G. D. SOMANI MEMORIAL SCHOOL
PRELIM EXAMS

SUB: PHYSICS MARKS:80

DATE: 17/1/08 TIME:1½HRS.

Answers to this Paper must be written on the paper provided separately. You will not be allowed to write during the first 15 minutes. This time is to be spent in reading the question paper. The time given at the head of this Paper is the time allowed for writing the answers.

Section I is compulsory. Attempt any four questions from Section II

The intended marks for questions or parts of questions are given in brackets [ ]

SECTION - I [40 MARKS]

*Attempt **all** questions from this Section.*

Question: I

[A] A body of mass 5kg is at rest. A force is applied on it for 15 seconds. Velocity after 15 seconds is 120ms^{-1}. Calculate change of momentum and force acting on the body. [2]

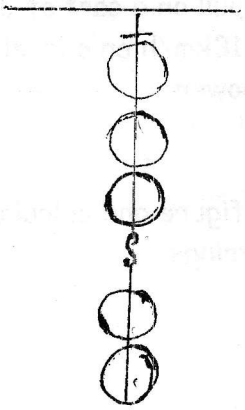
[B] What is the relationship between MA and VR for ; [2]

i. ideal machine ii. Practical machine.

[C] The diagram shows a system of five pulleys. [2]

i. Copy and complete the diagram by drawing strings around the pulley and mark positions of L and E.

ii. If the load is raised by 1m what distance will the effort move?



[D] Define Refractive Index by Snell's Law. [2]

[E] A magnified image is to be projected on a screen. [2]

i. What type of lens should be used?

ii. State two other features of the image.

Question: II

[A] Compare the exposure time for slow and fast films. What does the aperture control? [2]

[B] Differentiate between spectral and pigment colours? [2]

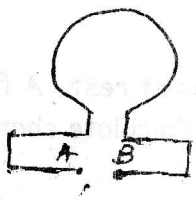
[C] Why are stringed musical instruments provided with large sound boxes? [2]

[D] How does the resistance of a circuit change when ; [2]
(i) current is doubled.
(ii) when resistors are connected in parallel.

[E] An electric lamp is marked 240V 60W. What does the marking mean? What will be the resistance of the filament? [2]

Question: III

[A] A and B are the terminals of a batteryin the given diagram. The circular coil has north polarity when the current flows. What are the polarities of A and B? Name the rule you used to come to the conclusion. [2]



[B] Explain why ether provides greater cooling effect than water when smeared on our hands. [2]

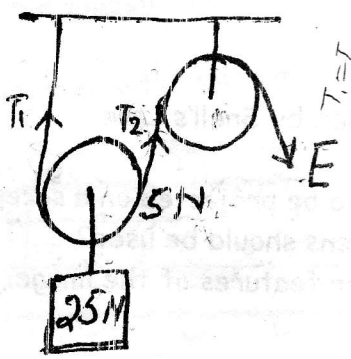
[C] List the advantages of nuclear fusion over nuclear fission. *(any two)* [2]

[D] A body weighs 48N on the moon. Acceleration due to gravity on the moon is $1.6ms^{-2}$. [2]
i) What is the mass of the body on the moon?
ii) What will be its mass when taken to the earth? $(g = 9.8ms^{-2})$

[E] A horse exerts a pull on a cart of 300N so that the horse and cart system move with uniform speed of 18km/h on a level road. Calculate the power developed by the horse in watts and horse power. [2]

Question: IV

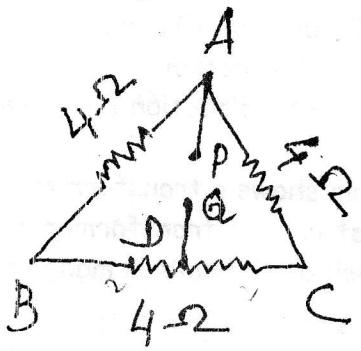
[A] Look at the given figure and calculate the magnitude of effort E and the value of Tension T_1 and T_2 in the strings. [2]



[B] A parallel beam of light falls on a converging lens of focal length 18cm and comes out as a parallel beam from a second converging lens of focal length 12cm. How far apart are the lenses kept? Draw a ray diagram *(not to scale)* to explain your answer. [2]

[C] Explain why loudness of sound decreases with distance. [2]

[D] In the given figure the point D divides resistance of part BC into two equal halves. Calculate resistances between the points P and Q. [2]



[E] What is the function of split ring in DC Motor? [2]

SECTION - B

[Answer any four questions]

Question: V

[A] i. Explain briefly what changes take place within the nucleus when β particles are emitted by radioactive substance. [3]

ii. When does an element become radioactive?

