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கல்விப் பொதுத் தராதரப் பத்திர(உயர் தர)ப் பரீட்சை
General Certificate of Education (Adv. Level) Examination

භෞතික විද්‍යාව
பௌதிகவியல்
Physics

01 E II

2026 Paper - #02
1½ hours

Name : .....

.....

School : .....

.....

Stream : **MATHS** ☐ **BIO** ☐ **IT** ☐

Student's Signature	

CLASS :

Reiss	-	**Rawatawatta**	☐
Nenapetha	-	**Kesbewa**	☐
Gravity	-	**Nugegoda**	☐

Important :

- This question paper consists of 06 pages.
- This question paper comprises of 10 MCQs, one structured essay & one essay question.
- Use of calculators are not allowed.

For Examiners' Use Only

MCQ	/10	/50
Q1	/20	/50
Q2	/30	
Total		/100

Part I

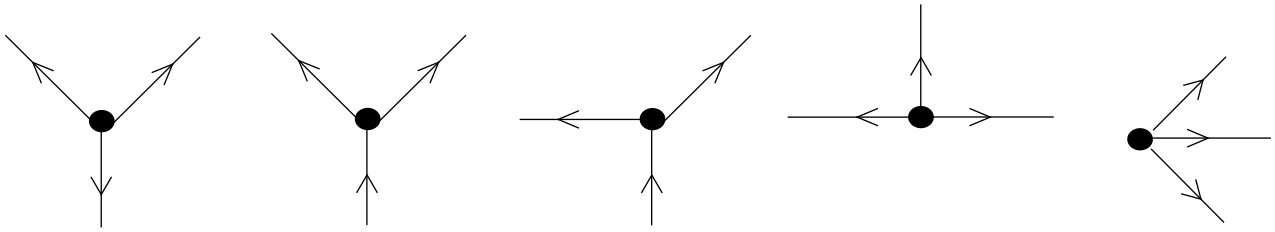
01. $F = \eta \frac{AV}{d}$, in the equation where F is force, A is area, V is velocity and d is distance. The dimensions of η is given by,

1) $M^1L^{-1}T^{-1}$ 2) $M^0L^{-1}T^{-1}$ 3) $M^1L^1T^{-1}$ 4) $M^1L^1T^1$ 5) $M^1L^{-1}T^0$

02. $F = ax + bt^2$, in the equations where F is force, x is displacement and t is time. The displacement of $\frac{a}{b}$ is given by,

1) $M^0L^0T^1$ 2) $M^0L^1T^1$ 3) $M^0L^1T^2$ 4) $M^0L^{-1}T^2$ 5) $M^1L^{-1}T^2$

03. The following force systems are acting separately on five identical bodies which are at rest. The object which is gained a minimum velocity within a same time period is,



(1) (2) (3) (4) (5)

04. A man can swim at a speed of $4ms^{-1}$ in the still water. The river flowing at a velocity of $3ms^{-1}$. The breadth of the river is $20\ m$. The minimum time taken by the man to reach to opposite side of the river is,

1) $\frac{20}{3}s$ 2) $\frac{20}{4}s$ 3) $\frac{20}{5}s$ 4) $\frac{25}{3}s$ 5) $\frac{25}{4}s$

05. The mass of the man who is climbing the tree is $80\ kg$. That man can stay at the 05 equilibrium by the frictional force obtained by pressing the ring which is at his feet to the tree. The coefficient of dynamic friction and the static friction between the tree and the ring are 0.6 and 0.8 respectively. The magnitude of the normal reaction exerted on the ring by the tree when the man is at is equilibrium is,

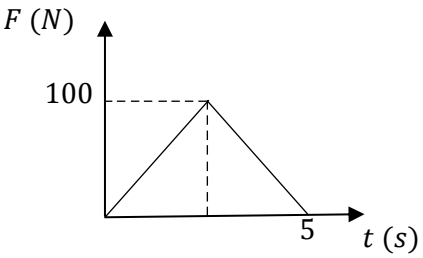
1) $800N$ 2) $1000N$ 3) $\frac{4000}{3}N$

4) $500N$ 5) $80N$

06. The graph shows the resultant force acting on an object of mass $15kg$ starting to move from rest. What would be its final velocity at the end of $5s$?

1) $\frac{20}{3}$ 2) $\frac{50}{3}$ 3) $\frac{70}{3}$

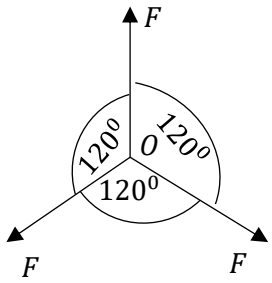
4) $\frac{100}{3}$ 5) $\frac{140}{3}$



07. Two trains of length $150m$ and $200m$ are travelling in parallel tracks towards the opposite direction, with velocities $72\ kmh^{-1}$ and $54\ kmh^{-1}$ respectibely. What is the time taken for them to cross each other (s)?

