JAMNABAI NARSEE SCHOOL

JUHU, MUMBAI - 400 049

PRELIMINARY EXAMINATION - 2007 Std X

SUBJECT : PHYSICS **TIME :1.5 HRS.**

MARKS: 80 MARKS

NOTE : This paper consists of 4 pages

: All Questions of section I compulsory. Section II any four.

SECTION - I (40 MARKS)

Q.1a. State the formula for Kinetic energy of a body and the SI Unit of each quantity in it. (2)

b. If 20g of boiling water at 100° C is added to 10°g of water at 20°C, what will be the final temperature of the mixture,observation under experimental conditions.(specific heat capacity of water=4.2J/g°C) (2)

c. A red rose with green leaves is illuminated with red light. (2)
What colour will the flower and the leaves appear ?

d. A single fixed pulley is an example of class I lever. Explain with the help of sketch diagram the position of load, fulcrum & effort. (2)

e. A body of mass 3 kg has a momentum 24 kgm/s. Find its kinetic energy. (2)

Q.2a. A nuclear reactor is a device used to produce new nuclides using suitable fissionable material. (2)

1) Name the material used.

2) Name the most prominent moderator used in it.

b. In a photographic camera, what are the factors which determine the amount of light falling on the film ? (2)

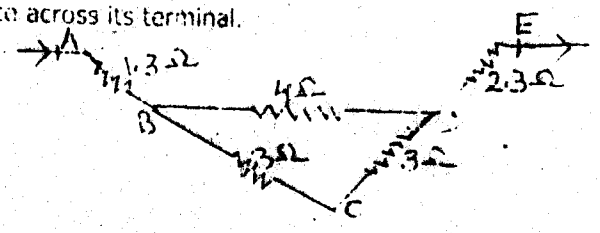
c. The wavelength of an electromagnetic radiation is in the range of 4×10^{-7} m to 5×10^{-9} m.

1) Identify the radiation and give one method to detect it. (2)

d. The apparent depth of water in a swimming pool is 5m. What is its real depth if $\mu_{aw} = 1.5$? (2)

e. What are complementary colours ? Give one example. (2)

Q.3a. The diagram below shows the connectivity of resistors. Find the effective resistance across its terminal. (2)



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Q.3b. Calculate the potential difference between points A and B if the work done in taking a charge of 2 coulomb from A to B is 3 joule. (2)

c. A nucleus of $^{226}_{88}Ra$ emits an alpha particle as shown in the equation below.

$^{226}_{88}Ra \xrightarrow{1\alpha\text{ particle}} {}^{Y}_{x}Rn + {}^{4}_{2}He$

(1) Complete the equation by rewriting the value of x and y.

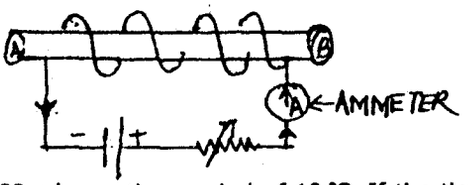
(2) What happens to the atomic number of the element when it emits an alpha particle ? (2)

d. What is meant by carbon dating ? Explain its use in estimating the age of a plant. (2)

e. Name the process responsible for the energy Generation in the Sun. (2)
Give a representative equation for the same.

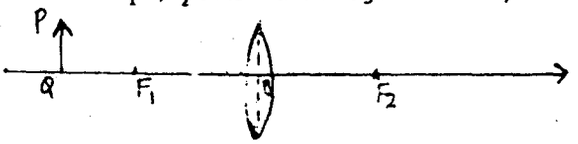
Q.4a. Diagram below shows a circuit containing a coil wound over a long and thin hollow cardboard tube. (2)

Copy the diagram and draw the magnetic field lines of force inside the coil and also show their direction. (2)

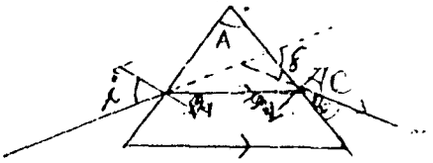


b. A soundwave of wavelength 0.322m has a time period of 10^{-3}S. If the time period is decreased to 10^{-4}S, calculate the wavelength and frequency of the new wave. (2)

c. An object PQ is placed on the principle axis of a convex lens as shown in figure below. Copy the diagram. Using three rays starting from 'P' and the properties of the points marked F_1 O,F_2 obtain the image formed by the lens. (2)

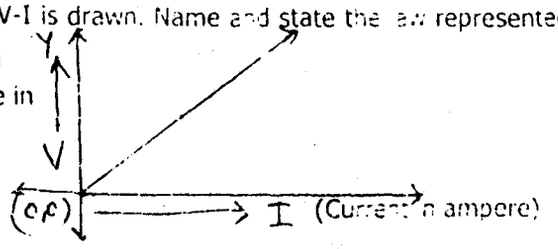


d. The diagram below shows a ray of mono-chromatic light passing through an equilateral prism placed in minimum deviation position. (2)



(i) Give the relationship between the angles A, δ, i and e

e. A Graph of V-I is drawn. Name and state the law represented by the graph. (2



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SECTION - II (40 MARKS) - ANSWER ANY FOUR

Q.5a. State work Energy Theorem. (2)

b. Show by a sketch diagram the energy conversion and conservation in a simple pendulum. (3)

c. An electric heater of power 500W raises the temperature of 5 kg of a liquid from 20° to 35°C in 2 minutes. Calculate the heat capacity of the liquid. (3)

d. Derive a relationship between newton and dyne. (2)

Q.6a. State the energy conversions in the following. (2)

(1) Ringing of an electric bell.

