**SCHOOL BASED EXAMINATION 2019**

**PHYSICS 232/1**

**MARKING SCHEME**

**JULY/AUGUST 2019**

1. Reading shown 2.5

 0.05

 2.55 cm ✓

 Actual reading 2.55

 + 0.05

 2.60cm ✓

1. Heat absorbed by water at 00C is only used to **raise the temperature**, ✓while that absorbed by the ice is used to **melt and then raise the temperature**✓
2. M = w = 30 = 3kg

g 10

 Wjupiter = Mg jupiter

 = 3 x 26 ✓

 = 78N ✓

1. Let P be the atmospheric pressure

P1V1 = P2V2

 26( P + 5) = 30 (P – 5) ✓

 26P + 130 = 30P – 150

 30P – 26P = 130 + 150

 4P = 280

 P = 70cmHg ✓

1. – Unstable equilibrium ✓
* When slightly displaced it moves further away from its original position. ✓
1. E = 1/2 Fe

 = 1/2 x 5 x 2.5 x 10-2✓

 = 6.25 x 10-2 J ✓

1. Brass expands more than Iron.

Hence the bar bends upwards, ✓closing the gap between it and the contact to switch on the current. ✓

1. The cardboard does not fall. ✓ The atmospheric pressure acting upwards is greater than the pressure due to the water column. ✓

 30cm 50cm 100cm

m

w

 Clockwise movement = Anticlockwise moment

 w1d1 = w2d2

 0.2 x 30 = w x 20 ✓

 w = 0.2 x 30

 20

 w = 0.3N ✓

1. To reduce heat loss through radiation. ✓
2. Rate of flow = AV

 V = 0.001 ✓

 5 x 10-4

 = 2.0 m/s ✓

1. Volume = m = 75 – 25 = 50cm3

 ρ 1

 ρ = m = 65 – 25 = 40 ✓

 v 50 50

 ρ = 0.8g/cm3✓

1. Thickness = Volume

 Area

 = 0.01 x 10-3 ✓

 5 x 102

 = 1 x 10-5

 5 x 10 2

 = 0.2 x 10-7

 = 2 x 10-8 cm✓

**Section B (55 marks)**

1. a) i) Displacement per unit time ✓B1

 or rate of change of displacement

 SI unite metre per second (m/s) ✓ B1 Statement not

 Symbols

 ii) T = 1/f  or 100 cycles = 1seconds

 = 1/100 1cycle = ? ✓B1 no unit

 = 0.01 seconds = 1cycle x 15 = 0.01seconds No mark

 100cycles

b) i) h = 1/2gt2

 45 = ½ x 10t2 or S = ut + 1/2 gt2 ✓M1

 t2 = 9 u = 0 - Correct method

 t = 9 45 = 0 + 1/2  x 10t2 and substitution.

 = 3s 45 = 5t2

 t2 = 45/5 = 9 ✓A1 No unit no

 t = 9 mark

 t = 3s

 ii) R = ut or S = ut + 1/2 gt2 ✓M1 correct

 = 25m/s x 3s where g = 0 substitution

 = 75m

 S = ut + 0 ✓A1 No mark

 S = (25 x 3) + 0 without unit

 S = 75m

 c) i) ✓B1 – graph of

 velocity –time

V2

Velocity m/s

 ✓B1 correct

V1

 Sketch

 0 5 8 10 12 Time (s)

 ii) V1 = 2 x 5 + 0 or Distance = (1/2 x 10 x 5) + (10 x 3) + [(1/2 (10 + 15)}2 ✓M1 – final velocity

