1.6m

1. Calculate the distance between the points (2,3) and (-5, 1) on a plane (a) 7.3 (b)7.2 (c) 7.1 (d) 7.4
2. The unit of momentum is (a) Js-1 (b) Ns (c) Ns-1 (d) Nms
3. A car accelerates from 0.54km/h to 0.72km/h in 10 seconds. Its acceleration is (a) 0.25ms-2  (b) 0.005ms-2 (c) 0.05ms-2 (d) 4ms-2
4. An object fall from a height of 20m. How long does it take to reach the ground? (g=10ms-2) (a) 0.5s (b)1s (c) 1.5s (d) 2s
5. A car travelling at 20ms-1 is brought to rest with a constant deceleration of 10ms-2. Calculate the distance travelled (a) 10m (b) 20m (c) 200m (d) 400m
6. An object is projected with a velocity of 80ms-1 at an angle of 300 to the horizontal. The maximum height reached is (a) 20m (b) 80m (c) 160m (d) 320m
7. At what angle must the nozzle of a machine gun be kept when firing to obtain a maximum range for the bullet? (a) 0.00 (b) 22.50 (c) 30.00 (d) 45.00
8. If a projectile has a maximum range of 40m. Find its speed of projection. (g=10ms-2) (a)05ms-1 (b) 2ms-1 4ms-1 (d) 20ms-1
9. An object that was fired into space and was observed to describe a path that is parabolic is called (a) trajectory (b) projector (c) projectile (d) shuttle
10. A ball is thrown vertically upward from the ground with an initial velocity of 10ms-1. The maximum height reached by the ball is (g=10ms-2) (a) 5m (b) 50m (c) 10m (d) 20m
11. A boy walks 10m due west and then 10m due south. His displacement is (a)10m, S300W (b) 10m, S600W (c) 10√2m, S450W (d) 10√2m, S600W
12. A ball is moving at 18ms-1 in a direction inclined at 600 to the horizontal. The horizontal component of its velocity is (a) 9√3ms-1 (b) 6√3ms-1 (c) 6ms-1 (d) 9ms-1
13. Which of the following is not a vector quantity? (a) force (b) altitude (c) weight (d)displacement
14. Weight of 0.2N and 5.0N are placed at the 30cm and 80cm marks on a uniform meter rule. If the meter rule balances horizontal on a knife edge at the 60cm mark, the weight of the meter rule is (a) 0.1N (b) 0.3N (c) 0.4N (d) 0.7N
15. A uniform half meter rule AB is balanced horizontally on a knife edge placed 15cm from A, with a mass of 30g at A. What is the mass of the rule? (a) 4.4g (b)450g (c) 45g (d)0.45g
16. The time rate of change of displacement is known as (a) speed (b) velocity (d) impulse (d) acceleration
17. The property of a body to remain at rest, or to continue to move in a straight line, is known as (a) force (b) impulse (c) momentum (c) inertia
18. A resultant force of 15N acts on a body of mass 4kg. Calculate the change in momentum of the body within this period (a) 3.75kgms-1 (b) 90kgms (c)10kgms-1 (d)360kgms-1
19. A ball of mass 200g travelling with a velocity of 100ms-1 collides with another ball of mass 800g moving at 50ms-1 in the same direction. If they stick together, what will their common velocity be? (a) 20ms-1 (b) 50ms-1 (c)60ms-1 (d) 75ms-1
20. A machine gun with a mass of 5kg fires a 50g bullet at a speed of 100ms-1. The recoil speed of the machine gun is (a) 0.5ms-1 (b) 1.5ms-1 (c) 1ms-1 (d)2ms-1
21. A net force of magnitude 0.6N acts on a body of mass 40g initially at rest. Calculate the magnitude of the resulting acceleration (a) 90ms-2 (b) 60ms-2 (c) 30ms-2 (d) 15ms-2
22. A simple pendulum makes 50 oscillations in one minute. Determine its period of oscillation (a) 0.04s (b) 0.83s (c) 1.20s (d) 50.00s
23. A vibrating diving board has a frequency of 20Hz. What is the angular velocity of the board? (a) 2π rads-1 (b) 20π rads-1 (c) 30π rads-1 (d)40πrads-1
24. A simple pendulum with a period 2.0 has its length doubled. Its new period is (a) 1.00s (b) 1.41s (c) 0.35s (d) 2.83s
25. Which of the following is nor an example of a machine? (a) inclined plane (b) lever (c) horizontal plane (d) pulley
26. In which of the following is the effort applied between the load and the fulcrum (a) claw hammer (b) laboratory tong (c) pliers (d) nutcracker
27. An inclined plane which makes an angle of 300 with the horizontal has a velocity ratio of (a) 2 (b) 1 (c) 0.866 (d) 0.5
28. Calculate the velocity ratio of a screw jack of pitch 0.3cm if the length of the Tommy bar is 21cm (a) 140π (b) 70π (c) 40π (d) 14π
29. A machine of a velocity ratio 5 is 40% efficient. What effort would be needed to lift a load of 100N (A) 200N (b) 40N (c) 50N (d) 2N
30. The instrument used for measuring atmospheric pressure is (a) hydrometer (b) rate meter (c) barometer (d) manometer

