**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

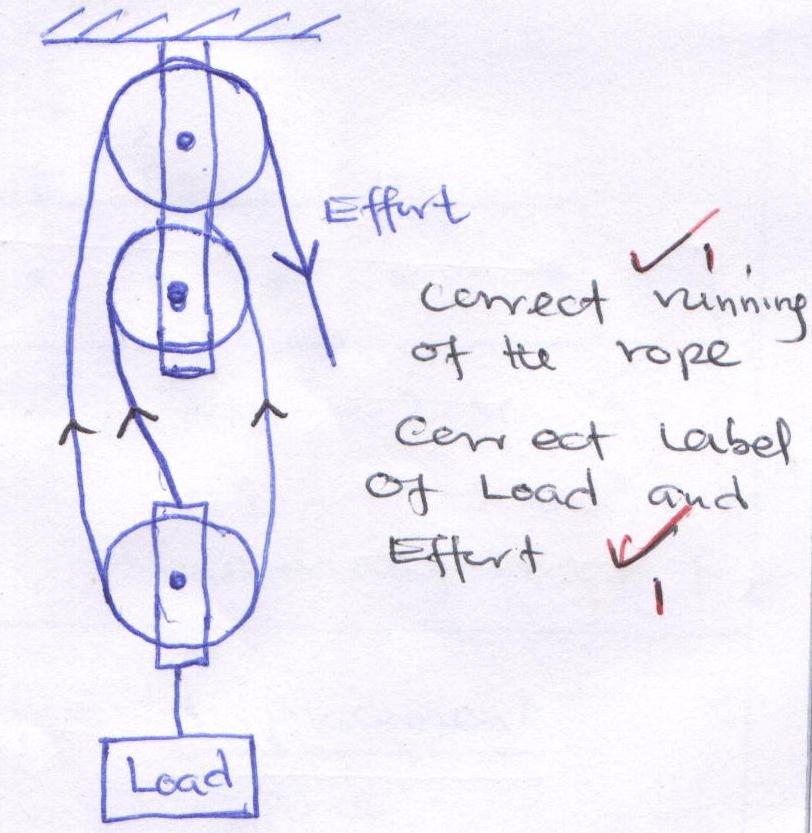
1. Momentum is conserved momentum before = momentum after

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

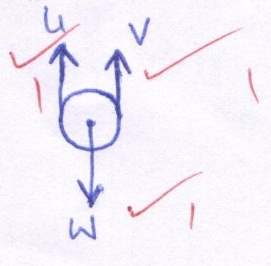
=30m/s

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

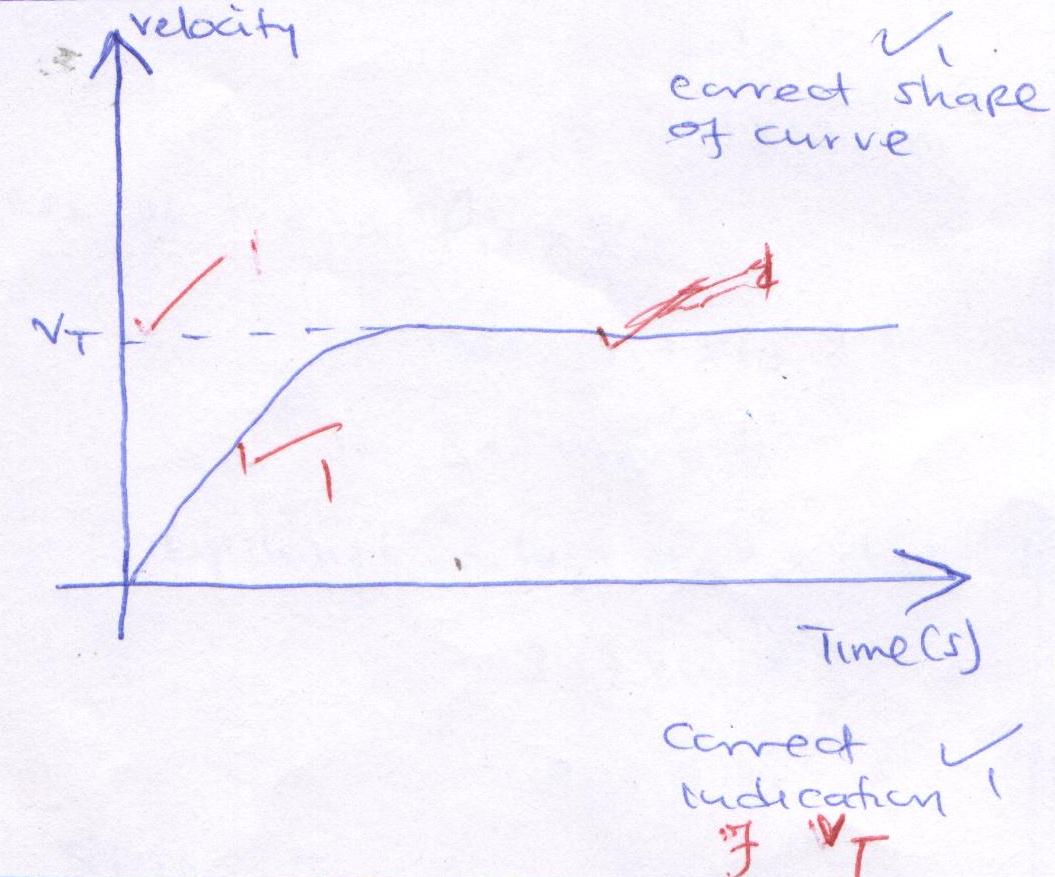
Elastic collision – only momentum is conserved✓1

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

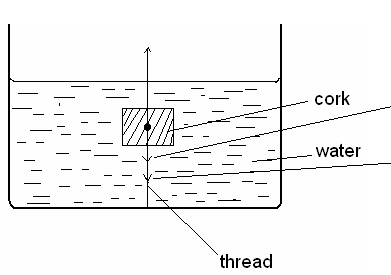
(b) (i) The spring balance reading increases. 🗸¹

(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 |  |
| E  Weight (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.