**SET 3**

**PHYSICS MARKING SCHEME**

1. 5.5 + (0.01 × 18) + 0.15

= 5.68 +0.15 mm

= 5.83 mm

1. (a) Neutral

(b) Stable

1. (a)Freely suspend the bar on the string given. Let it come to rest under the action of the earth’s magnetic field. The north-seeking end of the suspended magnet will point towards magnetic north whereas the south-seeking pole will point towards magnetic south.

(b)Use repulsion for this identification process. A known pole of the magnetic in part (a) will repel a similar pole of the new magnet. Test for this. In comparison, the ends of the unmagnetised iron piece can only be attracted.

1. The rod turns.
2. (a) Is the product of force and its perpendicular distance from the line of action of the force.

(b) The longer handle provides bigger moment, while the short handle gives small moment thus can’t loosen a tight nut.

1. $k$ = $\frac{0.6}{12}$

 = 0.05N/mm

1. That total mass is [60 + (3 × 6)] = 78g. The force F due to this mass is 0.78N.

∴e1 = F/k = 0.78/0.05

∴**e1 = 15.6mm**.

1. ∴e2 = $\frac{F}{k}$

 = $0.36/0.05$

∴**e2 = 7.2mm**.

1. Total force = 0.66N.

The force borne by each of the three springs sharing this weight is thus 0.22N.

∴e3 = $F/k$ = $0.22/0.05$

∴e3 = 4.4mm.

e = e1 + e2 + e3

∴**e = 27.2mm**

1. (i) For a system in equilibrium, the sum of clockwise moments about a point is equal to the sum of anticlockwise moments about the same point.

(ii) CWM = ACWM

 $(0.5 × 0.4) + (0.4 ×0.6) = 0.1 F + (0.2 × 1.4)$

 $0.2 + 0.24 = 0.1F + 0.28$

 $0.1F = 0.16$

 $ F = 1.6N$

1.

N

S

1. - the nails tend to diverge from each other.

- this is because they acquire same polarity at the sharp end, like poles repel.

1. The candle becomes less stable.

As it burns its centre of gravity lowers, in relative to its height.

1. ($i$) $x = 2ϴ$

= $2 ×15$

= 30o

($ii$) $r$ = 90 - (35-15)

= 70o

1. ($a$) 20 × ρy= 16 ×ρw

$$^{ρ\_{y}}/\_{ρ\_{w}}= ^{16}/\_{20}$$

= $^{4}/\_{5}$

 $ρ\_{y}: ρ\_{w}$ = $4:5$

($b$) 1000×0.16×10 = 1250×h×10

 $h$ =$ 12.8 cm$

1. (a) – used as rear-view mirrors of vehicles

-used for security purposes in supermarkets a big malls.

(b) ($i$) $-\frac{1}{18}=\frac{1}{u}-\frac{1}{12}$

 $\frac{1}{u}= \frac{1}{36}$

 $u = 36 cm$

 ($ii$) $\frac{12}{36}= \frac{5}{Ob}$

 $Ob = 36 × ^{5}/\_{12}$

 $= 15 cm$

1. For an helical spring or any elastic substance the extension is directly proportional to the force applied provided the elastic limit is not exceeded.
2. ($i$) 4 N

($ii$) $4/0.2$

 = 20N/m

iii) a. 4 ×2

 = 8 N

 b. 20×2 = 40N/m

1. (a) A- copper

B- dilute Sulphuric acid

 C- zinc

(b) ($i$) A- bubbles of gas accumulate around the electrode.

 ($ii$) C- the electrode is eaten away as bubble ooze from it.

(c) ($i$) polarization

($ii$) local action

(d) Removing the bulb and wiping the bubbles.

(e) - Using a depolarizer. (Adding potassium dichromate to the electrolyte.)

 - Using pure zinc.

 - Or coating the zinc with mercury (amalgamation)

1. (a) The deflection stated arises because of the induction sequence diagrammatically described immediately below.

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+

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(b) As negative charges accumulate at the needle’s tip, their high concentration causes the ionization of the air surrounding that tip. Positively charged ions will be attracted to the tip where they will take away the accumulating electrons via collisions for the sake of neutralization. The electroscope will then progressively become net positive. When the positively charged rod on the right is subsequently removed, the positive charges causing the deflection seen will redistribute. A smaller number of those charges will be left at the leaf hence maintaining a smaller deflection compared to that seen before.