 = 10 m/s + (1/2 x 15 x 2) after each

 V2 = (2.5 x 2) + 10 = 25 + 30 + 25 + 15 acceleration

 = 15m/s = 95m

5

 Distance = 1/2  x 10 (11) + 1/2  x 2 (25) + 1/2  x 2 x 15 ✓M1 – correct

 = 55 + 25 + 15 substitution

 = 95m ✓A1 No unit

 No mark

1. a) M.A refer to ratio of load to effort ✓B1

b)i) V.R. = 3 ✓B1

 ii) V.R = ED = Effort distance ✓M1

 LD Load distance - Correct formula

 substitution

 3 = ED

 1.5m

 => ED = 3 x 1.5m ✓A1 No unit

 = 4.5m No mark

 iii) n = M.A. x 100 = 1200 x 1 x 100 ✓M1 Formula

 V.R. 500 3

4

20

 = 1200 x 1 x 100 ✓M1 correct

1

 500 3 substitution

 = 80% ✓A1 % age

c) i) Some energy is used to **move parts** of the pulley or ✓B1

 - Some energy is used to **overcome friction** of the pulley

d) i) Heat lost = Heat gained

 Hot water Calorimenter + Ice + melted ice ✓B1

 Mc(60-T) = mc(T - 00) + mlf + mc(T - 00)

 ii) mlf = Q ✓M1 – correct

 substitution

 Q = 20g x 334,000

 1000 ✓A1 No unit

 = 6680J No mark

1. a) i) **The rate of change of momentum is directly proportional to the**

 **resultant external force** and take place in the direction of the force.

 ii) F = mu – mv ✓M1 – deviation

 t of a v – 0

 t

But v – u = a

 t

 Then

F = m(v – u) ✓A1

 t

 🡪 F = ma ✓

b) i) m1u1 + m2u2  = m1v1 + m2v2 ✓M1 consideration of momentum

 m1 – bullet m2 = gun B4 after

 (0.02 x 0) + (20 x 0) = (0.02 x 200) + 20v ✓M1 current

 -20v = 4 substitution

 V = -4/20

 = -0.2m/s 🡪 V = 0.2m/s (- ignore the –ve)✓ ✓A1 – No mark

iii) Recoil velocity is negative; It move in opposite direction ✓B1

 of the bullet.

c) i) Fr = µR Fr = 0.8 x 200 ✓M1 – Reaction (weight of box)

 R = mg = 160N

 = 20 x 10N/kg ✓A1 – Unit must be correct

 = 200N ✓ m1

ii) - Use of rollers

* Lubrication (greasing /oiling) ✓B1
* Use of ball-bearing ✓B1
1. a) – Frictional force between the road surface and the tyres. ✓B1

b) – The bus is more likely to skid off the road than on a

 banked road ✓B1

c) i) – Weight of the stone (in weigh) or

 Gravitational pull ✓B1

* Tension on the string ✓B1

ii) I w = 2πf ✓M1 - Formula

 = 2 x 3.142 x 2 ✓M1 – correct substitution

 = 12.568 rad S-1 ✓A1 No unit no mark

 = 12.57 radian per second 4 s.f. or 2 d.p at least

 ii) II Fc = T – mg

 Tension = Fc + mg ✓M1 correct method

 V = wr FC = mw2r 🡪 Tension = m(2πf)2 + mg

 = (0.2 x (2 x 3.142 x 2)2 x 0.4) + (0.2 x 10) ✓M1 substitution

 = 12.636 + 2.0

 = 14.636N ✓A1 no mark without unit

1. a) Vol = Mass

 density

 = 4kg OR 4000 = 1333.3cm3

 3000kg/m3 3

 = 1.333 x 10-3 m3 ✓A1 no mark without unit

b) Upthrust = Weight of displaced liquid

 = e x vol x g

 = 1.333 x 10-3 x 800kg/m3 x 10N/kg

 = 10.6667N

 = 10.67N ✓A1

c) Upthrust = Weight in air – Weight in liquid ✓B1 statement

 Reading (sprint) = Weight in air – upthrust

 = (4 x 10N/kg) – 10.67 N

 = 29.33N ✓A1 No unit no mark

d) Total compression reading – Spring reading ✓M1

 = 85N – 29.33N

 = 55.667N

 = 55.67N ✓A1 – No unit, no mark