

CHRISTIAN SOCIAL SERVICES COMMISSION- (CSSC)  
NORTHERN ZONE JOINT EXAMINATION SYNDICATE(NZJES)



FORM TWO PRE-NATIONAL EXAMINATION AUGUST 2024

PHYSICS

MARKING SCHEME

1.

<b>Questions</b>	i.	ii.	iii.	iv.	v.	vi.	vii.	viii.	ix.	x.
<b>Answers</b>	C	D	A	C	A	C	C	A	B	A

2.

<b>Questions</b>	i.	ii.	iii.	iv.	v.
<b>Answers</b>	E	A	C	B	F

**SECTION B (70 marks)**

3. (a) I will advise the carpenter to place the door knob as far as possible from the hinge, so as to increase the perpendicular distance hence the turning effect of force will increase.

(b) Moment of force = Force X perpendicular distance

Moment of force = 90N X 2.5m

Moment of force = 225Nm

4. (a) Explain why trucks carrying very heavy loads are fitted with many tyre

This is done to reduce the pressure acting on the road surfaces which would destroy the roads. Many tyres increase the surface area in contact and as a result the pressure exerted by the loads is reduced

(b)

i. The maximum pressure it exerts on a flat surface

Smallest area of the body = 0.4m X 0.02m = 0.008m<sup>2</sup>

Biggest area of the body = 0.5m X 0.4m = 0.2m<sup>2</sup>

Weight of the body W = mg = 8 X 10 = 80N

Maximum Pressure =  $\frac{\text{Force}}{\text{Smallest area}} = \frac{80}{0.008} = 10000\text{N/m}^2$

ii. Minimum pressure =  $\frac{\text{Force}}{\text{Biggest area}} = \frac{80}{0.2} = 400\text{N/m}^2$

5. a This is because a fat person has a big amount of volume and therefore displaces a big amount of water

As compared to a slim person. This makes the fat to easily float when in water since one of the factors affecting floating is the volume of the body placed in a fluid.

(b) A body weighs 35N in air and 27N in a liquid whose density is  $0.76\text{g/cm}^3$ . What is the volume of the displaced liquid

Upthrust = Real weight - Apparent weight

Upthrust =  $35\text{N} - 27\text{N} = 8\text{N}$

But upthrust = weight of displaced liquid .

Therefore weight of displaced liquid =  $8\text{N}$

But Weight =  $mg$

$8\text{N} = m \times 10$

$M = 0.8\text{Kg} = 800\text{g}$

But mass (m) = Density X Volume of displaced liquid

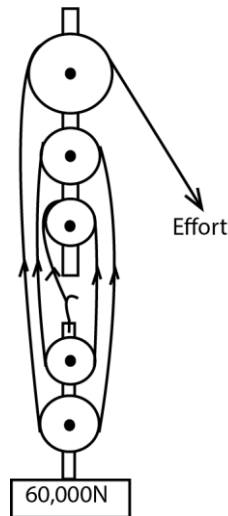
$800\text{g} = 0.76 \times v$

$V = 1052.6\text{cm}^3$

The volume of displaced liquid is therefore  $V = 1052.6\text{cm}^3$

6. (a) The efficiency is less than 100% because some energy is used to overcome friction force in the moving parts of the machine and also some energy is used in raising the moving parts of the machine

(b)i.



$$\text{ii) Efficiency} = \frac{\text{Mechanical Advantage}}{\text{Velocity Ratio}} \times 100\%$$

$$90\% = \frac{M.A}{5} \times 100\%$$

$$M.A = \frac{90 \times 5}{100} = 4.5$$

$$\text{But } M.A = \frac{L}{E}$$

$$4.5 = \frac{60,000}{E}$$

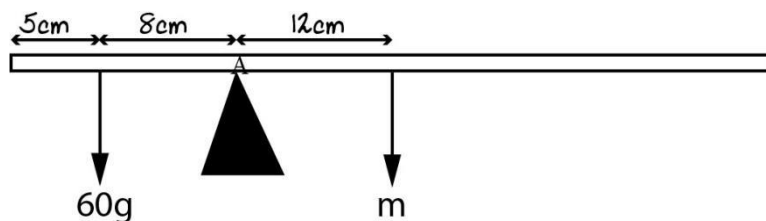
$$E = \frac{60,000}{4.5} = 13,333.3\text{N}$$

7. a Luggage compartments are placed at the bottom rather than at top because when the luggages are Placed at the bottom the centre of gravity of the car is lowered and as a result the car becomes more

Stable preventing it from overturning

b Unstable equilibrium is used when you are walking

c Taking moment at point A



We use principle of moments

Sum of clockwise moments = Sum of anticlockwise moments

$$60 \times 8 = m \times 12$$

$$m = 40\text{g}$$

8. (a) It is not possible to push a car while seated inside because for anybody to move an external force must

be applied to the body. When seated inside you don't apply the external force to the car that means that it remains in it's state of rest **OR** because action and reaction act on the same object so they will cancel each other

(b) When the goal keeper stretches out his hands and pulls the ball, in the process of pulling the ball

Towards himself he is increasing the time of collision between him and the ball and as a result the force of the ball acting on him is reduced

c Momentum is conserved

$$M_{gun} \times V_{gun} = m_{bullet} \times v_{bullet}$$

$$4000 \times V_{gun} = 2 \times 320$$

$$V_{gun} = \frac{2 \times 320}{4000} = 0.16 \text{ m/s}$$

9. (a) (i) When the pinhole is very small a very sharp image is formed on the screen  
(ii) When the object is brought close to the pinhole camera the image formed is bigger in size as

Compared to when the object is far.

(b) (i) When perpendicular

$$n = \frac{360}{\theta} - 1 = \frac{360}{90} - 1 = 3 \text{ images}$$

(ii) When parallel

$$n = \frac{360}{\theta} - 1 = \frac{360}{0} - 1 = \infty$$

.The number of images is therefore infinite when the mirrors are Parallel

10. (a)

Ammeter connected in series

Reasons Measuring current passing through the whole circuit

Voltmete connected in parallel

Reasons Measuring voltage across a given component

(b) Total resistance

$$\frac{1}{R_{parallel}} = \frac{1}{3} + \frac{1}{4} = \frac{7}{12}$$

$$R_{parallel} = 1.7 \Omega$$

$$\text{Total resistance} = 1.7 \Omega + 5 \Omega = 6.7 \Omega$$

$$\text{Current in the circuit (I)} = \frac{V}{R} = \frac{12}{6.7} = 1.79 \text{ A}$$

C(i) If the length of the wire is increased the resistance of the wire increases therefore the current in

The circuit reduces which makes the lamp to reduce it's brightness

(ii) When the temperature of the wire is reduced, the resistance reduces and as a result the current

In the circuit increases which makes the lamp to be more bright.