**PHYSICS FORM FOUR**

**OPENER TERM ONE 2023**

 ***MARKING SCHEME***

1. a) linear ( translational) motion

b) Oscillatory motion

c) Circular motion

 2. a) Latent heat of fusion is the heat required to change the matter from solid to liquid without change in temperature

 b) Heat capacity is the amount of heat energy required to raise the temperature of a given mass of material by one degree/ Kelvin

 c) Evaporation is the continuous process which molecules break from the surface of liquid to the atmosphere at any temperature

 3. a= $\frac{V-U}{t}$ = $\frac{36-20}{4}$= 4m/s2

 4. a) capacitance is charge stored per unit voltage.

 b) Area of overlap.

 Distance of separation between plates.

 Permittivity of the insulating material.

 5. i) A stationary wave is produced by superposition of two waves of same speed , frequency and equal amplitude.

 ii) Has nodes at points of displacement and antinodes at points of maximum displacement

 iii) At points between successive nodes, the vibration of particles is in phase.

 6. a) The ratio of the sine of incidence and angle of refraction is constant. The incidence ray, the refracted ray and the normal ray at a point of the incidence all fall on the same plane.

 b)$w∩g=w∩a× a∩g$

 $\frac{3}{4}$×$ \frac{3}{2}$= $\frac{9}{8}$=1.13

 7. a) Momentum is the product between the mass and velocity of a body

 b) Elastic collision both kinetic energy and momentum are conserved unlike inelastic collision where momentum is maintained but kinetic energy lost

 8. Emf is the voltage across the terminal where the circuit is open whereas the potential difference is the voltage across the terminal of a cell when the circuit is closed

 9. Ohms law states that the current through a conductor is directly proportional to the potential difference across the conductor provided temperature and other physical conditions are kept constant.

 10.

 11. a) the fluid is streamline

 b) The fluid is incompressible

 c) The fluid is non- viscous

 12. A1=3.142×0.0252=1.96375×10-3M2

 A2=.142×0.012=3.142×10-4M2

 A1V1=A2V2

 V2=$\frac{20×1.96375×10-3}{3.142×10-4}$

 13.a) This is the force which causes the surface of a liquid to behave like a stretched elastic skin

 b) Temperature and impurities

 14. i) work done is the product of force and distance moved by a body

 ii) Mechanical advantage is the ratio of load to effort

 M.A=$\frac{load}{EFORT}$

 iii) Velocity ratio is the ratio of effort distance to load distance

 iv) Efficiency is the ratio of mechanical advantage and velocity ratio expressed as a percentage

 15. i) Velocity ratio=$\frac{1}{sin∅}$=$\frac{1}{sin30}$=2

 Mechanical advantage= Efficiency× VR=$\frac{72}{100}$×2=1.44

 Effort=$\frac{load}{M.A}$=$\frac{50×10}{1.44}$=347.2N

 ii) Work done against friction = work input- work output

 Work output = mgh= 50×10×4=2000J

 Work input= effort × distance moved by effort

 3.44.2×$\frac{4}{sin30}$= 2777.6J

 Work against friction= 2777.6-2000=777.6J

 i) Temperature: increasing the temperature of a liquid brings about increase in movement of molecules on the surface. Hence the evaporation increases

 ii) Surface area

 iii) Draught

 iv) Humidity

 Heat lost by steam=$\frac{25}{1000}$×lvj=0.025lvj

 Heat lost by water=mcØ= 0.025×4200×(100-27)=7665j

 Heat gained by ice= 0.04 ×336000=13400j

 Heat gained by water= (0.6+0.04)4200×27= 72576j

 Heat gained by calorimeter= 0.3×400×27=3240j

 Heat gained = heat lost

 0.025lvj+ 7665= 13400+ 72576+3240

 Lvj=3262040Jkg-1

 16. a) using rollers, greasing and air cushioning

 b) Momentum before= momentum after

 (1200kgs×72 × $\frac{5}{18}$ )+ (800×0) =2000(v)

 2400=2000v

 12m/s

 ii) Distance= time× speed

 12m/s ×10=120metres

 iii) Impulsive force= change in momentum

 12000×20=24000

 1200×12=14400

 24000-14400=9600

 Ft=9600

 F×2=9600

 f=4800N

17 a) the rate change place in the direction of the force of momentum of a body is directly proportional to the external force and takes place in the direction of the force

 b) i) Going upwards

M ( a+g)=f

70(2+10)=140N

ii) M ( a-g)=f

70(10-2)=560N