**LORAL INTERNATIONAL SECONDARY SCHOOL IGBESA/FESTAC**

**FIRST TERM EXAMINATION 2015/2016**

**FURTHER MATHEMATICS CLASS: SS 2 TIME: 2 HOURS**

**SECTION A (OBJECTIVES)**

1. If y = {1 – 4x)-3, then dy/dx = (a) 12 (1 – 4x)-4 (b) -12(1 – 4x)-4 (c)12(1 – 4x)4 (d) 12 (1 – 4x)-2 (e) (1 – 4x)-4
2. Simplify Sin 3θ – sin θ (a) tan 2θ (b) cot 2θ (c) –cot 2θ (d) –tan 2θ (e) sec 2θ
   * 1. Cos 3θ – cos θ
3. Find the range of value of x for which x2 – 5x > -6 (a) 2 < x < 3 (b) -2≤ x ≤ 3 (c)2 < x < -3 (d) x > 2 and x > 3 (e) x < 1 and x > 6
4. Evaluate 42 1/3 x 36 -1/6 ÷ 211/3 (a) 3 (b) 1/3 (c) 1/9 (d) 1/27 (e)none
5. Given that universal set U = {a, b, c, d, e) and A = (a, b), B = (a, c, d) find A’ n B (a) (a, b, d) (b) (a, b, c, d) (c) (c, d) (d) (a, c, d) (e) (c, d, e)
6. Which of the following is not a measure of central tendency? (a) mean (b) mode (c) median (d) standard deviation (e) geometric mean.
7. If a = 6i – 7j and b = 3i + 2j, find the scalar product of ‘a and b’ (a)32 (b) -32 (c)-4 (d)4 (e) 0

**Find the modulus of the following questions 8 – 12**

1. 3i + 4j (a) √24 (b) 5 (c) √6 (d) 7 (e) √10
2. 4i – 2j (a) √20 (b) 5 (c) 6 (d) 7 (e) √15
3. 10i + j (a) 100 (b) 101 (c) √101 (d) √8 (e) 7
4. 5i – k (a) √26 (b) 5 (c) √15 (d) 20 (e) 2
5. 9i + 4j + k (a) 90 (b) √98 (c) 14 (d) 4 (e) √9

**Find the unit vector of the following question 13 – 15**

1. i + j = (a) 1 + j/√2 (b) √3 (c) √5 (d) 7 (e) 8
2. 2i + j = (a) 2i + j/ √5 (b) 2i + j (c) √15 (d) 20 (e) 10/√5
3. 4i + 3j = (a) 5 (b) 4i + 3j/5 (c) 4i + 3j/4 (d) 9/√3 (e) 17
4. Evaluate log3 81 (a) 2 (b) 3 (c) 4 (d) 9 (e) 18
5. If y = (2x + 3)3, find dy/dx (a) 3(x + y) (b) 3(x – y) (c) 3(x – y)

