**232/1**

**PHYSICS LANJET 2021**

**PAPER 1**

**MARKING SCHEME**

1. 16.21mm✓1 correct answer with correct units

Accept 1.621cm or 0.01621m

 Magnetic force

Electrostatic force

Gravitational force

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**

13. (a) (i) A-B - stationary body

 (ii) B – C to moves with increasing velocity

 (iii) CD to deceasing velocity

 b)

50m

45m

 R = Ut

 h = ½ gt2

 45 = ½ x 10 x t

 t2 = 45 = 9

 5

 t = 3less

14.a) The pressure of a fixed mass of gas is directly proportional to absolute temperature provided that volume is kept constant. ✓1

b) When a gas is heated it expands ✓1 increasing the number of collusions per unit area which in turn raise the pressure✓1

c)

i) - Temperature of water✓1

 - Pressure gauge reading✓1

ii) - Collect various values of pressure under different temperatures✓1

 - Plot a graph of pressure against temperature and study the values✓1

iii) P

P1 – 5.0 x 105 Pa

P2 = ?

T1 = 273 + 37 = 300k

T2 = 75 + 273 = 348k

 ✓

 ✓1

P2 =

 = 580000

P2 = 5.8 x 105 Pa✓1

 (ii) R = ut

 50 = 0 x 3

 3 3

 U = 50 = 16. 67 m/s

 3

 (iii) V = u + at

 = gt

 = 10 x 3

 =30m/s

15.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

 b) i)



 ii)



16.a) i) = 2f

 = 2 10

 = 20rad s-1

 = 62.83 rad-1

 TA = M 2r – mg

 = ✓1

 = 19 + 3.9 – 10

 = 1963.9N✓1

 ii) At the lowest point

 Fc = T – Mg

 ⇒ Fe + Mg

 = mr 2 + mg

 = 10.5+ ✓1

 = 1973.9 + 10

 = 1983.9N✓1

 b(a) (i) Tension in the spring supporting the object. 🗸¹

 (ii) There is change in the direction of instantaneous velocity at various

points along the circular path. 🗸¹

 (b) (i) The spring balance reading increases. 🗸¹

 (ii) The centripetal force

1. The object moves tangentially to the circular path at that point where it cuts. 🗸¹

a) 17 (a) A floating object displaces its own weight of the fluid in which it float.

b (i)



Upthrust, u

(ii) U = mg + T

 (ii) Viscous drag

 B (i) Upthrust = weight of solid

 = 11.5 x 0.8 x 10

 1000

 = 0.092 N

 (ii) Density of solid = volume submerged

 Density of liquid Total volume

0.8 = 8.5

 e1 11.5

e1 = 1.0824g/cm3

Alternatively

e = m

v

= 0. 0.92 x 100

 8.5

1mk

 = 1.0824g/cm3

d) i)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Load | 0.00 | 1.00 | 2.00 | 4.00 | 5.00 | 6.00 |  |
| L | 10.00 | 11.50 | 13.50 | 16.00 | 18.00 | 24.00 |  |
| EWeight (mg) | 0.00 | 1.50 | 3.50 | 6.00 | 8.00 | 14.00 | 1 |

 ii) Suitable axes labelled 1

Tension (T)

 All points correct 1

 Suitable line 1

 iii) Springs constant K = F 1

 e

 Use students graph

 Correct units 1

 iv) Energy stored when the length is stretched by 16 cm

 Area under the graph 1

 Or E = ½ ke2

 Use k from graph and e = 16 cm.

 K must be correct.

 Correct substitution 1

 Answer correct unit 1

(iii) Upthrust = weight of liquid displaced

 = 11.5 x 1.0824 x 10 1000

 = 0.1245 N

18.