PHYSICS PAPER 231/1A 1996 MARKING SCHEMES

- Correct full marks to be given
- Wrong units no marks given
- Wrong substitution no mark
- No units full mark

1. 15.00 + 0.30 = 15. 30 mm; or 1.53 / 1.53 x 10^2m

2. Frequency: OR wavelength or energy

3. Length of container/ height

   Width of the base/ base area/ diameter/ radius of the base/ thickness

4. $h_p\ p_1\ g = h_2\ p_2 g$ Same as $h_1\ p_1 = h_2\ p_2$

   $h_1 = \frac{h_2\ p_2 g}{pg}$ $= 8 \times \frac{18}{08}$

   $= 18$cm;

5. (i) Rubber is elastic and when a nail pushed through it stretches and grips the nail firmly without allowing air leakage

   (ii) Valve effect pressure from inside causes tyre rubber to press firmly on the nail

6. Concrete mixture and steel have approximately the same linear expansively. The expand/ contract at the same rate;

7. Radiation is at the electromagnetic waves Φ infrared while conduction involves particles, which move at lower speed

8. There are three different sources of light of the different intensities; brighten/ dimmed / different direction/ amount quality. Similar sources/ at different distances from the object

9. like charges repel unlike charges attract

10. Mass per unit length

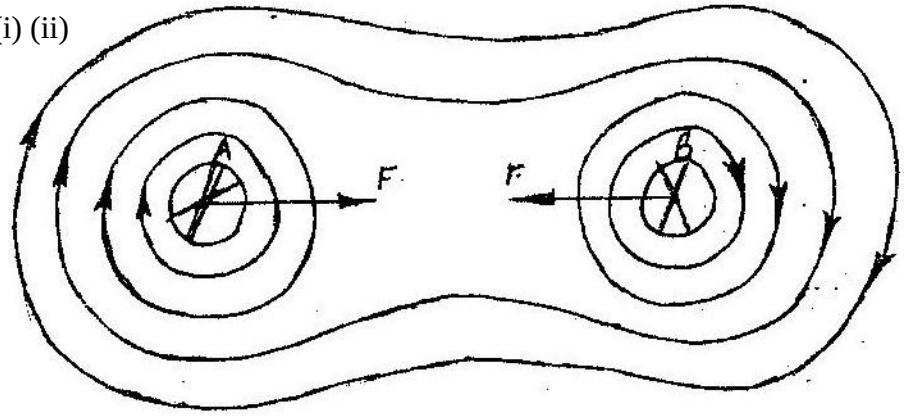
    Or (linear density/ thickness/ cross – sectional area/ diameter, radius

11. Adhesion

    Cohesion/ surface tension

12. As the thermistor is heated its resistance reduces/ conductivity increases hence drawing more current through it; hence less current flowing through B;

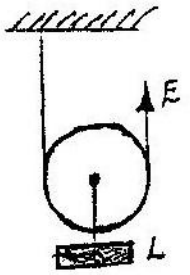
13. (i) (ii)



14. T< F or F> T

    Moments of T and F about are equal; but the perpendicular distance from O to T perpendicular distance from O to F/ Resultant moment are zero

15. Turn anticlockwise about O, OR Oscillate about O

16. 

    Correct diagram
    Correct label E,L and arrow

17. The wavelength/ velocity of the water waves reduces; away from the centre because the pond becomes shallower/ pond deeper at centre

18. Interferences (accept beat)

19. Parallel resistor allow diversion of current; hence may not overheat; / current shared by parallel resistor

20. Heat gained $5(80 – 40) = m(40-15)$ Heat gained MCD θ (80- 40)

    $5(40) = 25m$ Heat post MCD $\theta = m (40 – 15)$ MC $40 – 15$

    $5(80-40) = 25$ m

    $25m = 200 = m = 8$ kg

21. Equal qualities of heated supplied;

    $MC_W\theta_W = MC_P\theta_P$ $MC_W (Qw –Q) = MC_P (Q_p – Q)$
    Since $\theta P > \theta W$ or $MC_w > \theta_0 = MC_P > Q_P$
    $C_W > \theta_P C_p$