3x – 5y 3x + 5y 3x – 5y

(d) x – y (e) x + y

x + y x – y

1. One tonne is equal to what in kg (a) 100g (b) 10g (c) 10000kg (d)1000kg (e) 20kg
2. Log10 10 is (a) 0 (b) 1 (c) 2 (d) 3
3. Determine the cardinality of A = (b, e, t, f, g, x) (a) 4 (b) 5 (c) 1 (d) 9 (e) 6
4. If 3y = 243, find the value of y (a) 2 (b) 3 (c) 4 (d) 5 (e) 6
5. If 5 times a certain integer is subtracted from twice the square of the integer the result is 63. Find the integer (a) 21 (b) 9 (c) 7 (d) 4 (e) 3
6. Differentiate 2x4 (a) 8x3 (b) 8x5 (c) 16x (d) x4 (e) 6x5
7. Simplify 3/√5 (a) 3 √5 (b) 15√6/√5 (c) 3 √5/5 (d) 45 (e) 5 √5
8. Find the gradient of the line joining the points (0, 2) and (4, 0) (a) 0 (b) 2 (c) 4 (d) ½ (e) - ½
9. Determine the coordinate of the mid-point of the line joining points (0, 2) and

(6, 0) (a) √40 (b) 40 (c) 4 (d) (3, 1) (e) (1, 3)

1. Solve for x in 2x = 0.125 (a) 2 (b) 3 (c) -2 (d) -3 (e) 4
2. Given that S = (a, b, c, d). What is the power of set S. (a) 4 (b) 8 (c) 16 (d) 32 (e) 14
3. Given that f’ (x) = 3x2 + 4x2 + 5. Find f’ (2) (a) 36 (b) 50 (c) 62 (d) 52 (e)33
4. If a function is defined by f(x + 1) = 3x2 – x + 4, find f’ (0) (a) 4 (b) √4 (c) -4 (d) 5 (e) 6
5. Find the value of 16¾ (a) 6 (b) 7 (c) 8 (d) 9
6. If a = 6i – 7j and b = 3i + 2j, find the scalar product of “a and b” (a) 32 (b) -32

(c) -4 d) 4

1. Find the modulus of the vector 3i + 4j. (a) √24 (b) 5 (c) 6 (d) 10
2. Which of the following is not a measure of central tendency?

(a) Mean (b) Mode (c) Median (d) Standard deviation

1. Find the value of log864 (a) 1 (b) 2 (c) 3 (d) 4
2. Solve for x in 8x = 0.25 (a) ½ (b) 3/2 (c) -2/3 (d) 2/3
3. If the function of x is x3 – 3x2 + x – 5, find the value of f (1) (a) 10 (b) - 20 (c) - 6 (d) 15
4. If f (x) = x3 – 3x2 + x – 5 is divided by x + 2, what will be the remainder?

(a) 10 (b) 27 (c) -27 (d) 30

1. Evaluate log381 (a) 2 (b) 3 (c) 4 (d) 9
2. Differentiate 4x3 (a) 12x (b) 12x2 (c) 12x3 (d) 12x4
3. Simplify log 125

log 25 (a) ½ (b) 2/3 (c) 3/2 (d) 5/4

1. Find the unit vector of 2i + j (a) 2i + j (b) 2i + j (c) √15 (d) 10

√5 5 √5

**If the roots of 3x2 – 4x – 1 = 0 are α and ß for 43 and 44**

1. Find the value of α + ß (a) ½ (b) 3/2 (c) 4/3 (d) 1/3
2. Find the product of the roots αß (a) ½ (b) 3/2 (c) -4/3 (d) -1/3
3. Construct the quadratic equation whose roots are -2 and -3 (a) x2 + 5x + 6 (b) x2 – 5x + 6 (c) x2 – 5x – 6 (d) x2 + 5x – 10
4. Simplify 6/√3 (a) 2√3 (b) 6√3 (c) √3 (d) 5√6
5. Find the scalar product of these two vectors A = 2i + 3j + 5k; and

