CHRISTIAN SOCIAL SERVICES COMMISSION (CSSC)

NORTHERN ZONE JOINT EXAMINATIONS SYNDICATE (NZ-JES)

FORM FOUR PRE – NATIONAL EXAMINATION AUGUST 2025

PHYSICS 1

MARKING SCHEME

1. (i) A
(ii) B
(iii) D
(iv) C
(v) B
(vi) D
(vii) D
(viii) D
(ix) D
(x) C

1@=10 marks)

2. (i) D
(ii) C
(iii) E
(iv) A
(v) G
(vi) B

2@ = 06 marks

b

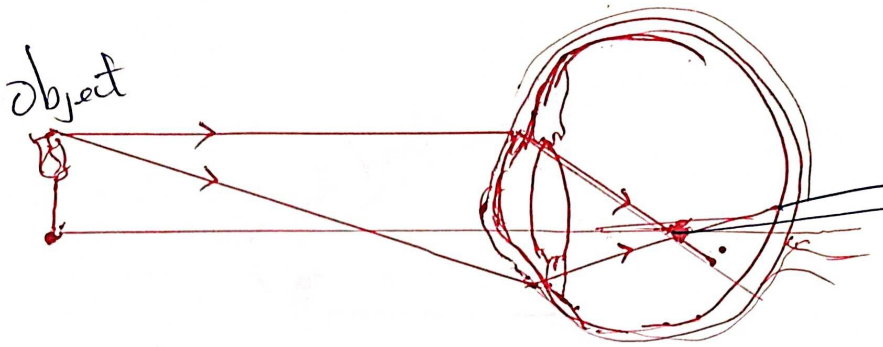
SECTION B (54 marks).

3 (a) Because of refraction of light as it moves from air to water. (4 marks).

(b) Person suffering from short sightness cannot see distant object because, the eyeball is too long

—01—

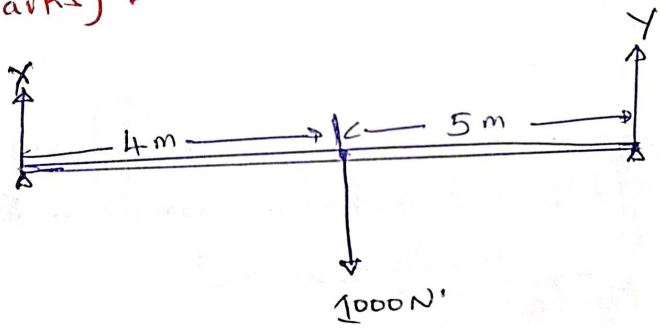
from ~~th~~ front to back in comparison with the radius of curvature of the cornea causes the rays of light from an object to be formed infront of retina (2 marks)



(3 marks).

4. (a) Since the atmosphere pressure decrease at the top of mountain, also the mercury level will decreases. (4 marks).

(b)



Sum of upward forces = Sum of downward forces (01)

$X + Y = 1000N.$ (01)

Sum of anticlockwise moments = Sum of clockwise moments. (01)

$X(9m) = 1000N \times 5m.$

$\frac{9Xm}{9m} = \frac{5000Nm}{9m.}$

$X = 555.56N.$ (01)

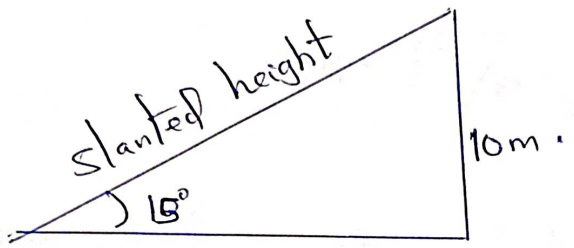
—02—

$Y = 1000N - X$.

$1000 - 555.56$.

$= 444.44N$. (01)

(a)



(i) Workdone against gravitational force = Load x Load Distance

$30 \times 10 \times 10$

$= 3000Nm$

$= 3000J$. (01)

(ii) Since No friction,

Workdone of moving a body = Effort x Effort distance + friction workdone. (01)

$\sin 15° = \frac{10m}{\text{slanted height}}$

$\text{slanted height} = \frac{10m}{\sin 15°}$

$= 15.38m$. (01)

Workdone $= (100N \times 15.38) + 2000$.

