P.1 MEMO June

PHYSICAL SCIENCES GRADE 11

QUESTION 1

1.1 2nd class (1)

1.2 Mechanical advantage (1)

1.3 N(ewton) (1)

1.4 Accommodation (1)

1.5 Focal length (1)

[5]

QUESTION 2

2.1 product ....square of the distance (2)

2.2 moment or torque of a force... or ..... is if an object is balanced about a turning point, the total anti clockwise moment = total clockwise moment (2)

2.3 2nd law or ...stating newtons 1st law (2)

2.4 Short small wavelengths... or ... high frequency or note with low pitch (2)

2.5 2 consecutive compressions.... or ..... 2 consecutive rarefactions (2)

[10]

QUESTION 3

3.1	A	B	C	
3.2		B	C	D
3.3	A		C	D
3.4		B	C	D
3.5		B	C	D

[5 X 2 = 10]

TOTAL SECTION A : 25 MARKS

QUESTION 4

4.1

$$F = \frac{GM_1M_2}{r^2}$$

$$r^2 = \frac{6,7\times10^{-11}\times 5,97\times10^{24}\times 7,15\times10^{22}}{1,13\times10^{20}}$$

$$= 2,53\times10^{16}$$

$$r = 5,03\times10^{8}\ m$$

$$r = 5,03\times10^{5}\ km$$

(5)

4.2

$$F_{new} = \frac{G2M_1M_2}{(\frac{1}{3}r)^2}$$

$$= \frac{2GM_1M_2}{(\frac{1}{9}r^2)}$$

$$= 18\frac{GM_1M_2}{r^2}$$

$$F_{new} = 18F_{original}$$

(4)

QUESTION 5

5.1 Law of Conservation of momentum. In an isolated system the TOTAL momentum before a collision is equal to the TOTAL momentum after a collision **OR** The total momentum in a closed system is conserved in both magnitude and direction. (4)

5.2

$$P_{before} = P_{after}$$

$$m_1v_{i1} + m_2v_{i2} = (m_1 + m_2)v_f$$

$$(3600\times20) + (800\times-35) = (3600+800)v$$

$$72000 - 28000 = 4400\ v$$

$$v = 10\ m.s^{-1}$$ in direction of trucks motion (6)

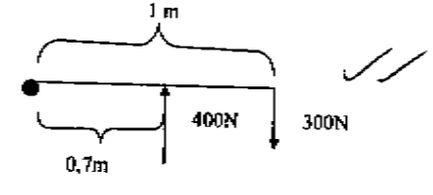
QUESTION 6

6.1 Point about which an object will turn. (2)

6.2 Force x perpendicular distance to fulcrum. N.m (2)

6.3 Big load x small distance = small effort x big distance (2)

6.4.1



(2)

6.4.2 Clockwise torque = F⊥r
= 300 x 1
= 300 N.m

Anticlockwise torque = F⊥r
= 400 x 0,7
= 280 N.m

The gate will open. (4)

6.5 Take moment about point Y

$\tau_{net} = 0$

$(F \perp r)_1 - (F \perp r)_x - (F \perp r)_w = 0$

$(F \times 20) - (20\times10^1 \times 5) - (30\times10^1 \times 10) = 0$

$20F - 400000 = 0$

$20F = 400000$

$F = 20\times10^1\ N$

(5)

QUESTION 7

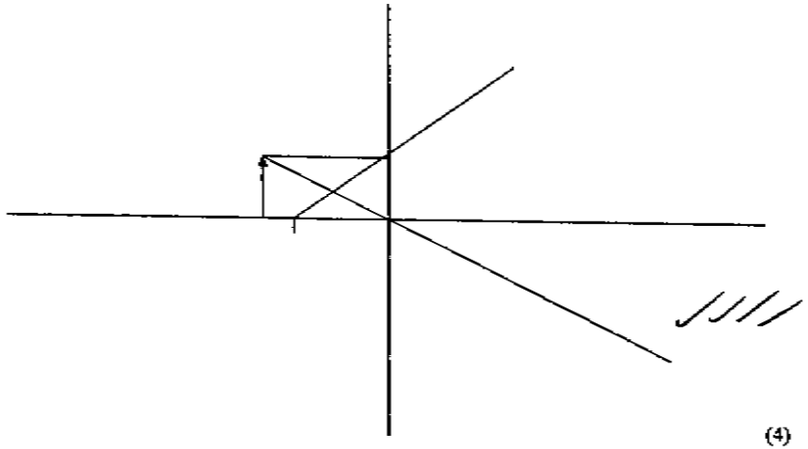
7.1) B,D (2)

7.2) 4m (2)

7.3) $v = f\lambda = 4 \times 4 = 16 m.s^{-1}$ (3)

QUESTION 8

8.1)



(4)

8.2) Virtual, Upright and diminished (3)

8.3) $m = \frac{I_{ver}}{O_{object}} = \frac{I_{Distance}}{O_{Distance}} = 0.4$ (3)

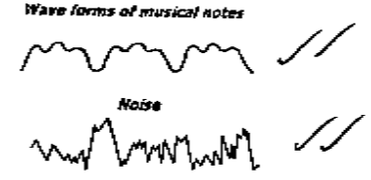
QUESTION 9

9.1) $v = 345 m.s^{-1}$

$t = 0.036/2 = 0.018s$

$\therefore \Delta x = v \times t = 345 \times 0.018 = 6.21m$ (5)

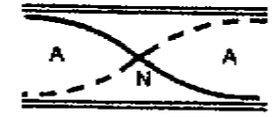
9.2)



(4)

QUESTION 10

10.1)



(2)

10.2) $f_3 = 600 = 3f_0$

$\therefore f_0 = 600/3 = 200Hz$ (2)

10.3) $L = \frac{3}{2}\lambda$

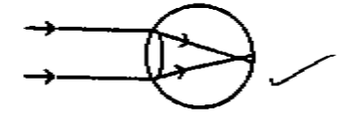
$\therefore \lambda = \frac{2}{3}L = \frac{2}{3}(2.5) = 1.67m$ (3)

10.4) $v = f \times \lambda = 200 \times 1.67 = 333.33 m.s^{-1}$ (2)

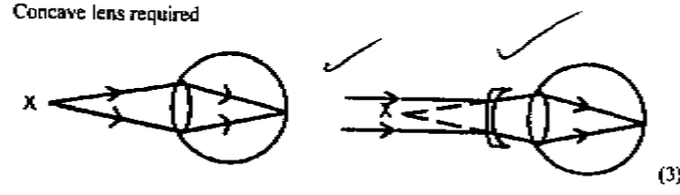
QUESTION 11

11.1) Myopia (1)

11.2)



Concave lens required



(3)

TOTAL: 100 MARKS