B = 4i + 1j + 6k (a) 20 (b) 25 (c) 33 (d) 41

1. The scalar product of two vectors at right angles is \_\_ (a) 0 (b) 1 (c) 2 (d) 3
2. Determine the cardinality of the set of P = {b, e, f, k} (a) 5 (b) 2 (c) 4 (d) 6
3. If 5 times a certain number is subtracted from twice the square of the number the result is 63; find the number (a) 4 (b) 3 (c) 7 (d) 9
4. Given that f (x) = 3x2 + 4x + 5, find f (2) (a) 36 (b) 14 (c) 25 (d) 62
5. Find the modulus of the vector 9i + 4j + k (a) 90 (b) √98 (c) 14 (d) √9

**The ages of certain people attending drug-abuse clinic is given below. Use it to answer question 53– 55. The ages are: 15, 18, 18, 15, 12, 12, 19**

1. Find the mean age (a) 12 (b) 14 (c) 16 (d) 15
2. Find the modal age (a) 20 (b) 15 (c) 16 (d) 12
3. Find the median of their ages (a) 12 (b) 13 (c) 14 (d) 15
4. A mass of two tones is equivalent to what value in kilogramme (kg) (a) 200g (b)20g (c) 2000g (d) 20000g
5. The value of tan 60o is equivalent to (a) √2 (b) √3 (c) 2/√3 (d) 1/√2
6. Find the distance between the points A (2, 5) and B (5, 9) (a) 4 (b) 5 (c) 6 (d) 10
7. Find the value of log10100. (a) 0 (b) 1 (c) 2 (d) 3
8. Find the 15th term of the sequence -3, 2, 7 …. (a) 20 (b) 37 (c) 67 (d) 81
9. If 22x = 8 find x (a) 1 (b) 1.5 (c) 2 (d) 2.5
10. Simplify 272/3 (a) 6 (b) 7 (c) 8 (d) 9
11. Solve the equation 3x = 81 (a) 2 (b) 3 (c) 4 (d) 5
12. Simplify log4 81 = x. Find x (a) 2 (b) 3 (c) 4 (d) 5
13. Log10 1000 = x. Find x (a) 1 (b) 2 (c) 3 (d) 4
14. Evaluate 322/5 (a) 1 (b) 2 (c) 3 (d) 4
15. If log93 + 2x = 1. Find x (a) -½ (b) -1/4 (c) 1/4 (d) ½.
16. Find the remainder when 5x3 + 2x3 – 7x – 5 is divided by (x – 2). (a) -51 (b) -23 (c) 29 (d) 49.
17. The sum and product of roots of a quadratic equation are 4/7 and 5/7 respectively. Find the equation. (a) 7x2 – 4x – 5 = 0 (b) 7x2 – 4x + 5 = 0 (c) 7x2 + 4x – 5 = 0 (d) 7x2 + 4x + 5 = 0.
18. The fourth term of a geometric sequence is 2 and the sixth term is 8. Find the common ratio. (a) ±1 (b) ±2 (c) ±3 (d) ±4
19. Find the roots of the quadratic equation x2 + 5x + 6 = 0. (a) -2, -3 (b) 2, 3 (c) -2, 3 (d) 2, -3.
20. Find the unit vector in the direction of -5i + 12j. (a) 1/13 (-5i + 12j) (b) 1/13 (-5i – 12j) (c) 1/13 (5i – 12j) (d) 1/13 (5i + 12j)
