KITUI COUNTY MOCK

232/1

PHYSICS

PAPER 1

(THEORY)

JULY, 2017

TIME: 2 HOURS

END OF TERM II FORM FOUR EXAMINATION, 2017

Kenya Certificate of Secondary Education (K.C.S.E)

MARKING SCHEME

SECTION A

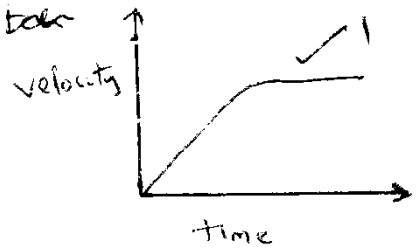
1. M.S = 8.00
T.S = 0.30
= 8.30mm✓[1] (Unit a must)

2. Tube A✓[1] – because air molecules move faster✓[1] than water molecules

3. Upthrust ✓[1]
Frictional force ✓[1]

4. Let the point be x cm from pivot to the left side
Clockwise movement = anticlockwise moment
$(x \times 1) + 0.12(50 + x) = (50 - x)\ 0.18$✓[1]
$x + 6 + 0.12x = 9 - 0.18x$
$1.3x = 3$
$x = 2.307$cm✓[1]
Answer = 50 – 2.307 = 47.69 cm✓[1] (4 sf)

5.



6. To prevent skidding✓[1] or overturning of vehicles at high speed.

7. $P = \frac{Fd}{t}$✓[1]
$= \frac{80 \times 10 \times 10 \times 0.2}{5}$ ✓[1]
= 320W ✓[1]

8. When fire breaks mercury✓[1] is heated. It expands and makes contact with terminal T✓[1], thereby completing the circuit and the bell rings.

9. $k = \frac{F}{e} = \left(\frac{W}{4}\right) mm$. For series $k = \frac{W}{4} \div 2$
$= \left(\frac{W}{8}\right) mm$✓[1]

Total extension = $\frac{F}{k}$,

$e = \left(\frac{W}{\frac{W}{8}}\right)$ = 8mm ✓[1]

10. i) To remove air from the bottle ✓[1]
ii) Pressure imbalance on the inside and✓[1] outside causes the higher atmospheric pressure on the outside
iii) The water drives air out of the bottle. On cooling, the steam inside condenses creating a region of low pressure✓[1] inside. The higher✓[1] atmospheric pressure deforms the bottle.

11. Rate of change✓[1] of angular displacement with time.

12. Make building stable by lowering✓[1] the centre of gravity

13. Pressure is inversely proportional to the✓[1] speed or speed increases as pressure decreased

SECTION B

14. a) i) P.E = mgh

= 2 x 10 x 0.15✓1

= 3J✓1

ii) P.E = K.E = ½ mv^2

$v = \sqrt{\frac{2K.E}{m}}$ ✓1

$= \sqrt{\frac{2 \times 3}{2}}$ ✓1

$= \sqrt{3} = 1.732 ms^{-1}$ ✓1

b) i) $M_1V_1 + M_2V_2 = (M_1 + M_2)V$

1 x 1 + 2 x 0 = (1 + 2)V ✓1

1 = 3V

V = 0.3333 ms^{-1} ✓1

ii) K.E = ½ mv^2

= ½ x 3 x 0.3333^2 ✓1

= 0.495J

iii) $f_r = ma$

a ¿ $\frac{u^2}{2s}$

¿ $\frac{1 \times 1}{2 \times 0.1} = \frac{1}{0.2}$

= 5 ms^{-2} ✓1

f_r = 3 x 5

= 15 N ✓1

c) Velocity reduces to zero then increases✓1 to maximum value.
The body is thrown upwards✓1 and coming back where it was released from

15. a) Bodies in circular motion change✓1 the direction at different instant implying a change of velocity✓1 thus accelerates✓1

b) i) V = rw

$w = \frac{v}{r}$

$v = \frac{2}{2}$ = 1ms^{-1} ✓1

$w = \frac{1}{5} = 0.2 rads^{-1}$ ✓1

ii) $w = \frac{2\pi f}{T}, f = \frac{w}{2\pi} \rightarrow T = \frac{2\pi}{w}$

$= \frac{2\pi}{0.2}$ ✓1

= 31.42✓1 seconds

c) T = mg + mrw^2

= 0.04 x 10 + 0.04 x 0.5 x $(0.2)^2$ ✓1

= 0.4 + 0.0008N✓1

= 0.4008N✓1

d) As the clothes rotates in the spin driver, the fibre of the clothes cannot✓1 provide sufficient centripetal force for the most of the water to make it✓1 go round in a circle. The water tends to fly off at a tangent to the circle and so move towards the wall where it gets out through✓1 the holes

e) Mass ✓

Velocity ✓
Radius ✓
(Any 2 correct)

16. a) H.C is the quantity of heat required to change✓ any mass of substance by 1°C or 1k. Whole s.h.c in the heat required to change a unit mass of substance by 1k.

b) i) Time, temperature rise, current (I) and p.d (V), mass of liquid, mass of calorimeter and its contents.
(Any 4 correct (2 marks)

ii) - After t seconds, the new temperature is noted from the initial temperature of liquid. ✓
- Corresponding I and p.d should be✓¹ noted. With the other variables the specific heat capacity in obtained from.

$C = \frac{VIt - M_c C_c \Delta\theta}{M_L \Delta\theta}$ ✓¹

iii) Ensure continuous stirring of the liquid. ✓¹

c) pt = 0.4 x 900 x 10 + 1 x 4200 x 10 ✓¹
2000t = 3600 + 42000 ✓¹
$t = \frac{45600}{2000}$
= 22.8 seconds ✓¹

17. a) Product of force and distance✓¹ moved by an object.
SI unit – Joule or NM ✓¹

b) i) W = mgh
= 500 x 10 x 4 ✓¹
= 20000J ✓¹

ii) $P = \frac{w}{t} = \frac{20{,}000}{8}$ ✓¹
= 2,500w ✓¹

iii) $\frac{Power\ Output}{Power\ Input} \times 100$ ✓¹
$= \frac{2500}{2800} \times 100$ ✓¹
= 89.29% ✓¹

iv) - Friction of the moving parts ✓¹
- Work done in lifting the parts of the machine ✓¹

18. a) i) L = 3.0cm ✓¹

ii) Gradient = $\frac{8.5 - 4.5}{0.85 - 0.25}$ ✓¹
$= \frac{4}{0.6}$
= 6.667 cm/N ✓¹

iii) $\frac{1}{slope}$
$= \frac{1}{6.667}$ ✓¹
= 0.15 N/cm **or** 15 N/m

b) $w = w_{air} - u$
= 25 – 14✓¹
= 13N ✓¹

c) Weight of stone alone✓[1] is greater than upthrust, however stone and wood have smaller weight than upthrust ✓[1]