JSS INTERNATIONAL SCHOOL DUBAI

Practice papers 1 - By Salman Sir

80 marks | Full syllabus | 2 Hours

SECTION-A

(Attempt all questions from this Section.)

Question 1.

Choose the correct answers to the questions from the given options:[15]

(1) If two unequal forces are applied at the two ends of a body in opposite direction, then:
(a) the body will not rotate
(b) the body will move on forward direction
(c) the body will rotate only
(d) the body rotates and moves in forward direction

(ii) No work is done when:

(a) a nail is hammered into a wooden box
(b) a box is pushed along horizontal floor
(c) there is no component of force, parallel to the direction of motion
(d) none of these

(iii) Potential energy of a person is minimum when:

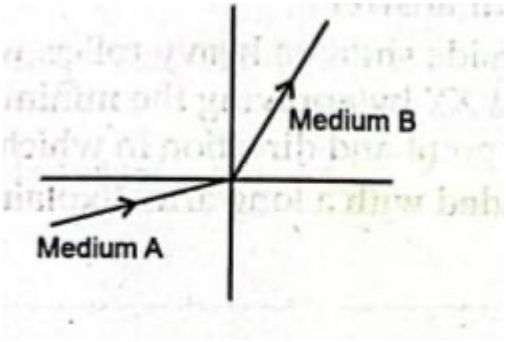
(a) person is standing
(b) person is sitting in a chair
(c) person is sitting on the ground
(d) person is lying on the ground

(iv) Which is more energetic?

(a) alpha particle
(b) beta particle
(c) gamma rays
(d) X-rays

(v) The colour of light which is deviated the least by a prism in the spectrum of white light is:
(a) red
(b) green
(c) violet
(d) yellow

(vi) A ray of light from medium A enters into medium B as shown. The refractive index of medium B relative to A will be:



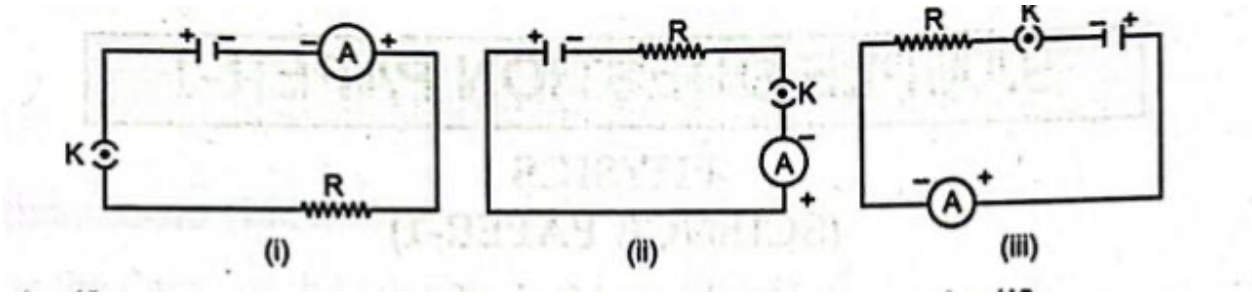
(a) greater than unity
(b) less than unity
(c) equal to unity
(d) zero

(vii) Ultrasonic are not used in:

(a) SONAR
(b) sonography
(c) CUSA
(d) radio waves

(viii) To detect the obstacles in their path, bats produce:
(a) Infrasonic waves
(b) Ultrasonic waves
(c) Electromagnetic waves
(d) Radio waves are arranged as shown in the circuit diagrams of figure. The current

(ix) A cell, a resistor, a key and ammeter are arranged as shown in the circuit diagrams of figure.The current recorded in the ammeter will be:



(a) maximum in (i)
(b) maximum in (ii)
(c) maximum in (iii)
(d) same in all the cases.

