

Name.....Index No.....Adm. No.

ClassSignDate

232/1
PHYSICS
2 HOURS

KAMDARA JET - 2016

INSTRUCTION TO CANDIDATES

- Write your name, index number/Admission number in the spaces provided above.
- This paper consists 11 of the sections: A & B.
- Attempts all the questions in the spaces provided.
- Silent Non Programmable electronic calculator may be used
- All working must be clearly shown.

For examiners Use only

SECTION	QUESTION	Maximum Score	Candidates Score
A	1 - 10	25	
B	11	11	
	12	11	
	13	10	
	14	11	
	15	12	
Total Score		80	

This paper consists of 11 printed pages. Candidates should check the question paper to ascertain that all pages are printed as indicated and that no question is missing.

SECTION A(25 MKS)

1. The figure below shows a burette partly filled with a liquid. The burette was initially full to the mark 0. If the quantity of the liquid removed has a mass of 20g, determine the density of the liquid. (2 mks)



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2. Water at 20°C falls over a waterfall of height 40m. Calculate the temperature of water at the bottom of the waterfall if 80% of potential energy at the top is converted into heat energy (3marks)

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3. A faulty thermometer reads 2°C when dipped in ice a 0°C and 95°C when dipped in steam at 100°C. what would this thermometer red if placed in water at room temperature of 18°C? (3 marks)

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4. $X\text{cm}^3$ of substance A which has density 800 kg/m^3 is mixed with 1000cm^3 of water with a density of 1000kg/m^3 . The density of the mixture is 960kg/m^3 . Determine the value of X.

(3 marks)

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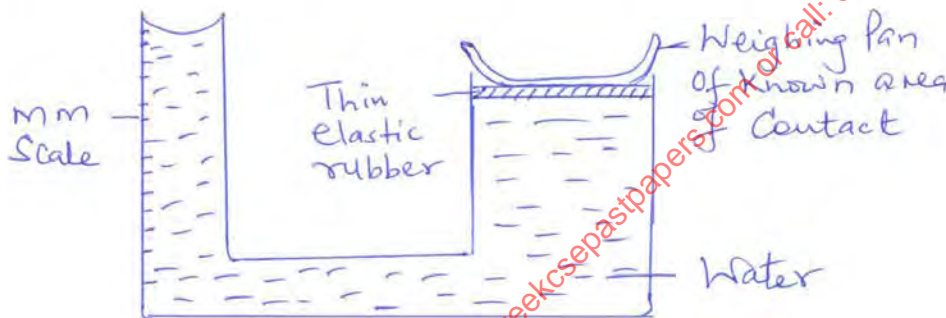
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5. The figure below shows a simple instrument designed by a student for weighing objects.



a) State what happens if one places an item on the weighing pan.

(1 mark)

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b) State two properties of water that make it suitable for this purpose.

(2 marks)

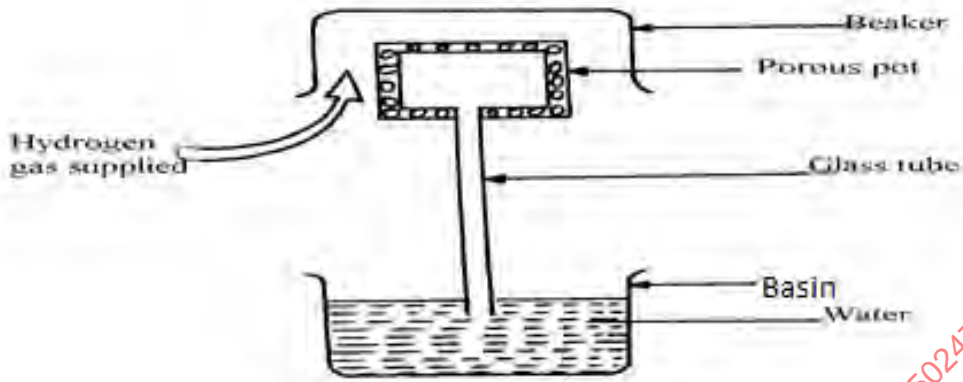
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6. The figure below shows an arrangement of demonstrate diffusion through solids.



The hydrogen gas is supplied for sometimes then stopped and the beaker removed. State and explain what is likely to be observed when the hydrogen gas supply is stopped. (3 marks)

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7. A metal pin was observed to float in the surface of pure water. However, the pin sank when drops of soap solution were carefully added to water. Explain this observation. (1 mark)

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8. Sauce pans have a plastic or wooden handles. It is observed that in the morning the pan feels colder than the wooden handle. Explain the difference in this observation. (2 marks)

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9. A bullet moving at a velocity of 350m/s hits a tree trunk of diameter 70cm. It emerge from the opposite side with a velocity of 180m/s. Determine the average deceleration of the bullet in the trunk. (3marks)

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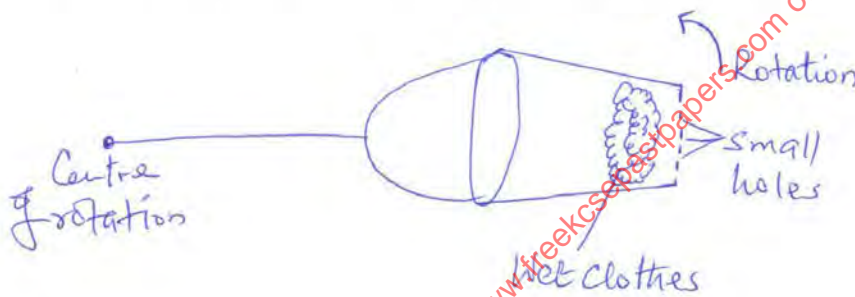
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10. The figure below shows a container with small holes at the bottom in which wet clothes have been put. When the container is whirled in air at high speed, it is observed that the clothes dry faster.



