**232/1**

**PHYSICS**

**PAPER 1**

**(THEORY)**

**FORM FOUR**

**END TERM 1 2023 EXAMS**

**MARKING SCHEME**

1. 16.21mm✓1 correct answer with correct units

Accept 1.621cm or 0.01621m

1. Momentum is conserved momentum before = momentum after

72 9 = 216 4✓1

⇒ u = ✓1

= 3.0m/s✓1

1. Roofing materials allows radiations to penetrate into the greenhouse✓1 but not out. Higher concentration of carbon dioxide inside the greenhouse helps to retain higher temperature by trapping/ insulating✓1 the heat.



1. V.R = 3✓1
2. Increase in temperature increases✓1 the speed of sound.
3. i) Convection takes place in air upwards direct due to✓1 to density defect.

ii) Convection requires a ✓1 material medium but the space between the sun and the earth i.e. space of the atmosphere has no material medium

1. From the equation of continuity

A1U1 = A2U2✓1(flow rate is constant)

120 0.4 = 4 U2

 U2 = ✓1

= 12 ms-1✓1

1. Work done on the mass

 = force distance

 = 25 10 120

 = 5000J.✓1

Work done = power time

 = 200 30✓1

 = 6000J✓1

But = 100

= 100

= 83.3% ✓1

1. ΔH = MCΔ

= +

390

= 34650.000 + 429000

= 463650✓1

Energy dissipation E = pt

3000

⇒t = = 154.55 sec✓1

1. At balance

Sum of clockwise = sum of anti-clockwise moments

 40 = 30 X + (10)✓1

1.840 = 30X +18

X = ✓1

= 1.8N✓1

1. To increase surface area of contact thus reducing pressure exerted on the road✓1

**SECTION B**

1. a)



b) i) Velocity =

 =✓1

 = 31.25cms-1✓1 **OR**0.3125ms-1

 ii) E to I

 Velocity = ✓1

 = 56.25 cms-1✓1

c) a =

 =

 = = 1.5625ms-2

d) End A✓1

e) i) Trolley runs on a straight path on the runway✓1

 ii) Tape lies flat on the horizontal surface. ✓1

1. i) Brownian motion is the continuous erratic/ random motion in either gas or liquid molecules✓1

ii) - A small glass with air and carbon (smoke) particles✓1

* the glass cell is strongly illuminated by a filament lamp directed by a perspex rod✓1
* the particles scatter light and they can be viewed through a microscope✓1
* they appear as bright specks (spots) moving with the same irregular random motion



 b) i) V= r2h

 0.01 = 3.14 r2h✓1

 h = ✓1

 = = 2m ✓1

 ii) i) Oil spreads to form a monolayer✓1

 ii) Oil patch formed is exactly circular. There is no evaporation of oil molecules movement/ spreading ✓1 of the oil molecules are elastic.

1. a) i) In elastic collision – K.E and momentum of the objects are conserved✓1

 Elastic collision – only momentum is conserved✓1

 ii) Initial momentum = Final momentum

 2MBUB + MAUA = 3MV✓1

 0 + MUA = 3Mu✓1

 3Mu = MU

 u -

 = ms-1✓1

b) i)



 ii)



1. a) i) = 2f

 = 210

 = 20rad s-1

 = 62.83 rad-1

 TA = M2r – mg

 = ✓1

 = 19 + 3.9 – 10

 = 1963.9N✓1

 ii) At the lowest point

 Fc = T – Mg

 ⇒ Fe + Mg

 = mr2 + mg

 = 10.5+ ✓1

 = 1973.9 + 10

 = 1983.9N✓1

 b) i) - Electric heater is switched ✓1 on.

 - Time is obtained for a certain temperature rise✓1

 - Mass of block is obtained✓1

 pt = MCθ

 c = ✓1

 ii) pt = MCΔ

 ⇒C=

 = ✓1

 = ✓1

 = 4050JKg-1k-1

1. a) i) ∑C.m = ∑ A.C.M

 40(0.25 - u) = 30 20✓1

 10 – 40u = 600

 40u - -590

 U = ✓1

 = - 14.75N✓1

 u = 14.75 (acting upwards)

 ii) U = wgt of liquid displaced

 14.75 = mg

 = v g

 Vol of liquid displaced = vol of block

 =

 = = 0.00125✓1

 14.75 = 0.00125

 ⇒ = ✓1

 = 1180kgm-3✓1

b) i) A floating object displaces its own weight of the fluid on which it floats✓1

 ii) Tension + Upthrust = weight

 Upthrust = wgt of H2O displaced

 Vol. of H2O displaced = vol of aluminium

 = =

 = 3.7 m3✓1

 Mass of H2O =

 = 1000

 = 3.7

 upthrust = wgt of H2O displaced

 = 3.7

 = 3.7N✓1

 Since T + U = W

 T = W – U

 = Mg – U

 T = (10 ) – 3.7

 = 6.3N✓1