(x) In accordance with the new and old conventions, the colours of the insulation of the live wire are:

(a) brown, black

(b) blue, red
(c) green, red
(d) brown, red

(xi) The material of the core of a strong electromagnet is:

(a) steel
(b) soft iron
(c) wrought iron
(d) brass

(xii) Choose the correct statement. Latent heat absorbed:

(a) is independent of the mass of the substance
(b) is directly proportional to the increase in the temperature of the substance
(c) is directly proportional to the specific heat capacity of the substance
(d) is directly proportional to the specific latent heat of the substance

(xiii) Two bodies A and B are put in contact. It is observed that there is no flow of heat between two bodies. This shows that:

(a) The temperature of body A is higher than B (b) The temperature of body B is higher than A
(c) The two bodies have same temperature
(d) You cannot say anything about the temperature

(xiv) A light ray does not bend at the boundary in passing from one medium to the other medium if the angle of incidence is:

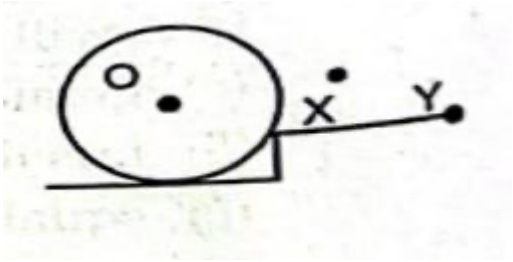
(a) 0°
(b) 45°
(c) 60°
(d) 90°

(xv) In refraction of light through a prism, the light ray:
(a) Suffers refraction only at one face of the prism
(b) Emerges out from the prism in a direction parallel to the incident ray
(c) Bends at both the surfaces of prism towards its base
(d) Bends at both the surfaces of prism opposite to its base

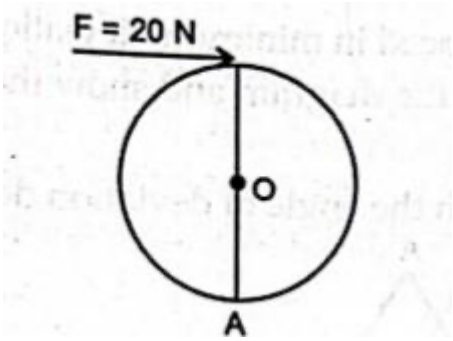
Question 2.

(i) (a) Write an expression to show the relationship between mechanical advantage, velocity ratio and efficiency for a simple machine.
(b) When does the nucleus of an atom tend to be radioactive?
(c) A radioactive substance is oxidised. Will there be any change in the nature of its radioactivity? Give a reason for your answer

(ii) The diagram alongside shows a heavy roller, with its axle at O which is to be pulled on to the pavement XY by applying the minimum possible force. Draw the diagram and mark on it the point and direction in which the force should be applied? [2]



(iii) Jack screw is provided with a long arm. Explain.[2]
(iv) If the moment of F about the centre of a wheel O is 6 Nm, then calculate the moment of F about A.

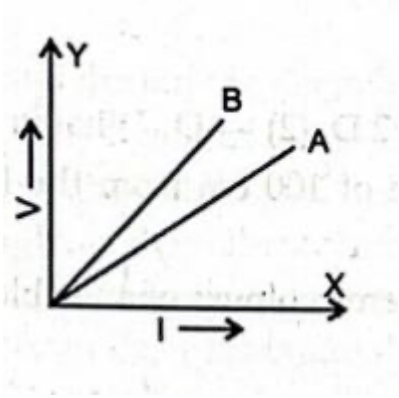


[2]

(v) A man climbs a slope and another walks the same distance on a level road. Who does more work and why?[2]

(vi) A freely suspended pendulum in air is disturbed once and left to oscillate on its own: (a) Name the type of vibrations.
(b) State one way to decrease the frequency of this vibration.