$= 1538 + 2000J$

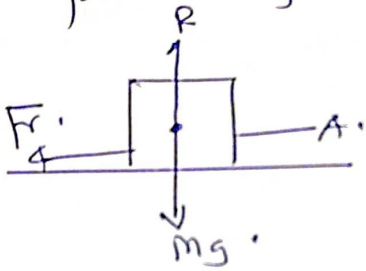
$= 3538J$. (01)

$$\text{Efficiency} = \frac{\text{Work output}}{\text{Work input}} \times 100\% \quad (01)$$

$$\frac{3000\,J}{3538\,J.} \times 100\%$$

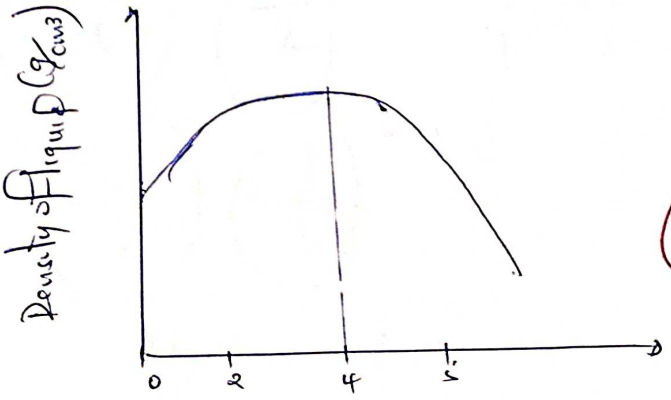
$$84.79\%. \quad (01)$$

(b) No, there are forces acting on it (02)



(02)

6. (a) As you increase the temperature, the density of liquid decreases due to increase in volume of liquid (02)



(02 marks)

(b) Heat lost = Heat gain 01

$\frac{V^2}{R} t = M_w C_w \Delta\theta$. 01

$t = \frac{M_w C_w \Delta\theta . R}{V^2}$

$= \frac{150kg \times 4200 J/kgK \times (40-20) \times 25\Omega}{240^2}$ 01

time $= 5,468.75$ seconds (02).

7 (a) from

$\left(\frac{N}{N_0}\right) = \left(\frac{1}{2}\right)^n$, $n = t/t_{1/2}$. (02)

$\left(\frac{N}{N_0}\right) = \left(\frac{1}{2}\right)^{\frac{11400}{5700}}$. (01)

$\left(\frac{N}{N_0}\right) = \left(\frac{1}{2}\right)^2$.

$N/N_0 = 1/4$.

Amount remaining $= 1/4$. (02).

7 (b) from

$$f = \frac{n}{2l}\sqrt{\frac{T}{\mu}} \quad (02)$$

$n = 3$.

$$f = \frac{3}{2 \times 0.75}\sqrt{\frac{18N}{8.2 \times 10^{-3}} \times 0.75} \quad 01$$

$$= 81.15Hz. \quad (01)$$

8 (a) (i) Help in navigation
(ii) Help in fishing
(iii) Used for generation of electricity. (Four points = 04 marks)

(b) → Landslides
→ Tsunamis
→ Collapsing building
→ Fire outbreak
→ Backward rivers
→ Destruction of properties
→ Death

Five points = 05 marks

9. (a) → Area of a plate
→ Distance between plates
→ Dielectric nature of a material. (3 marks).

(b) $E = I_1(R_1 + r)$.

$E = IR + Ir$.

$E = V_1 + Ir$. ——— (01 marks)

$E = 1.1 + 0.2r$. ——— (i) ——— 01 marks

$E = 1.3V + 0.1r$. ——— (ii)

$0 = (1.3V - 1.1V) + (0.1r - 0.2r)$.

$0 = 0.2V - 0.1r$. ——— 01 (mark)

$-0.2V = -0.1Ar$.

$-0.1A$

$-0.1A$.

$r = 2\Omega$. ——— (02 mark)

E.m.f = $1.1 + (0.2 \times 2)$

$1.1 + 0.4$

$= 1.5V$. ——— 02 mark).

(c) · Local action: Deterioration of the battery due to cuments that are flowing from and to the same electrode. (01½ marks)

— It can be minimized by using pure zinc or by rubbing mercury on the zinc plate to form amalgam (01½ marks)

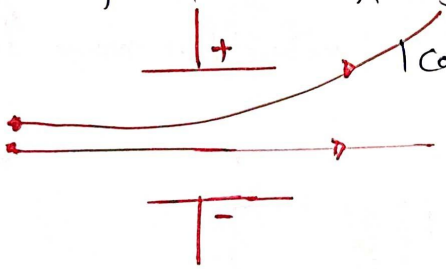
07

: Polarization (0 1/2 marks)

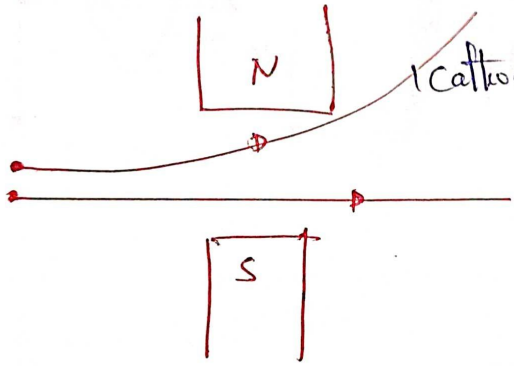
⇒ Caused by acculation of hydrogen gas around a positive electrode.

