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

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பௌதிகவியல்
Physics

01 E II

2026 Paper - #03
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

PRAGEETH ARAVINDA

B.Sc. (University of Sri Jayawardenepura)

Part I

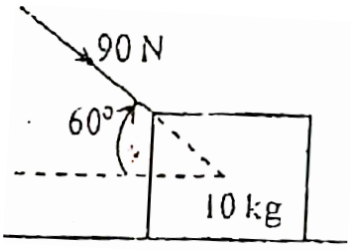
01. The potential energy of a particle with distance from a fixed origin as $u = \frac{A\sqrt{x}}{(x^2+B)}$ where A and B are dimensional constants. Then find the dimensional formula for AB.

1) $ML^{\frac{11}{2}}T^2$ 2) $M^2L^{12}T^2$ 3) $ML^{\frac{7}{2}}T^2$ 4) L^2 5) ML^5T^2

02. A stone dropped at rest reach the ground in $8s$. Distance the stone travelled in the last second is,

1) 320m 2) 245m 3) 160m 4) 75m 5) 70m

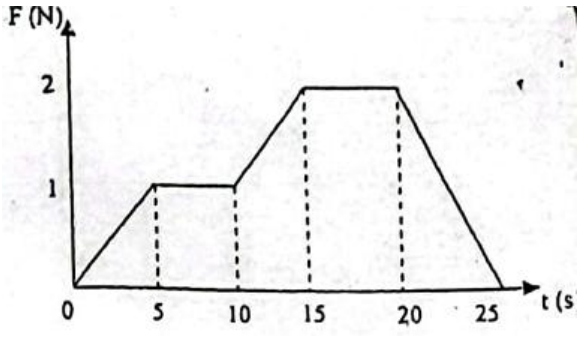
03. $90N$ force acted on a block which placed on the horizontal plane as shown in the figure. The co-efficient of static and dynamic friction among the block and the plane are 0.48 and 0.3 respectively. The magnitude of the friction created by the plane on the block is,



1) 0 2) 30N 3) 40N

4) 45N 5) 78N

04. The graph shows the variation of the force F acted upon an object of mass $2kg$ which is at rest, with the time. The momentum of the object after $25s$ is,



1) $5Ns$ 2) $20Ns$ 3) $25Ns$

4) $30Ns$ 5) $35Ns$

05. An object which is at rest initially reaches a velocity V moving a time $n(s)$ with a uniform acceleration on a smooth horizontal plane. The displacement of the object in between $(n-2)^{th}$ second and n^{th} second is,

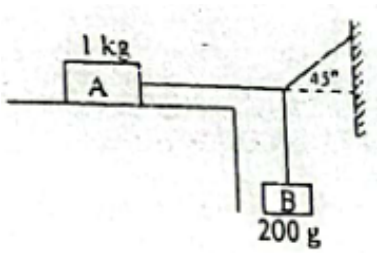
1) $\frac{2nV}{(n+1)}$ 2) $\frac{2nV}{(n-1)}$ 3) $\frac{2V}{n}$ 4) $\frac{2V(n-1)}{n}$ 5) $\frac{V(n^2-1)}{2n}$

06. An aeroplane requires for take-off a speed of 80km/h, the run on the ground being 100m.(runway). The mass of the plane is 10,000 kg and the coefficient of friction between the plane and the ground is 0.2. Assume that the plane accelerates uniformly during the take-off. What is the minimum force required by the engine of the plane for take-off?

1) $3.0 \times 10^4 N$ 2) $2.47 \times 10^4 N$ 3) $1.96 \times 10^4 N$

4) $4.43 \times 10^4 N$ 5) $5.0 \times 10^4 N$

07. The mass-string system shown in figure is in equilibrium. If the coefficient of friction between A and the table is 0.3, the frictional force on A is,



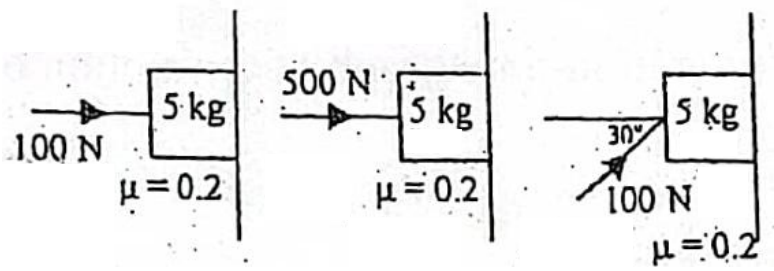
1) $2N$ 2) $3N$ 3) $4N$

4) $1N$ 5) $6N$

08. An object starts from the rest travels first 50m distance with a constant acceleration, next 200m with a uniform velocity and another 30m with a constant deceleration and come to rest at the end. If the total time it travelled is 30s, the maximum velocity it acquired is,

1) $12.0ms^{-1}$ 2) $8.7ms^{-1}$ 3) $6ms^{-1}$ 4)$6.7ms^{-1}$ 5) $2.7ms^{-1}$

09. In which diagram, the maximum and the minimum friction force is given,



a **b** **c**

1) b and c 2) a and c 3) c and a 4) c and b 5) a and b

10. A particle moving in a straight line covers half the distance with speed of $3ms^{-1}$. The other half of the distance is covered in tow equal time intervals with speed of $4.5ms^{-1}$ and $7.5ms^{-1}$ respectively. The average speed of the particle during this motion is,