[B] State the energy changes in an oscillating pendulum? [3]

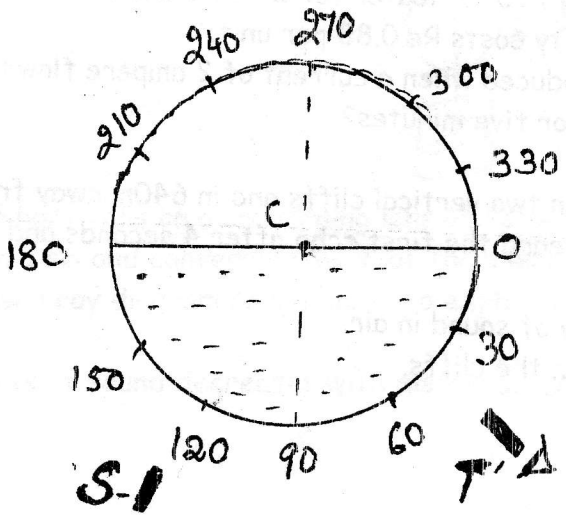
[C] The adjoining figure shows circular cross section of a transparent cylindrical petridish, half of which is filled with a liquid of critical angle 45°. 'S' is source which sends a narrow beam of light towards C, the centre of the circle, 'T' is the tube through which any light coming out of the vessel can be seen. S and T can be rotated in a circular path with C as centre.

i. From which two positions of T can the light be seen when: [2]

a] S is at 120°

b] S is at 135°

ii. From which position can you see the light when 'S' is at 150°. Explain why you see it from one position of 'T' only. [2]



Question: VI

[A] Find the work done by a man carrying a suitcase of mass 30kg over his head when he travels a distance of 10m in ; [3]

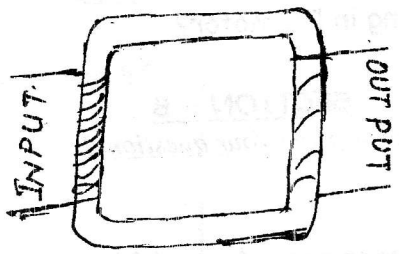
i. vertical direction

ii. horizontal direction $\{g = 9.8ms^{-2}\}$ [3]

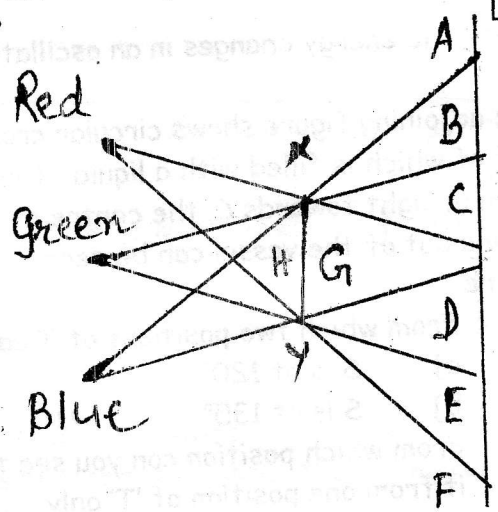
[B] The diagram shows a transformer.

i. what type of transformer is it?

ii. which of the coils is made up of thinner wire and why?



[C] Three ray boxes using red, green and blue filters are kept in front of an opaque card 'XY' which obstructs some of the light falling on the screen *(white)* as shown in the adjoining figure. What will be the colours seen in the parts ABCDEFG? Which colour will be seen on the side H of xy and why? [4]



Question: VII

[A] i. Find the cost of using 750 W heater for 2 hours and four 100W lamps for five hours if electricity costs Re.0.80 per unit. [3]

ii. How much heat is produced when a current of 2 ampere flows through a resistance of 10 Ω for five minutes?

[B] A person is standing between two vertical cliffs and in 640m away from the nearest cliff. When he clapped he heard the first echo after 4 seconds and the second echo three seconds later. [3]

i. Calculate the velocity of sound in air.

ii. The distance between the cliffs.

[C] A load of 60 kgf an be pushed up with a force of 30Kgf along a plank.

i. what will be the height gained by the load when it has been pushed 8m along the plank? [2]

ii. At what angle must the plank be set with the ground? [1]