(vii) The V-I graph for a series combination and for a parallel combination of two resistor is shown in the figure below. Which of the two A or B, represents the parallel combination? Give a reason for your answer [2]



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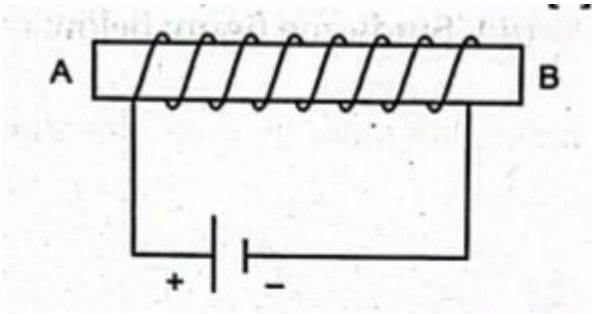
Questions 3.

(i) A lens L cannot form an image on the screen. (a) Name the lens X.
(b) Is it possible for this lens to form a magnified image? [2]

(ii) There are three pins in an electric plug top. Answer the following:
(a) How would you identify the earth pin?
(b) In which of the three connecting wires should the electric switch be connected? [2]

(iii) Consider a solenoid AB as shown:



(a) What is the polarity at end A?
(b) Give one advantage of an electromagnet over a permanent magnet shown [2]

(iv) How much heat is required to change 2 g of ice at 0°C into steam at 100°C? (Specific heat capacity of water is 4.2 J/g°C; specific latent heat of ice 336 Jg^{1}; specific latent heat of steam is 2268 Jg^{1}). [2]

(v) Out of alpha, beta and gamma radiation, which radiation has highest velocity?[2]

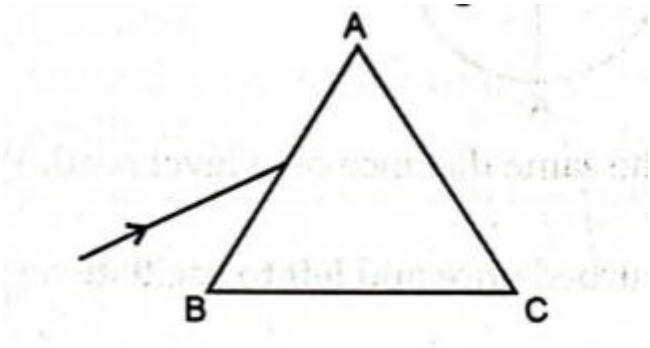
SECTION-B
Question 4.
(Attempt any four questions.)

(i) A glass slab is placed over a page on which the word VIBGYOR is printed with each letter in its corresponding colour.

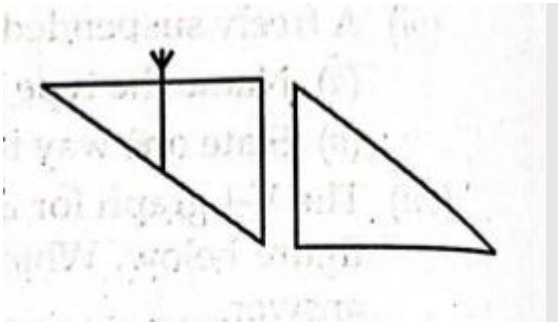
(a) Will the image of all the letters be in the same place?
(b) If not, state which letter will be raised to the maximum. Give a reason for your answer.[3]

(ii) (a) Figure shows a glass prism placed in minimum deviation position. A ray of monochromatic light is incident on its face AB. Copy the diagram and show the refracted and the emergent ray.Mark the angle of deviation.

(b) State any two factors on which the angle of deviation depends. [3]



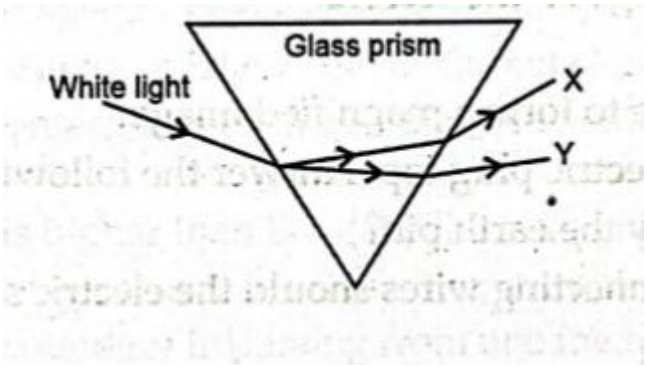
(iii) Two isosceles right-angled glass prisms are placed near each other as shown in the figure. Complete the path of the light ray entering the first isosceles right-angled glass prism till it emerges from the second identical prism. [4]



