

CHRISTIAN SOCIAL SERVICES COMMISSION (CSSC)
NORTHERN ZONE JOINT EXAMINATIONS SYNDICATE (NZ-JES)



FORM TWO PRE-NATIONAL ASSESSMENT, AUGUST 2026

PHYSICS

MARKING SCHEME

SECTION A (15 Marks)

QUESTION: 1

Item	i	ii	iii	iv	v	vi	vii	viii	ix	x
Answer	B	D	A	B	C	B	A	C	B	D

[@ 1 mark = 10marks]

QUESTION: 2

Item	i	ii	iii	iv	v
Answer	E	G	A	F	B

[@ 1 mark = 5marks]

QUESTION: 3

(a) WAYS OF DETERMINING THE NORTH POLE OF UNKNOWN MAGNET

- i. Suspending a bar magnet freely.** A freely suspended bar magnet always points in a north-south direction. The north pole of a freely suspended magnet points in the north direction and South Pole points in the south direction of the earth.
- ii. By using a known bar magnet.** If the pole of a known bar magnet is brought near to the pole of unknown magnet and found to be repelling, the pole of the unknown magnet will be the same to that of known bar magnet and If the pole of a known bar magnet is brought near to the pole of unknown magnet and found to be attracting, the pole of the unknown magnet will be unlike to that of known bar magnet.
- iii. By using a compass.** The head of a compass is a magnetic north pole and tail is a magnetic south pole. If a compass is brought to the magnet, the head will point toward the North Pole. [**2 marks @ for any 2 = 4marks**]

(b) WAYS OF STORING A MAGNET

- i.** Avoid storing magnets in places where they may come into contact with ferrous objects such as steel.
- ii.** Store magnets in pairs with the unlike poles facing each other. Pieces of magnetic keepers are used at the end to preserve the strength of the magnets.
- iii.** Do not overheat magnets. This may cause harmful structural changes in the magnet
- iv.** Do not store or keep magnets near strong magnet or electric fields
- v.** Do not subject magnets to any form of several stress such as vibrations and mechanical impacts.
[2 marks @ for any 3 = 6marks]

QUESTION: 4

(a) Hammer Vs. sharp pin on inflated balloon

- Hammer spreads force over a larger area for a short time, causing deformation but not penetrating the rubber. Tearing needs a sharp puncture point with high stress concentration.
- A pin:
 - ✓ Applies force at a tiny area
 - ✓ Produces very high pressure at that point → punctures the balloon → it bursts. [4 marks]

(b) Hydraulic press: raise car weight 5000 N by height 0.3 m

Given:

Small piston area $A_s = 0.02\text{m}^2$

Large piston area $A_L = 0.1\text{m}^2$

(i) Force on smaller piston

$$\frac{F_S}{A_S} = \frac{F_L}{A_L}$$

Here is F_L car's weight = 5000 N.

$$F_S = 5000 \times \frac{A_S}{A_L}$$

$$F_S = 5000 \frac{0.02}{0.1}$$

$$F_S = 1000 \text{ N}$$

Force on smaller piston = 1000 N [3 marks]

(ii) How far small piston pushed down

In ideal hydraulic systems:

$$A_S \times d_s = A_L \times d_L$$

Given lift height of car = $d_L = 0.3\text{m}$

$$0.02 \times d_s = 0.1 \times 0.3$$

$$d_s = \frac{0.03}{0.02} = 1.5\text{m}$$

Small piston moves 1.5 m down [3 marks]

QUESTION: 5

(a) To find the number of images formed by two plane mirrors inclined at an angle we use the formula.

$$n = \frac{360^\circ}{\theta^\circ} - 1$$

Here $\theta = 60^\circ$

$$\frac{360^\circ}{60^\circ} = 6$$

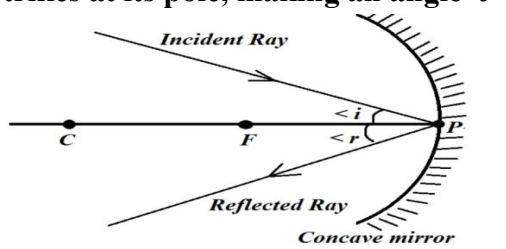
Then

$$n = 6 - 1 = 5$$

$\therefore$ 5 images will be formed when an object is placed in the middle [4 marks]