21. Simplify (3√2 – 1) (3√2 + 1) (a) 15 (b) 16 (c) 17 (d) 18.
22. Simplify 5/√2. (a) 5√2 (b) 5√4 (c) 5√2/2 (d) 10√2
23. Convert 3√5 to a single root. (a) √15 (b) √30 (c) √45 (d) √60.
24. Simplify 3√2 - √32 + √50 + √98. (a) 11√2 (b) 16√2 (c) 19√2 (d) 4√2.
25. Solve the inequality 2x – 3 < x + 7 (a) x < 5 (b) x < 10 (c) x <15 (d) x < 17.
26. If the sum of 3x, 2x, 4x + 900 = 3600. Find x. (a) 300 (b) 600 (c) 450 (d) 900.
27. Find the acute angle between the lines 2x – y = 4 and x – y = 3. (a) tan-1 (2) (b) tan-1 (3) (c) tan-1 (2/3) (d) tan-1 (1/3).
28. The ages in years, of four boys are 10, 12, 14, and 16. Find the average age of the boys. (a) 12 years (b) 121/2 years (c) 13 years (d) 14 years.
29. If y = 3x2. Find dy/dx. (a) 12x (b) 6x2 (c) 6x (d) 3x3.
30. The 3rd term of an A.P is 16 and its 6th term is 34. Find the second term. (a) 12 (b) 10 (c) 8 (d) 6.
31. A stone is dropped from the top of a building 160m high. Find, in seconds, the time taken to reach the ground. (g = 10m/s2). (a) 16 (b) 4√2 (c) 4 (d) 2√2.
32. Find the distance between A (3, 2) and B (4, 6). (a) √12 (b) √13 (c) √15 (d) √17.
33. Find the midpoint of the line joining the points A(3, 5) and B(1, 3). (a) 2, 2 (b) 2, 3 (c) 2, 4 (d) 2, 5.
34. Find the gradient of the line joining (3, 2) and (7, 10). (a) 1 (b) 2 (c) 3 (d) 4.
35. Determine the equation of a straight line of gradient 3 and y – intercept 2. (a) y = 3x + 2 (b) y = 3x – 2 (c) y = x + 2 (d) y = 4x – 2.
36. Given the y – intercept form of y = -5x + 1. What is the gradient? (a) 5 (b) -5 (c) 1 (d) -1.
37. Given the equation y = 3x – 4. What is the intercept on the y = axis. (a) 4 (b) -4 (c) 3 (d) -3.
38. Find the derivative of x2 + y2 = 4. (a) x2 (b) x/y (c) –x/y (d) 2x/y
39. If y = 2x4. Find d2y/dx2 (a) 18x (b) 16x (c) 8x2 (d) 16x2.
40. Solve the simultaneous equations 3x – y = 7 and 2x = 3 – y (a) -1, 2 (b) -2, -1 (c) 2, -1 (d) 2, 1
41. Evaluate (0.008)1/3 (a) 0.15 (b) 0.8 (c) 0.5 (d) 0.2
42. Given that a2 – b2 = 18, and a – b = 9. What is (a + b)? (a) 0 (b) 1 (c) 2 (d) 3
43. If Sin 3x = Cos2x and 0 < x < 900, find x (a) 900 (b) 450 (c) 360 (d) 180