(2) Working of an AC dyanamo.

b. A man drops a 10 kg rock from the top of a 5m ladder. What is its speed just before it hits the ground ? ($g=9.8m/S^2$) (3)

c. A cook used fire tong pair of length 32 cm to lift a piece of burning coal of mass 500g. If he applies his effort at a distance of 8 cm from the fulcrum, (5)

(1) What is his effort ? Assuming friction absent.

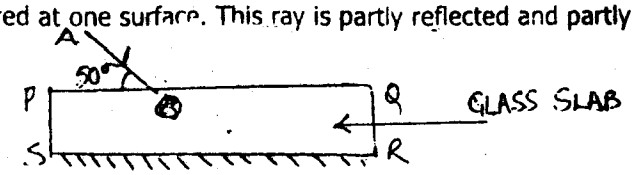
(2) Draw a sketch diagram and mark the position of L,E and F.

(3) Obtain the value of its MA.

Q.7a. State two ways by which the frequency of transverse vibrations of a stretched string can be decreased. (2)

b. A shooter stands at a distance of 850m from a cliff and fires a gun. After what time gap will he hear the echo, if the sound travels at a speed of 350m/s in air. (3)

c. Figure below shows a ray of white light AO incident on a rectangular glass block, which is silvered at one surface. This ray is partly reflected and partly refracted. (5)



(1) Copy the diagram and trace the path of the refracted ray and the reflected ray. Show atleast 2 rays emerging from the surface PQ.

(2) How many images are formed in the above case ?

(3) Which image is the brightest ?

Q.8a. What is a fuse ? where is it placed in a circuit ? (2)

b. An electric heater is rated 500 KVA, 220V. If the heater is operated for 10 hours, calculate the energy consumed in kWh. (3)

c. Two electric lamps of 40W, 220V and 100W, 220V. Out of the two lamps which one will glow the brightest when connected in series to a supply of 220V. (2)

d. What are the colour codes used for various wires in an electrical circuit ? (3)

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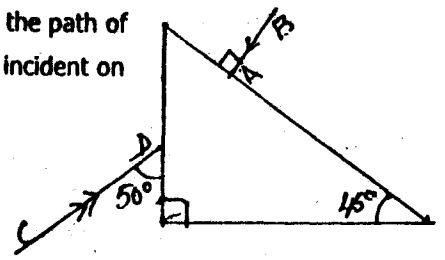
Q.9a. Define specific latent heat of vaporization of steam. (2)

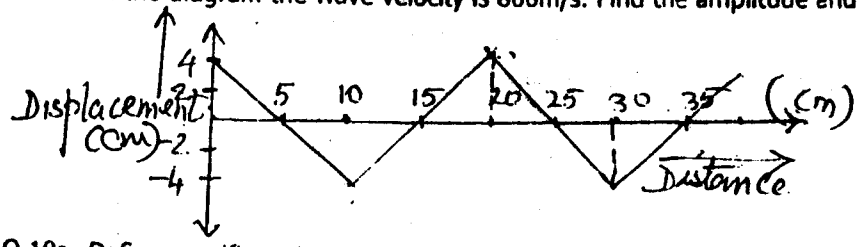
b. 1 Kg of ice at 0°C is being continuously heated through an electric heater of 2KW. Assuming that all the heat is transmitted to ice, calculate the time intervals in seconds for (i) ice to completely melt to water at 0°C. (ii) Water to be heated from 0°C to steam at 100°C. (4)

Given specific latent heat of ice = 336000 J/kg. specific heat capacity of water = 4200 J/Kg°C. Specific latent heat of steam = 2260,000 J/kg.

c. Copy the diagram and trace the path of two rays AB and CD of light incident on a right angled glass prism. (2)



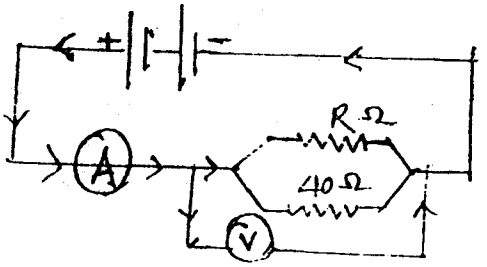
d. In the diagram the wave velocity is 800m/s. Find the amplitude and frequency.



(2)

Q.10a. Define specific resistance of a conductor. State a factor on which it depends. (2)

b. In the circuit diagram, the voltmeter reading and ammeter reading are 4V and 0.4A respectively. (3)



Obtain (1) the value of the combined resistance of 40 Ω and R Ω

(2) the value of R

(3) the current flowing throught 'R'

c. Draw a representative diagram of a D.C. motor label the following in your diagram. (5)

(1) the field magnet

(2) the armature

(3) commutators

(4) wire brushes

What is the energy changes involved in this case ?

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