22. Magnified, enlarged upright, virtual , image behind the mirror, negative distance

23. Apparent depth = $\frac{\text{Real Depth}}{\text{Refractive indese of water}}$ $\frac{12m}{1.3} = 0.9$ m

24. Pressure is inversely proportional to the speed OR speed increases as pressure distance

25. Maintaining a stable voltage during make and break/ storing charge during make and break and stops arcing sparking

26. High temperature causes high – pressure build up in the cylinder, which causes the explosion; OR increases of KE of gas molecules which result to pressure, build up causing an explosion (2 mks)

27. A Polaroid absorbs/ cuts off light waves in all planes except in a particular plane of propagation (1mk)

28. A hears a constant frequency produced by the siren/ same roundness/ pitch B hears a frequency that increases as the vehicle approaches/ sound of increasing loudness/ higher sound (2 mk)

29. Solid copper is denser than water hence the solid sphere sinks; weight is greater than upthrust. Hollow sphere experiences an upthrust equal to its weight so it will float/ density of hollow sphere is less than that of water (2 mks)

30. The weight of the door and the force are perpendicular to one another (1 mk)

31. Eddy current (1 mk)

32. Low negative voltage is applied on control grid, which control the number of electrons reaching the screen (1 mk)

33. Low speed / high charge / more massive/ size is large/ bigger` (1 mk)

34. n.p.n

35. Limit the current through the base controls the current/ protect transistor from high current or voltage/ regulate reduce voltage.

36. Diode is forward biased; Base currents flows; hence collector current flows and lights the bulb/ current amplification (3 mks)
air molecule are in constant random motion; smoke particles collide with these air molecules hence their random motion

PHYSICS PAPER 232/1B MARKING SCHEMES 1996

1. (a) (i) Acceleration a is rate of change of velocity

$a = \frac{v - u}{t}$

$V = U + at$

(ii) Distance is average velocity * time

$S = \frac{(v + u)t;}{2}$

Substitution for V with u + at;

$S = ut + \frac{1}{2} at^2$

(iii) Using $t = \frac{v - u;}{a}$ in $s = ut - \frac{1}{2} at^2$

$s = u \frac{(v-u)}{a} + \frac{1}{2} a \frac{(v-u)^2}{a} = V^2 = u^2 \div 2$ as

(b) u = 50 – v = 0 a =2

Using $v^2 = u^2 - 2as;$

Substitute $0 = 50^2 + 2 (-2) s;$

S = 625m;

2. (a) (i) Each bar is suspended at a time using the string;
The suspended bar is allowed to rest;
Its orientation is observed and recorded;
This is repeated several times for confirmation

(ii) The bar magnet settles in the N – S specific direction, due to its Interaction (l) with magnetic field of the earth (l)
The iron bar settles in any direction; (l) because it does not have a magnetic field to the interact with that of the earth; (l)

(b) P and Q are magnetized to the same level, by applying two different (l) current lp and lq such that lq > lp (l)
Thus Q requires greater magnetizing power, (l) since its domains are more difficult to align; (l) P is easier to magnetize, since its (l) domain are more easily aligned: (1 mk)

(Total 14 mks)

3 (i) Series resistors $4 + 1 + 5\Omega$ (1 mk)

Parallel resistors $2 + 3 + 5\ \Omega$ (1mk)

$R_p = {}^5/_2 = 2.5$

Total effective resistance $5.5 + 2.5 = 8.0\ \Omega$ (1 mk)

(ii) Current $l = \underline{V}; = \underline{4.0}; = 0.5A;$
R 8.0

(iii) Current through each wing $= 0.5 = 0.25$ A; (1 mk)
2

Potential at Y = 0.5 x 4; 11; (2 mks)

Potential at Q = $\underline{0.5}$ x 2; = 0.51; (2 mks)
2

Potential difference between Y and Q

= 1-0.5 V; = 0.5 (2 mks)

= 0 -0.5 V; + 0.5V Total 13 mks)

4. (a) (i) The aluminium block is heated using the electric immersion heater for some time

t; The temperature changes (2) $\Delta\ \Phi$ of the block is recorded;