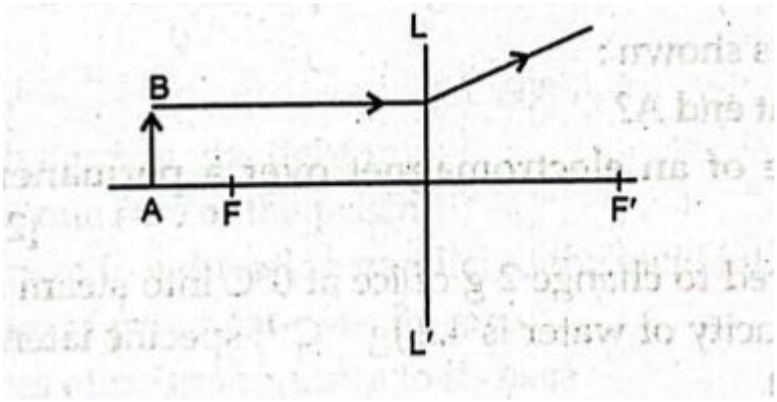
Question 5.

(i) (a) Two lenses have power of (1) +2D (2)-4D. What is the nature and focal length of each lens?
(b) An object is kept at a distance of 100 cm from the lens having power of -4 D. Calculate image distance. [3]

(ii) The diagram below shows the extreme colours of a visible spectrum (X and Y).[3]
(a) Identify the colours X and Y.
(b) Which colour has greater speed in vacuum?



(iii) Study the figure below: [4]



(a) Name the lens L'.
(b) What are the points F and F"?
(c) Complete the diagram to show the final image formed.

Question 6.

(i) A block and tackle pulley system has a velocity ratio 3.
(a) Draw a labelled diagram of this system. In your diagram, indicate clearly the points of application and the directions of the load and effort.
(b) Why should the lower block of this pulley system be of negligible weight? [3]

(ii) A steering wheel of diameter 50 cm is rotated clockwise by applying a couple with each force of magnitude 7 N.

(a) Draw a free body diagram to show the application of forces.
(b) Calculate the moment of couple applied.[3]

(iii) A horse pulls a cart with a force of 300 N, such that the system of horse and cart moves with an initial velocity of 18 km h^{-1} on a level road.
(a) Calculate the power developed by the horse in watt.
(b) What is the power in units of horse power? [Take 1 H.P. = 746 W][4]

Question 7.

(i) A person standing between two vertical cliffs and 640 m away from the nearest cliff shouted. He heard the first echo after 4 seconds and the second echo 3 seconds later.
(a) Calculate the velocity of sound in the air.
(b) Calculate the distance between the cliffs[3]

(ii) (a) A thorium isotope $233th_{90}$ an α-decay and changes into radium. What is the atomic number and mass number of the radium produced?
(b) If the radium undergoes a further disintegration and emits a beta particle, represent this reaction in the form of an equation.
(c) What is the source of energy released during the decay? [3]

(iii)A vibrating tuning fork is placed over the mouth of a burette filled with water. The tap of the burette is opened and the water level gradually starts falling. It is found that the sound from the tuning fork becomes very loud for a particular length of the water column.[4]
(a) Name the phenomenon taking place when this happens.
(b) Why does the sound become very loud for this length of the water column?