Explain how the rotation of the container causes the clothes to dry why so fast. (2 marks)

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SECTION B (55 MARKS)

11. The table below shows the value of the resultant force F and time t for a bullet raveling inside the gun barrel after the trigger is pulled.

Force F (N)	360	340	300	240	170	110
Times t (ms)	3	4	8	12	17	22

(a) On the grid provided plot a graph of force F against time t . (5 marks)

(b) Determine from the graph:

(i) The time required for the bullet to travel the length of the barrel assuming that the force becomes zero just at the end of the barrel. (1 mark)

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(ii) Impulse of the force. (2 marks)

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(c) Given that the bullet emerges from the muzzle of the gun with a velocity of 200m/s, Calculate the mass of the bullet. (3marks)

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12. a) State the pressure law. (1 mark)

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b) The pressure (P) of a fixed mass of a gas at constant temperature $T=300\text{k}$ is varied continuously. The corresponding values of P and volume (v) of the gas are shown below.

Pressure ($\times 10^5$ Pa)	2.0	2.5	3.0	3.5	4.0	4.5
Volume (m^3)	0.025	0.02	0.017	0.014	0.012	0.011

(i) Plot a graph of P against $1/v$ using grid provided below. (5 marks)

(ii) Given that $P = \frac{2RT}{V}$, Find the constant R from the graph. (2marks)

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(c) A tin with an air tight lid contains air at a pressure of 1.0×10^5 Pa and a temperature of 12°C . The air is heated in water bath until the lid opens. If the temperature at which the lid opens is 88°C , Determine the pressure attained by the gas. (3marks)

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13. (a) State Archimedes Principle (1 mark)

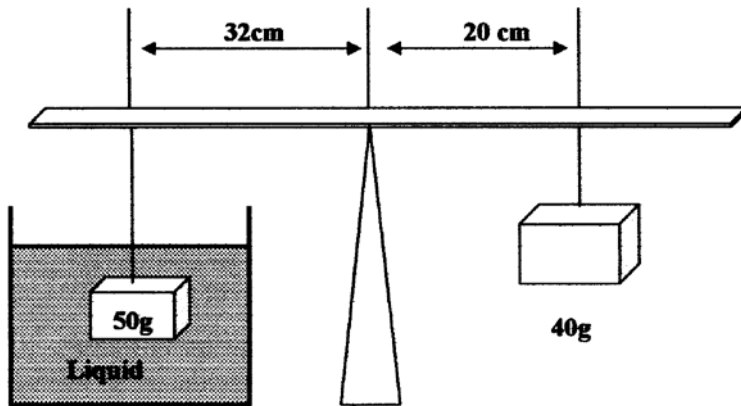
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- (b) The figure below shows a block of mass 50g and density 2000kg/m^3 submerged in a certain liquid and suspended from uniform horizontal beam by means of a string. A mass of 40g suspended from the other end of the beam puts the system in equilibrium



- (i) Determine the up-thrust force acting on the block. (3 marks)

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- (ii) Calculate the density of the liquid. (3 marks)

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(iii) Calculate the new balance point of the 50g mass (the 40g mass remains fixed) if the liquid was replaced with one whose density was 1500kg/m^3 . (3 marks)

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14. a) A liquid at 80° in a cup was allowed to cool for 20 minutes. State two factors that determine the final temperature. (2 marks)

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b) What is meant by specific latent heat of evaporation? (1 mark)

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c) In an experiment to determine the specific latent heat of vaporization L of water, steam at 100°C was passed into water contained in a well lagged copper calorimeter. The following measurements were made:

Mass of calorimeter = 80g

Initial mass of water = 70g

Initial temperature of water = 5°C

Final mass of calorimeter + water + condensed steam = 156g

Final temperature of mixture = 30°C

(Specific heat capacity of water = $4200\text{JK}^{-1}\text{kg}^{-1}$ and specific heat capacity for copper = $390\text{J/kg}^\circ\text{C}$).

Determine:

i) Mass of condensed steam. (2 marks)

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(ii) Heat gained by the calorimeter and water. (2 marks)

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(iii) Given that L_v is the specific latent heat of vaporization of steam.

a) Write an expression for the heat given out by steam. (1 mark)

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b) Determine the value of L_v . (3marks)

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15. a) Distinguish between load and effort. (2 marks)

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(b) A mason uses a six wheel pulley system to raise a weight of 250N through a vertical height of 2.5m using the machine. If the mason pulls using an effort of 500N. Calculate:

i) The velocity ratio of the pulley system. (2 marks)

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ii) The work done by the mason. (3 marks)

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(iii) The useful work done by the pulley system. (2 marks)

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iv) The efficiency of the system (3marks)

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