1) $4ms^{-1}$ 2) $5ms^{-1}$ 3) $5.5ms^{-1}$ 4) $4.8ms^{-1}$ 5) $6.0ms^{-1}$

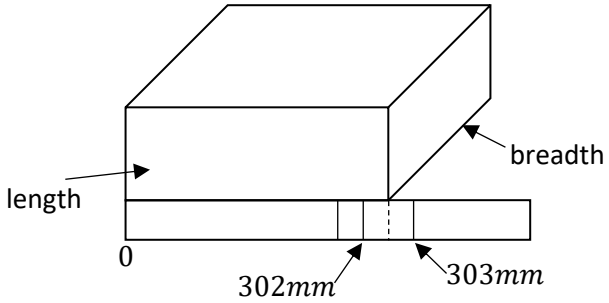
Question Number	**Answer**
1	
2	
3	
4	
5	

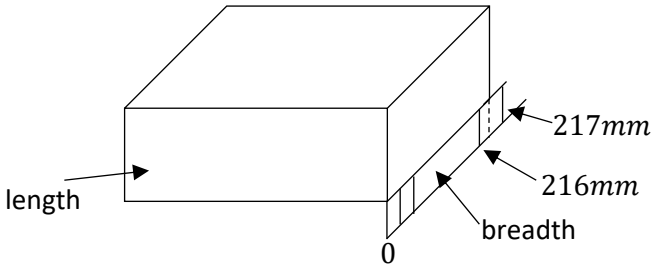
Question Number	**Answer**
6	
7	
8	
9	
10	

Part II

1. To store $A4$ sheets efficiently, you are supplied several storage boxes made out of hard cardboard, in different heights. To take the required measurements a scientific meter ruler, a normal micrometer screw gauge and a vernier caliper using in the school lab are provided.

   (a) Following diagram shows how to use a meter ruler to measure a length and breadth of a selected box.





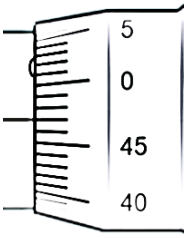
   i) Write down the corresponding fractional errors for the above two incidents if the zero mark of the meter ruler is exactly in line with the edge of the end of se box as shown in the figure.

   Length : .....

   Width : .....

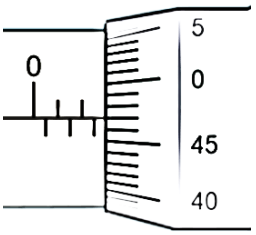
   (b) The thickness of the cardboard was measured by using the micrometer screw gauge as shown below.

Figure 1



When the anvil and the indie are in contact together

Figure 2



When object is gripped between the anvil and the spindle

   i) Find the thickness of cardboard.

   .....

   .....

ii) When the length and breadth of an $A4$ sheet are 29.7 cm and 21 cm respectively show that an A_4 sheet can be stored horizontally in the above box according to the measurements got in part (a) i) and (b) i).

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iii) Thickness of an A4 sheet is about $0.05\ mm$. To assure this value, the micrometer screw gauge is used. In order to achieve the maximum percentage error of the measurement of the thickness of the paper bundle as 1%, how many sheets should have to be used.

.....

(c) The gsm value of a paper is represented that the mass in grams per square meter. For an $A4$ sheet, this value is 75.

i) Find the mass of an A4 sheet in grams.

.....

.....

ii) When the mass of the cardboard box is 320g, find the maximum number of A_4 sheets that can be stored in the box, without exceeding the total mass 5 kg.

.....

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iii) Find the minimum internal height of the box that should be selected.

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iv) When selecting the storage box, the internal height should be measured. Which measuring instrument should be user to take this measurement and explain how do you use it.

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2. A) An object A is released at rest from a point P, $5m$ above the ground level when $t = 0$. The rebouncing velocity of A is $^3/_4$ of the velocity (V) with which A hit the ground. Another object B is dropped gently from P after $t = 0.5s$. Work out the following:

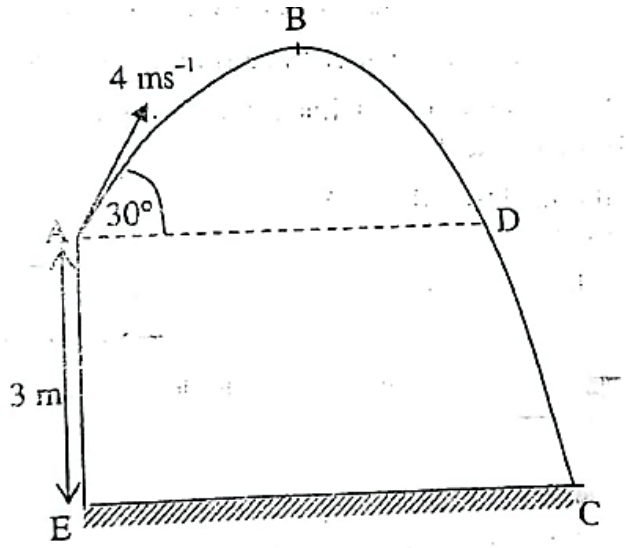
i) The time taken by A to strike the ground.

ii) Renouncing velocity of A

iii) The distance travelled by A when A and B collide

iv) Velocity of A when A and B collide

B) An object (O) is projected at $30°$ angle with the horizontal $4ms^{-1}$ velocity from a point A $3m$ above the ground level as shown in the figure. The object reaches its' maximum height at B and strikes the ground at C.



i) What is the velocity of the object at B?

ii) Calculate the time of flight for the object

iii) What is the magnitude and direction of the velocity of O as it move passing point D?

iv) What is the maximum height O ascend above the ground level?

v) Find the magnitude of O's velocity as it strikes the ground at $C\sqrt{19} = 4.36°$

vi) What is the horizontal distance between E and C?

vii) Sketch graphs (a and b) clearly depicting the initial and final positions of O for its' motion form A to C

a) vertical displacement (y) Vs time (t)

b) horizontal displacement (x) Vs time (t)