⇒ It can be minimized depolarizers such as potassium dichromate or manganese oxide which oxidizes hydrogen to water. (0 1/2 marks)

10. @ Cathode rays deflected by both magnetic fields and electric field. While X-rays cannot be deflected (02 marks)

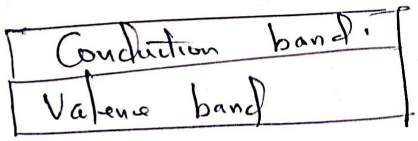


(01 mark)



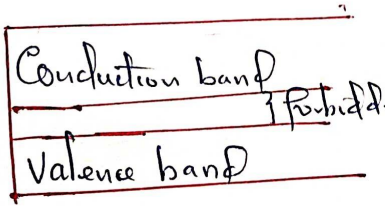
(01 mark)

(b). Conductors: Have no forbidden gap (01)



(01)

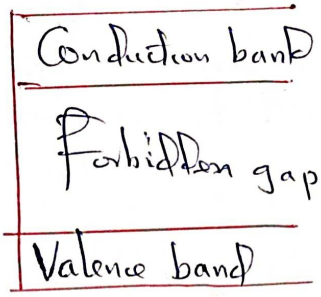
Semiconductors: Narrow forbidden gap. (01)



(01)

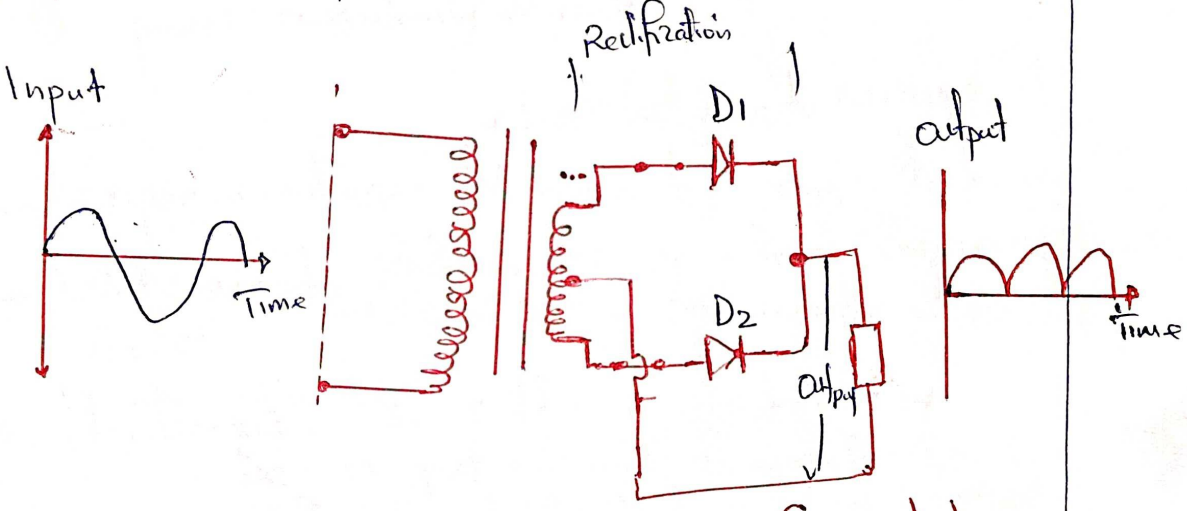
— OR —

Insulators: Have wide forbidden gap. (01 mark)



(01 mark).

(c) Full wave rectification



(05 marks)

11. (a) Microwaves are absorbed by the food molecules. The absorbed energy causes the molecules to vibrate rapidly producing thermal energy that cooks or warms the food. (03 marks).

(b) Name of the device electric bell. (01 marks).

D — Armature (01 mark)

E: Contact break (01 marks).

Its mechanisms

⇒ When current is switched on, it flows through the circuit and soft iron core become magnetized. The magnetized iron core attract the soft iron armature which ~~hits the ham~~ and then hammer hits gong to produce sound.

⇒ The contact break, which makes no current flowing and soft iron core demagnetised and return back. and the contact allowing current to flow again, and soft iron become magnetised and attract ~~the~~ armature to hit the gong.

The process continuously repeatly. (03 marks).

(c) → Copper windings: → Heat lost due to heating effect
Minimized by using thick wire (0½ marks)

→ Eddy currents: Reduced by laminating the iron
↳ Caused by Circulating current in a loop (0½ marks)
Core.

→ Hysteresis: Use soft iron which easily be magnetised and demagnetised (0½ marks)
↳ Due magnetized and demagnetized

- Flux linkage: Reduced by winding secondary coil over primary coil (1½ marks).

Note: Cause — 00½.
Explanation — 00½
Minimization ⇒ 00½ } @.