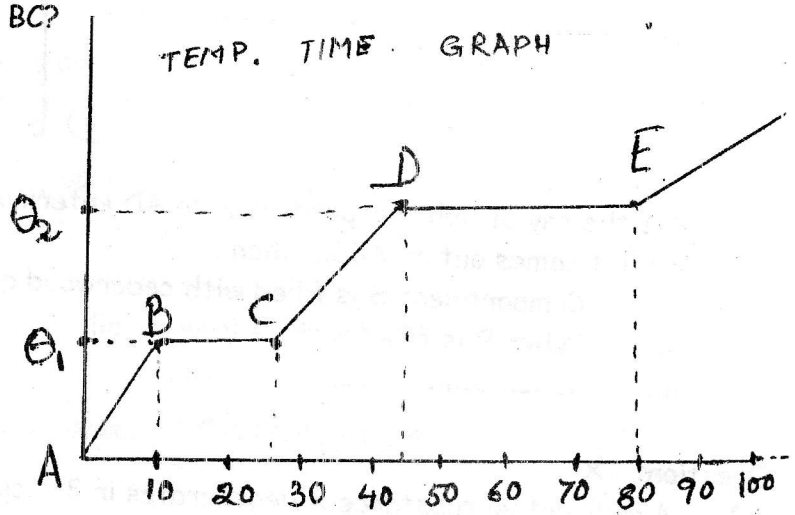
iii. State any assumptions made. [1]

Question: VIII

[A] The diagram given below shows the changes in the state of a substance from solid to vapour state. [3]

i. What do the following parts represent?
AB, BC, CD, DE.

ii. Why is DE longer than BC?



[B] Wavelength of the waves produced on the surface of water is 20cm. If the wave velocity is 24m/s, calculate; [3]

i. The number of waves produced in one second.

ii. Time required to produce one wave.

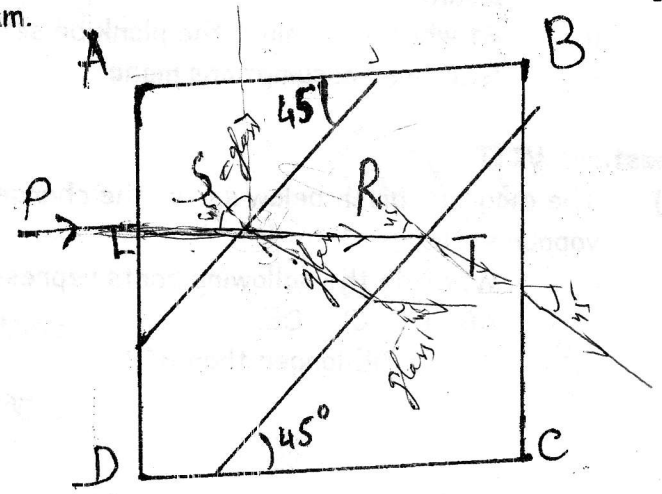
[C] A high resistance voltmeter in connected to a dry cell battery. The voltmeter read 12V. When a 24 Ω resistance is connected across battery terminals, the voltmeter reads 7.2V. Calculate the internal resistance of the batter. [4]

Question: IX

[A] 500gm of hot/boiling water is poured into a mug of mass 0.15kg and having specific heat capacity of 800J/Kg/°c. If the temperature of the water drops to 70°C, calculate the amount of heat energy lost by water. {*specific heat . 4200 JKg^{-1}°C^{-1}*} [3]

[B] What is power of accommodation of an eye? How far is the far point for a normal eye? [3]

[C] ABCD is a hollow glass cube divided into 3 compartments S, R and T by thin glass partition as shown in the given diagram. [4]



P is the ray of light perpendicular to AD entering the glass cube. Draw the path of P till it comes out of ABCD when ;

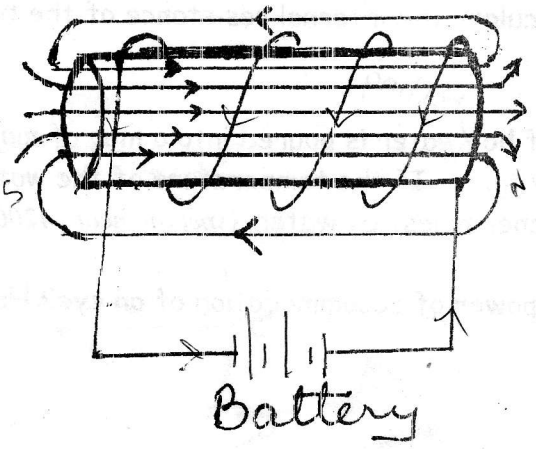
i. Compartment S is filled with cedarwood oil of RI 1.5 {*same as the glass*}
ii. When R is filled with cedarwood oil.
iii. When compartment T is filled with cedarwood oil.

Question: 2X

[A] A radioactive substance X degenerates in 3 steps and the final product is an isotope of X. What emissions are likely to have taken place? If mass of x is 86 what would be the mass of isotope of x and why? [3]

[B] Copy the given diagram and mark ; [3]

i. North and South poles of solenoid.
ii. Direction of current through the solenoid and positive and negative terminals of the battery.
iii. How will the magnetic field be affected if the soft iron bar is placed inside.



[C] Distinguish between a Dynamo and Motor. [4]

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