**Using the data 3, 2, 6, 8, 9, 6, 12, 11, 12, 6.**

1. Find the median. (a) 6 (b) 7 (c) 8 (d) 9.
2. Find the mode. (a) 6 (b) 8 (c) 11 (d) 12.
3. Find the mean (a) 6.5 (b) 7.5 (c) 8.5 (d) 9.
4. If f(x) = 2x2 + 5x + 2. Find f(2) (a) 10 (b) 20 (c) 30 (d) 40.
5. Which one of the following option is not a measure of central tendency? (a) Mode (b) variance (c) mean (d) median.

**PHYSICS**

**SECTION A (OBJECTIVE)**

1. Which of the following sources of energy is renewable? (a) petroleum (b)charcoal (c) solar (d)nuclear
2. The following are insulators except (a)wool (b) glass (c)silver (d)foam
3. The upward force experienced by an object immersed in a liquid is (a)upthrust (b)weight (c)float (d)viscous drag
4. A boy of weight 300N climbs to the top of a hill of height 20m. Calculate the work done by the boy. (a) 6000J (b) 600J (c) 320J (d) 15J
5. Which of the following instruments is suitable for making the most accurate measurement of the thickness of wire? (a) metre rule (b)micrometer screw gauge (c)venier calipers (d) pair of divider
6. The s1 unit of density is (a)ms-1 (b) Kgm3 (c)Kgm-2 (d) Kgm-3
7. Calculate the magnitude of the force required to just move a 20kg object along a horizontal surface if the co-efficient of friction is 0.2 (a)400.0N (b) 40.0N (c)4.0N (d) 0.4N
8. Convert 36km/h to m/s. (a) 10m/s (b) 20m/s (c) 30m/s (d)2.5m/s
9. Which of the following is not a unit of power? (a) watt (b)horse power (c)joule per second (d) wattmeter
10. The measuring cylinder is used to measure (a)Area (b)mass (c) volume (d)weight
11. Which of the following set of quantities is fundamental? (a) Length, Mass, Time (b)Speed, Length, Time (c) Speed, Mass, Distance (d)Distance, Time Speed
12. Most suitable instrument used for measuring the internal diameter of a test-tube is (a)Meter rule (b) vernier calipers (c)micrometer screw guage (d)ruler
13. Kind of energy stored in the spring of a wound clock is ……………. Energy (a)chemical (b)heat (c)potential (d)kinetic energy
14. Which of the following is a vector? (a)distance (b)energy (c)velocity (d)time
15. A rectangular block of wood has length 6cm width 5cm and height 10cm. If the mass of the wood is 150g. What is the density of the wood? (a)0.2g/cm (b) 2g/cm3 (c) 0.5g/cm3 (d) 19g/cm3
16. The motion of the wheels of a bicycle moving on a smooth straight road is (a) Oscillatory and random (b)rotational and transnational (c)random rotational (d)vibrational motion
17. The following are derived units except (a) M3 (b) N (c)Kg (d)Kgms-2
18. The motion of smoke particles is as typical example of (a)Oscillatory motion (b)rotational motion (c) random motion (d) circular motion
19. Which of the following devices converts sound to electrical energy? (a)loud speaker (b)microphone (c)dynamo (d)radio
20. Mechanical energy can be converted to electrical energy through (a)electric motor (b)Generator (c)Transformer (d)explosives
21. The slope of a displacement time graph is used to determine (a)speed (b)velocity (c)acceleration (d)displacement
22. Renewable energy sources are those which are ? (a) used over and over again (b)very cheap (c)easily replaced (d)very scarce
23. A body of mass 2.0kg is moving with a velocity of 20.0m/s. Calculate the kinetic energy of the stone. (a) 200J (b) 400J (c) 800J (d) 1600J
24. A 70kg man ascends a flight of stairs of height 4m in 7 seconds. The power expended by the man is (a) 40W (b) 100W (c) 280W (d) 400W
25. A car in motion is said to possess (a) heat energy (b) potential energy (c)kinetic energy (d) chemical energy
26. The engine of a train produces a force of 300N when moving at 30ms-1. Calculate the power of the engine (a) 1000W (b) 3000W (c)6000W (d) 9000W
27. An object of mass12kg is suspended at a height of 5m above the ground for 30 seconds. Calculate the work done. (a) 600J (b) 200J (c) 60J (d) OJ
28. The force required to just make a 6kg object move along a horizontal surface where the co-efficient of friction is 0.25 is (a) 130.0N (b) 24.0N (c) 15.0N (d) 1.5N
29. The friction which opposes motion operates when one solid surface slides over another is called (a) solid friction (b)static friction (c)dynamic friction (d)limiting friction