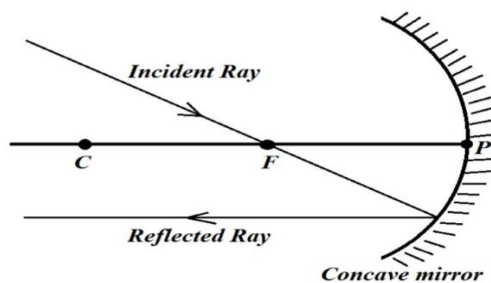
(b) Draw a ray diagram to show the path of the reflected ray in each of the following cases. A ray of light incident on the concave mirror.

i. Strikes at its pole, making an angle 'i' with the principal axis



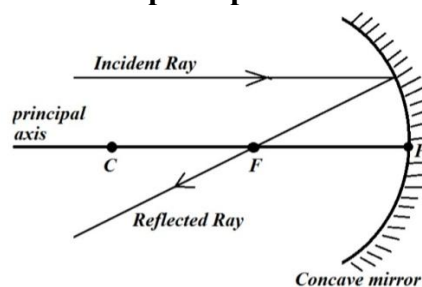
[2 marks]

ii. Is passing through principal focus



[2 marks]

iii. Parallel to its principal axis



[2 marks]

QUESTION: 6**(a) Equation for the motion under gravity when the body is moving upward**

i. $v = u - gt$

ii. $h = ut - \frac{1}{2}gt^2$

iii. $v^2 = u^2 - 2gh$ [**@ 1 = 3marks**]

(b) Calculating initial velocity and time taken

i. Initial velocity

From, $v^2 = u^2 - 2gh$

where,

$v = 0 \text{ m/s}, h = 20 \text{ m and } g = 10\text{m/s}^2$

$v^2 = u^2 - 2 \times 10\text{m/s}^2 \times 20 \text{ m}$

$0 = u^2 - 2 \times 10\text{m/s}^2 \times 20 \text{ m}$

$u^2 = 2 \times 10\text{m/s}^2 \times 20 \text{ m}$

$\sqrt{u^2} = \sqrt{400 \text{ m}^2/\text{s}^2}$

$u = 20 \text{ m/s}$

The initial velocity is 20 m/s [4 marks]

ii. To find time taken to reach maximum height

From, $v = u - gt$

$0 = 20 \text{ m/s} - 10\text{m/s}^2 \times t$

$t = \frac{20 \text{ m/s}}{10\text{m/s}^2}$

$t = 2 \text{ s}$

The stone used 2 seconds to reach a height of 20 m [3 marks]**QUESTION: 7****(a) Similarities of Human eye and lens camera**

i. Both uses convex lens to produce an image

ii. Both produces the image which is real, reduced and inverted [**@2 = 4 marks**]**(b) Finding magnification**

From,

$m = \frac{f_o}{f_e}$

$m = \frac{200 \text{ cm}}{4 \text{ cm}}$

$m = 50$

The magnification of a telescope is 50 [6 marks]

QUESTION: 8

(a) **Archimedes' Principle states that** "Any object partially or totally immersed in a fluid experiences an upthrust equal to the weight of the fluid displaced by the object" [2 marks]

(b) **Calculating Relative density and density of the diesel**

i. **Relative density of the object**

$$W_A = 18 \text{ N}$$

$$W_W = 13 \text{ N}$$

$$W_D = 14 \text{ N}$$

$$R.D_0 = \frac{W_A}{W_A - W_W}$$

$$R.D_0 = \frac{18}{18 - 13}$$

$$R.D_0 = \frac{18}{5}$$

$$R.D_0 = 3.6$$

Relative density of the object is 3.6 [4 marks]

ii. **Density of the diesel in SI unit**

$$R.D_D = \frac{W_A - W_D}{W_A - W_W}$$

$$R.D_D = \frac{18 - 14}{18 - 13}$$

$$R.D_D = \frac{4}{5}$$

$$R.D_D = 0.8$$

$$D_D = R.D_D \times D_W$$

$$D_D = \frac{4}{5} \times 1000 \text{ kg/m}^3$$

$$D_D = 800 \text{ kg/m}^3$$

The density of the diesel is 800 kg/m³ [4 marks]

QUESTION: 9

(a) **Work done is zero meaning**

Work done:

$$W = F \times s$$

If "wall didn't move anywhere" → displacement $s = 0$.