1) 2 2) 10 3) 14 4) 20 5) 70

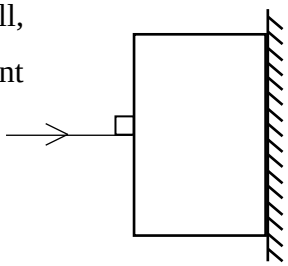
08. An object stays in equilibrium under the influence of three equal forces acting on the point O. The resultant force acting on the object when one of the forces is removed will be,



1) $\frac{F}{2}$ 2) F 3) $\sqrt{2}F$

4) $\sqrt{3}F$ 5) $2F$

09. The diagram shows a $5kg$ object placed in equilibrium against a rough wall, using a force of $120N$. The magnitude and the direction of the resultant force exerted on the object by the wall is,



1) $\downarrow 50N$ 2) $\uparrow 50N$ 3) $\leftarrow 120N$

4) $\nwarrow 130N$ 5) $\swarrow 130N$

10. A stone is released from an air balloon which is coming down at a uniform velocity of $5ms^{-1}$. The distance travelled by the stone at the last second is three times the distance travelled by it in the 1^{st} second. How far the balloon was above the ground (m) at the time the stone was released,

1) 20 2) 30 3) 60 4) 80 5) 100

Question Number	**Answer**
1	
2	
3	
4	
5	

Question Number	**Answer**
6	
7	
8	
9	
10	

Part II

1. You are asked to find the mass M of a piece of rock of irregular shape having a mass of the order of $60g$ by performing the experiment which uses the principle of moments. You are provided with the following items to carry out the experiment.
    - Three weights of masses (m) $10g, 50g$ and $100g$
    - A meter ruler
    - The knife edge and a suitable wooden block
    - Pieces of thread

    (a) As the first step of this experiment, you are asked to balance the meter ruler on the knife edge. What is the purpose of this step?

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    (b) i) Form the weights given above, which is the most suitable for this experiment?

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    ii) Give two reasons for choosing above (b) (i) weight.

    .....

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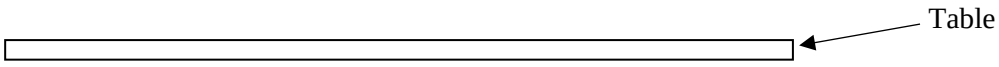
    (c) i) Draw a diagram of the arranged experimental setup on the table shown below. Mark the balanced lengths as the distance to the weight form the balanced point - l_1 and the distance to the piece of rock from the balanced point - l_2 (Consider $l_1 > l_2$)

    ii) When the above (c) (i) system is balanced, write down the relationship among these quantities.

    .....

    iii) Rearrange the above relationship to plot a graph.

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    .....

    iv) If you can change as you wish, the distance to the weight form the balanced point (l_1), write down the independent variable and the dependent variable.

    - Independent variable : .....
    - Dependent variable : .....

v) Explain how to find the mass of piece of rock by naming the axis and drawing the graph.

(d) Your teacher says that you can find the mass of the meter ruler by using only the above items.

i) Draw the practical setup you used to find the mass of the meter ruler (M_0) Increase l_2 value by changing the position of the knife edge ($l_2{}' > l_2$).

$l_2{}'$ - The distance to the piece of rock from the new position of the knife edge.

$l_1{}'$ - The distance to the weight from the new position of the knife edge.

ii) Write down the relationship among $M,\ m, M_0,\ l_1{}', l_2{}'$ and the distance to M_0 from the new balance point (X).

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iii) Re arrange the above relationship to plot a graph.

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iv) How do you find the mass of the meter ruler (M_0)?

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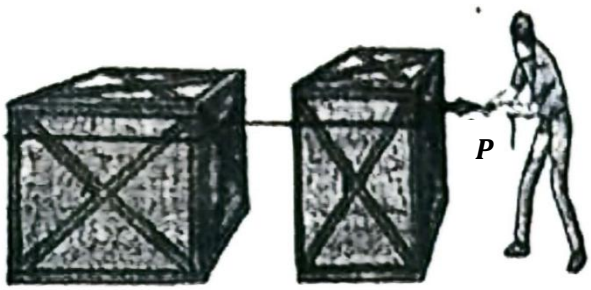
2. Two objects A and B of masses $60kg$ and $40kg$ connected by a rope. The maximum tension the rope can withstand is $400N$. The static and dynamic co-efficient friction between the blocks and the floor are 0.6 and 0.5 respectively.



(a) Assume that the mass of the rope is negligible. Force P is applied horizontally on B as shown in the diagram. Find,

i) The limiting friction of blocks A and B.

ii) Minimum P to keep the rope under tension (P_1).

iii) Minimum P required to move the blocks (P_2)

iv) Maximum acceleration the blocks can move without breaking the rope and the corresponding P value.

v) The friction on A and B when P is $500N$. Here P is in between P_1 and P_2.

vi) Minimum tension the rope should be able to withstand without breaking to move the blocks.

(b) Now assume that the rope between the two blocks has a mass $2kg$ and P is gradually increased,

i) Find the maximum acceleration the blocks can move without breaking the rope. Assume that the rope is straight at this moment and the maximum tension that the rope can withstand is $400N$.

ii) From what end does the rope break? Explain.

iii) Draw the free body diagrams of the two blocks and the rope separately.