30. Which of the following is not a viscous liquid? (a)Gum (b)engine oil (c)Water (d)honey
31. When a body is released from a certain height it will fall under (a)weight (b) friction (c) gravity (d) force
32. An object of mass 12kg is held at a height of 5 metres above the ground for 30 seconds. The work done is (a) 600J (b) 200J (c) 60J (d)0J
33. A force of 20N moves horizontally through a distance of 10 metres. Calculate the work done. (a) 20J (b) 200J (c) 2000J (d) 2J
34. A 70kg man ascends a flight of stairs of height 4m in 7 seconds. The power used by the man is (a) 40W (b) 100W (c) 280W (d) 400W
35. The energy which a body possess due to its position is called ……….. energy. (a) potential (b)kinetic (c)hydro (d)dynamic
36. The unit of power is (a)Joule (b)Watt (c)Kelvin (d)Newton
37. A pump lifts water into an over head tank at a height of 12m at the rate of 5kg/s. The power of the pump is (a) 60W (b) 600W (c) 720W (d)1200W
38. The unit of work done is (a) Kelvin (b)Newton (c)Joule (d)Newton-second
39. A force of 50N moves through a distance of 0.5m. The work done is (a)50J (b) 60J (c) 25J (d) 75J
40. A bullet of mass 40g moves at a velocity of 200mls. Calculate its kinetic energy. (a) 8J (b) 80J (c) 800J (d) 8000J
41. The formular work done divided by time is called (a) energy (b)power (c)gravity (d)impulse
42. The formula for Kinetic energy is (a) ½ mv2 (b)mgh (c) ½ mgh (d)½ mv.
43. When a body is released from a height. Midway in the air the body possess (a) K.E. (b)P.E. (c)P.E and K.E (d) 2P.E
44. The energy stored in a spring is called (a)K.E. (b) Elastic energy (c)elastic P.E. (d) P.E.
45. The motion of a helical spring is called (a) linear motion (b)vibrational motion (c)circular motion (d)rotational motion
46. The force required to just make a 6kg object move along a horizontal surface where the coefficient of friction is 0.25 is (a) 150N (b) 24N (c) 15N (d) 1.5N
47. Which of the following is a method of reducing friction? (a) lubrication (b)stretching (c)heating (d)pressing the surface together
48. A man pushes a wooden box on the ground towards the east, the friction on the box will move towards the (a)South (b)North (c) West (d)South-West
49. If the surfaces in contact are so smooth, the friction is (a) high (b)Low (c) zero (d) very low
50. For two rough surfaces moving in contact the friction is (a) high (b)low (c) zero (d) very low
51. Which of the following is a fundamental quantity? (a) Density (b)energy (c)Length (d)Speed
52. Which of the following is not a vector quantity? (a) force (b)Acceleration (c)Mass (d)Weight
53. The unit of acceleration is (a) M/S (b)M/S2 (c) M2/S2 (d)Newton
54. The dimension of velocity is (a) L2 (b) LT (c) LT-1 (d)LT-2
55. The dimension of stress is (a)LT-1 (b)MLT-1 (c) ML-1T-2 (d)LT-2
56. Any object immersed in a liquid will experience an upward force called (a) Viscosity (b)friction (c) upthrust (d) Weight
57. The mass of an object is 600g. If the volume is 200cm3, calculate its density. (a) 30g/cm3 (b)3g/cm3 (c) 0.3g/cm3 (d) 20g/cm3
58. An object weighs 60.0N in air, 48.2N in a certain liquid X and 44.9N in water. Calculate the relative density of the liquid X. (a)3.300 (b) 1.279 (c) 0.932 (d) 0.782
59. The slope of a velocity-time graph physically represents (a) distance (b) acceleration (c)speed (d)momentum
60. The motion of a butterfly is regarded as (a) translational (b)Oscillatory (c)Random (d) Ratational
61. In which of the following is frictional force a disadvantage? (a) help in power transmission (b) causing wear or tear (c) two wood nailed together (d) without friction we cannot walk
62. Which of the following is not a contact force? (a) Tension (b)Weight (c)Friction (d)Pulling Force
63. The Verinier calipers has an accuracy of: (a) 0.01cm (b)0.010cm (c)0.001cm (d)0.0001cm
64. The weight of a boy of mass 60kg is (assume g = 10mls2) (a) 600N (b) 600W (c) 600J (d) 600K
65. Convert 18km/h to m/s. (a)20m/s (b) 15mls (c) 10mls (d) 5m/s
66. The total amount of energy in the universe is (a) variable (b)constant (c)fixed (d) all of the above