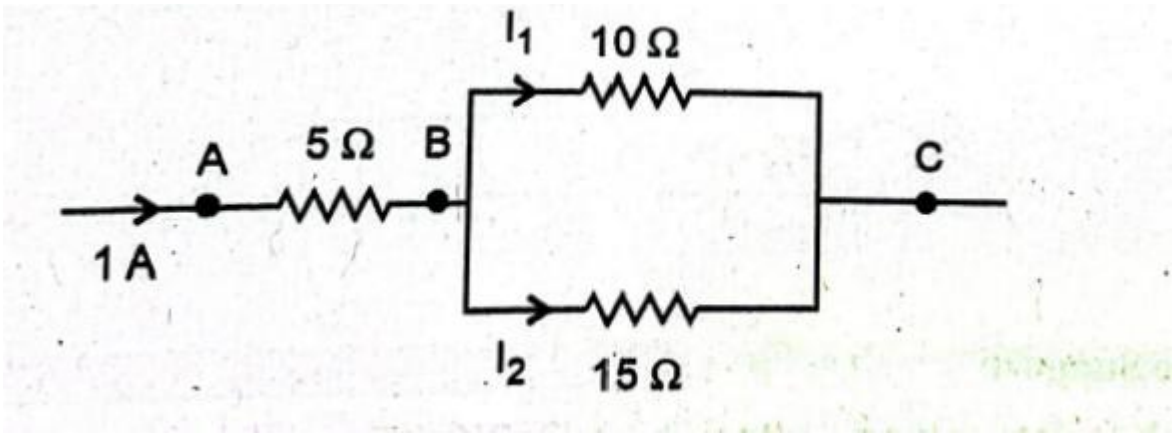
Question 8.

(i) A bulb is marked 100 W, 220 V and an electric heater is marked 2000 W, 220 V.
(a) What is the ratio of their resistances?
(b) In which of the above a thicker connecting wire or lead is required?[3]

(ii) (a) Copy and complete the following nuclear reaction:[3]

$$^{-}_{86}Rn \rightarrow {}^{218}_{-}Po + {}^{4}_{2}\alpha$$

(b) What will be the effect on the radiation emitted in the above reaction when it is allowed to pass through an electric field? [Be specific in your answer]
(iii) Three resistors are connected as shown in the diagram. A current of 1 ampere flows through the 5 ohm resistor as shown in the diagram.

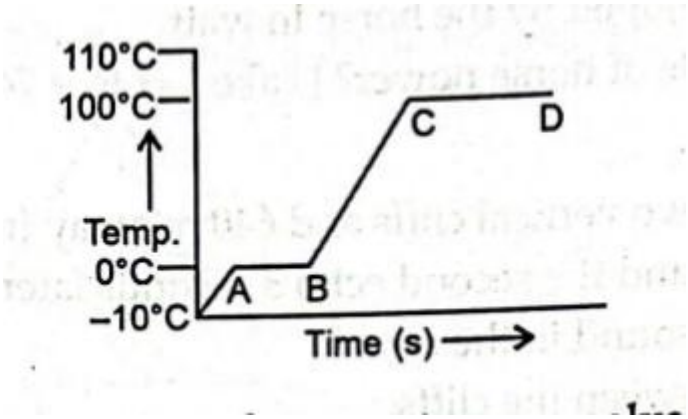


(a) What is the current through the other two resistors?
(b) What is the total resistance of the combination? [4]

Question 9.

(i) What mass of a liquid A of specific heat capacity 0.84 J/g°C and at a temperature 40°C must be mixed with 100 g of a liquid B of specific heat capacity 2.1J/g°C and at 20°C, so that the final temperature of the mixture becomes 32°C?

(ii) A piece of ice is heated at a constant rate. The variation of temperature with heat input is shown in the graph below:
(a) What are represented by AB and CD?
(b) What conclusion can you draw regarding the nature of ice from the given graph? [3]



(iii) The diagram below shows a coil connected to a centre zero galvanometer G. The galvanometer shows a deflection to the right when the N-pole of a powerful magnet is moved to the right as shown.

(a) Explain why the deflection occurs in the galvanometer. as shown.
(b) Does the direction of current in the coil appear or anticlockwise when viewed from end A?
(c) State the observation in G when the coil is moved away from N.
(d) State the observation in G when, both coil and the magnet, are moved to the right at the same speed.[4]