(ii) Mass of the block m

Time taken t

Initial temperature Φ_1 final temperature Φ_2

Current I voltage V;

Heat given = heat gained by electrical heater the block

$1\ Vt = mc\ (\Phi_2 - \Phi_1)$

C = 11.1

$M\ (\Phi - \Phi)$

(iii) Oiling the holes for better thermal; contact lagging

(b) Heat gained by calorimeter

$= 60 \times 10^{-3} \times 378\ (45 - 25)$ J;

= 453.6 J

Heat gained by water

$= 100 \times 10^{-3} \times 4.200\ (45 - 25$J;

= 8.400J

Heat lost by condensing steam = m/

$(163.5 - 160) \times 10^{-3}$/J

$= 3.5 \times 10^{-3}$ x / J

Heat lost 3.5 g of (condensed steam) water cooling to 45^0C

$3.5 \times 10^{-3}\ (100 - 45) \times 4{,}200;$

= 808.5J

Heat given = heat gained

Hence:

$3.5 / x\ 10^{-3} + 808.5$ J = 453 6J + 8,400J;

$= 2.3 \times 10^{-6}$J/Kg;

5. (a) (i) Particles of the transmitting medium vibrate in the direction of the wave for a longitudinal wave, but at right angles for a transverse wave:
Sound requires medium but no medium required for electromagnetic wave; speed of sound lower than that of electromagnetic wave;

(b) (i) Speeds of sound;
$2.5 \times s = 400 \times 2$
$S = 320$ m/s;

(ii) $2 \quad \frac{(x - 400)}{320} = 2.5 + 2);$
$= 1120$m;

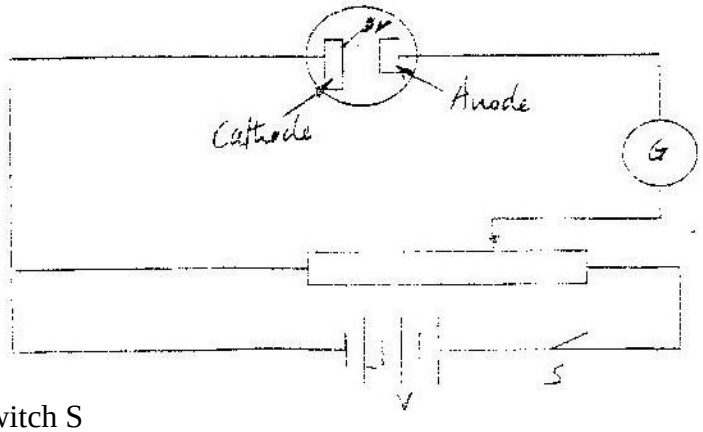
(c) (i) Double slit provides coherent sources;
(ii) Dark and bright fringes;
The central fringe is the brightest while the intensity of the other fringes reduces away from the central fringe;
(iii) I. The separation of fringes increases
II. Central fringe is white; fringes on either side are colored;

6. (a) Keep angular velocity Wl constant;
Centripetal force provided by mg;
Fix the mass m and measure of m;
Repeat for different values of m;

(b) (i) graph (see on the next page
Axes labeled
Scale
Pts plot
Straight line

(ii) Gradient of the graph
$= 0.625 - 0.1 = 1.167$ N
$0.525 - 0.075$
Force F on the body = $m_b W^2 r$
Where mb = mass of the body
$M_b w^2 r$ = Gradient of the graph = 1.167
$W^2 = 1.167 = 11.67$
0.1
$W = \sqrt{11.67}$
$= 3.42$ rad s^1

7. (a)



Close switch S
Vary pd until G deflects

(b) l)

K (J) x 10^{-19}	5	10	10	30	4
F = C/D (H_E) x 10^{-15}	1.89	2.64	4.11	5.55	6.5

Finding f
See graph
Axes labeled
Scale
Pointed plotted
Straight line

(ii) Work function Φ is given by Φ hf_0
F_0 is the x – intercept of graph
F_0 (from graph) = 1.2 x 10^{15} H_E
Φ = 6.63 x 10^{-34}0.5 x 1.2 x 10^{15}
= 7.96 x 10^{-19} J

No. 6
(a)