So:

$$W = 0$$

Therefore, there is no work done even if the force is applied and no displacement (it means work done is zero) [2 marks]

(b) **Friction:**

- Between wheel parts and air causes loss of kinetic energy.
- Kinetic energy converts into internal energy (thermal energy) → temperature rises.

Also, any deformation causes internal friction losses. [2 marks]

(c) Power developed by forklift

Given:

- mass = 400 kg
- height = 2 m
- time = 4 s
- g = 10 N/kg

Work done:

$$\begin{aligned}W &= mgh \\&= 400 \times 10 \times 2 \\&= 8000 \text{ J}\end{aligned}$$

Work done = 8000J [3 marks]

Power:

$$\begin{aligned}W &= \frac{w}{t} \\&= \frac{8000\text{J}}{4\text{s}} \\&= 2000\text{w}\end{aligned}$$

Power = 2000 W [3 marks]

QUESTION: 10

(a) Ohm's law states that “ The current passing through a conductor at a constant temperature is proportional to the potential difference between its ends” **[2 marks]**

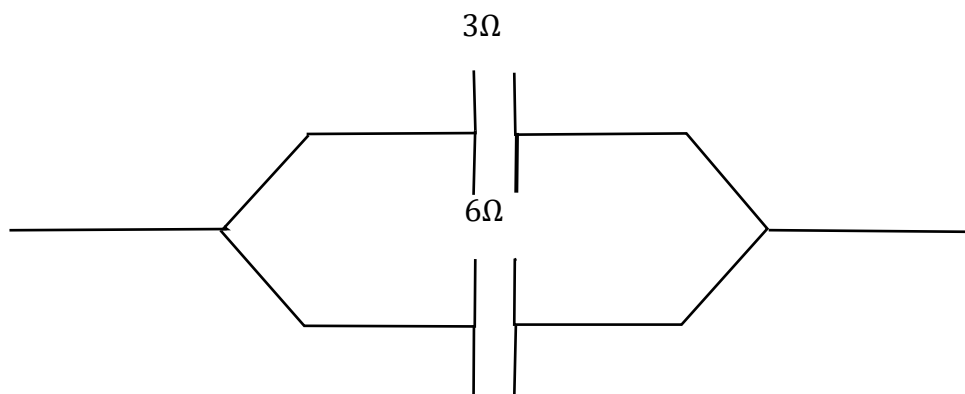
Its mathematical formula

$$V \propto I$$

$$V = IR \quad [1 \text{ marks}]$$

(b) Resistors are in parallel

i. Schematic diagram [2 marks]



ii. Total resistance of the circuit

$$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2}$$

$$R_T = \frac{R_1 \times R_2}{R_1 + R_2}$$

$$R_T = \frac{3\Omega \times 6\Omega}{3\Omega + 6\Omega}$$

$$R_T = \frac{18}{9}\Omega$$

$$R_T = 2\Omega$$

$\therefore$ Total resistance of the circuit is 2Ω [3 marks]

iii. Calculating potential difference

From

$$V = IR$$

$$I = 5\text{ A}$$

$$R = 2\Omega$$

$$V = 5\text{ A} \times 2\Omega$$

$$V = 10\text{ V}$$

$\therefore$ Potential difference is 10 V [3 marks]

(c) Four guidelines on how to maintain lead-acid batteries (Accumulators) for them to last for long time

- i. The cells should be charged regularly and should never be left discharged
- ii. The acid level should be maintained by adding distilled water when necessary. Never add acid.
- iii. The terminals should be kept clean and greased
- iv. Rough handling should be avoided, for example dropping the battery down
- v. The cell should not be short-circuited, that is they should not be allowed to drive very large current
- vi. When charging the rate specified by the manufacturer should not be exceeded

[@ 1 for any 4 pts = 4 marks]