**DECEMBER EXAM 2021**

**232/1 PHYSICS PAPER 1 MARKING SCHEME**

 **SECTION A (25MKS)**

1. Main scale reading 10.6

Vernier scale 0.08 +

 10.68;🗸

 -

Zero error + 0.03

 10.65cm; 🗸

1. Weight of water = mg

= ρ x v x g

= 1000 x 25 x 10 x 10

 10000 100

= 2.5N; 🗸

 Weight of container = 250 x 10

 1000

 = 2.5N

 Total downward force = 2.5 + 2.5 = 5.0 N; 🗸

 Total upward force = 5N; 🗸

 3.

 Clockwise; 🗸

 Heat

 Convection current set is in anticlockwise direction setting wheel to rotate in opposite

direction; 🗸

4.

 

String

 (X x 0.4) + (3 x 0.1); = (150 x 0.4 x 10); 🗸🗸

 1000

 0.4x + 0.3 = 1.5 x 0.4

 X = 0.75N🗸

1. Downward force = upward forces ( tension on AB); 🗸

0.75 + 3.0 + .5 = Tension

Tension.

Tension AB = 5.25N; 🗸

1. Moment before collision = moment after collision.

200 x 90 x 1000 + 600 x 110 x 1000 = 800v;; 🗸🗸 Formula substitution

 3600 3600

 🗸 = 29.167m/s; 🗸

1. Spring constant = F

 e

 = 1.2 x 100 = 60 N/m; 🗸

 2

1. Weight = 3 x 120; 🗸

 100

 = 3.6N; 🗸

1. At Y, the radius r is minimum and hence the centripetal force is maximum; 🗸
2. As the bucket gets filled, the centre of gravity is raised and so the stability reduces; 🗸 1 mk for both pts.
3. T max = mv2 + mg

 r

 = 8 x 62 + 8 x 10 Formula for both 🗸

 2

 = 224N; Ans 🗸

 T min = mv2 – mg

 r

 = 8 x 62 - 8 x 10

 2

 = 64N; Ans 🗸

1. Steam already contains latent heat; 🗸 (of vaporization) ; 🗸 which water doesn’t have ;🗸

**SECTION B (55 MARKS)**

1. a) The volume of a fixed mass of a gas is directly proportional to its temperature at

constant pressure; 🗸

b)

 

***Diagram ;🗸***

***Labelling;🗸***

***(at least 5); 🗸***

Heat

Capillary tube

Stirrer

Beaker

Water bath

Thermometer

mm scale

 

AXES ***🗸***

***SCALE 🗸***

***PLOTTING 🗸***

***LINE 🗸***

***Temp 0C***

***Volume / Length (cm)***

***Continued line***

***Dotted line***

(c) (i) – Both axes labelled with appropriate units; 🗸1

- Simple and uniform scale; 🗸1

- Correctly plotted point ½ mark each maximum of 4 points🗸2

-straight line with **positive** gradient passing through at least 3 correctly plotted points🗸1

c) ii) I 60cm ± 0.5; 🗸

 II -268 ± 2° C; 🗸

 TOTAL =5MKS

1. a) i)

Shape of graph 🗸

At least 2 peaks🗸

 14

V (m/s)

 Time (s)

* + 1. h = u2 ; 🗸

 g

Distance = 2 x 142; + 2 x 112; 🗸🗸

 10 10

 = 39.2 + 24.2

 = 63.4m***🗸***

 b) i) Period T = 1; = 0.01s

 100***🗸***

 Time AB = 5 x 0.01 sec

 Dist = 1.5 m

 100

 ∴vel in AB = 0.015; 🗸 = 0.3m/s

 0.05;

 Time CD = 5 x 0.01 or 0.05s

 Distance = 3.2 m or 0.032m

 100

 Av. Speed CD = 0.032 = 0.64m/s***🗸***

 0.05

1. a = v - u; 🗸 formular

 t

 a = 0.64 – 0.3; 🗸

 14 x 0.01; 🗸 Sub time at

 = 2.429m/s 2;🗸 ans

1. a) i) Have negligible temperature range in liquid state ; 🗸

ii) Wind blows out vapour creating room for more evaporation to occur; 🗸

 b) i) Effect of density on rate of diffusion: 🗸

 ii) I Hydrogen being of lower density diffuse faster inwards than air

diffuse outwards; 🗸

II Hydrogen more concentrated inside diffuses faster out; 🗸

 iii) - Concentration of the hydrogen gas: 🗸

- Presence of moving air / wind / draught: 🗸

 c) i) - Between A and B heat is translated to rise temperature with time; 🗸1

 - Between B and C heat is used to break bond between the solid

molecules to change state / latent heat; 🗸

* + Between C and D heat is used to raise temperature of liquid ; 🗸
1. Q = mLf

12.5 = 250 LF; 🗸1

 1000

Lf = 50J Kg-1; 🗸1

 16. a) A floating body displaces its own weight of the fluid in which it floats🗸1

1. Volume of acid displaced = mass of hydrometer

 density

= 25

 1.18

= 21.186 cm3***🗸1***

 Vol. hydrometer immersed = Vol of acid displaced 🗸1

 = 21.186 cm3

 Vol. of part hydrometer = (3 x 0.5) cm3

 above acid

 = 1.5 cm3🗸1

 Total volume = 1.5 + 21.186

 = 22.686 cm3🗸1

 c) i) - Hole B 🗸1

 - Speed is lower at wider end making pressure to be higher, hence it

leaks more; 🗸1

 

***2r***

VA X AA = VB x AB

VA = AB = π x (2r) 2 x 100% 🗸1

VB AA π x r2

 = 400% decrease 🗸1

d) When all the particles passing through a given point or cross – section areas have the same velocity and trace the same path, the flow is streamline whereas when all the particles passing through a given point or cross – section area have differing velocities and trace differing paths, the flow is turbulent ***🗸1***

 17. a) i) The sum of kinetic energy and potential energy is always constant. ; 🗸1

 ii) 75p; 🗸1 = 210 x 10 x 20; 🗸1

 100 1.2 x 60

 P = 777.8 W; 🗸1

b) i)

 

Effort

* ***Correct diagram ;*** 🗸1
* ***Correct position of Effort and Load*** ;🗸1

Load

As the load reduces, the ration of load to weight of the lower pulleys (and frictional force) reduces hence reduced M.A; 🗸1

ii) Efficiency = M.A x 100%; 🗸1

 V.R