67. A ball of mass 0.5kg is placed at a height of 20m. calculate its potential energy (g = 10m/s2) (a) 57J (b) 62J (c) 35J (d) 100J
68. A bus travels 225km in 4 hours. Calculate the average speed in km/h. (a) 25km/h (b) 54.5km/h (c) 56.3km/h (d) 60km/h
69. A piece of solid has a volume of 15cm3 and a mass of 27g. Calculate its density. (a) 1.89g/cm3 (b) 0.18g./cm3 (c) 0.018g/cm3 (d)180g/cm3
70. If a force of 50N pulls a train through a distance of 20m. Calculate the work done. (a) 103J (b) 102J (c) 105J (d) 106J
71. Convert 72km/h to m/s. (a) 20m/s (b) 10m/s (c) 40m/s (d) 50m/s
72. The minimum force that is just required to pull a box of mass 50kg is 200N. Find the coefficient of friction between the floor and the box. (g = 10m/s2) (a) 4.0 (b) 0.25 (c) 0.4 (d) 0.5
73. The linear velocity of a particle moving in a circle of radius 50cm is 20m/s. Calculate the acceleration of the body. (a) 10m/s2 (b) 2m/s2 (c)15m/s2 (d) 800m/s2
74. A body moving at a constant speed accelerates when it is in (a)rectilinear motion (b)translational motion (c)circular motion (d)vibrational motion
75. Mechanical energy can either be (a)Kinetic or electric (b)electric or heat (c)potential or kinetic (d)chemical or potential
76. The following are derived units except (a) kgm-3 (b) N (c)kg. (d)M3
77. Which of the following is a non-renewable energy source? (a) Coal (b)Hydro (c)Solar (d)Ocean waves
78. The friction which exists between two layers of liquid in relative motion is called (a) capillarity (b)surface tension (c) viscosity (d)cohesion
79. Which of the following is a viscous liquid? (a) water (b) kerosene (c)petrol (d)gum
80. The best instrument used for measuring a constantan wire is (a)metre rule (b) vernier calipers (c)micrometer screw gauge (d)divider
81. The instrument used for measuring the thickness of a sheet of paper is (a)vernier caliper (b) external caliper (c) micrometer screw guage (d)metre rule
82. The measuring accuracy of micrometer screw guage is (a) 0.1cm (b)0.01cm (c) 0.001cm (d) 0.001mm
83. The dimension of surface tension is (a) MT2 (b)M-1T2L-1 (c) MT-2 (d)M2T-2.
84. The unit of power watt is the same as (a) Nm (b) J/s (c) m/s (d) N/m2
85. The volume of stone of irregular shape can be determined using (a)metre rule (b) measuring cylinder (c) vernier caliper (d)micrometer screw guage
86. What is the least possible error in using a metre rule graduated in centimeter? (a) 0.1cm (b) 0.5cm (c) 1.0cm (d) 2.0cm
87. The motion of a woman buying things in the market is (a) Rotational (b)Random (c)Translational (d) Linear
88. Which of the following is a derived unit? (a) Kg (b) metre (c) Kelvin (d)Newton
89. The resultant of two forces 20N and 8N acting in opposite direction is (a)10N (b)12N (c) 14N (d) 16N
90. Which of the following is most viscous at room temperature? (a)kerosene (b) Alcohol (c) Petrol (d) Palm oil.
91. A solid weighs 6.4N in air, 5.4N in water and 5.6N in kerosene. Calculate the relative density of kerosene (a) 0.80 (b) 0.75 (c) 0.60 (d) 0.50
92. Two forces 75N and 17N are pulled towards the East. Calculate the resultant force (a) 58N east (b) 89N east (c) 92N east (d) 82N east
93. The motion of a car wheel is (a) rotational (b) translational (c)circular (d) rotational and translation
94. Which of the following liquid is the most viscous? (a) palm oil (b)vegetable oil (c) gum (d) petrol
95. Which of the following cannot be used for measuring volume accurately? (a) Burrette (b) Pipette (c) Measuring cylinder (d) Glass cup
96. Increase in the velocity of a car is called (a) over speed (b) deceleration (c)acceleration (d)accelerando
97. Anything that possess mass and occupy space is (a) molecule (b)matter (c)particle (d) atom
98. The great scientist which propounded a law concerning object immersed in a fluid is (a) Faraday (b) Archimedes (c) Newton (d) Gallileo.
99. The unit of relative density is (a) kg/m3 (b) kgm/s2 (c) N/m2 (d) no unit
100. The friction which operates when one solid slides over another surface is called (a) solid friction (b) dynamic friction (c) static friction (d)limiting friction.