

Unit : 6 Gravitation

Concept : The value of 'g' at different places

1. Choose the correct one based on the value of 'g' and write it.
 - (a) Equatorial region < polar region < on the moon
 - (b) On the moon < polar region < equatorial region
 - (c) On the moon < equatorial region < polar region

Score (1) Time (3 minute)

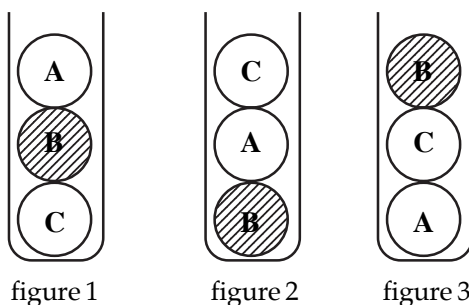
Concept : Newton's universal law of gravitation

2. The gravitational force of attraction between two objects depends on their masses and the distance between them. If so
 - (a) What change will happen to the force of attraction if the distance between them is halved? (1)
 - (b) The mass of both the objects is doubled. What change is to be brought about in the distance between them to ensure that the force of attraction between them does not change? (1)
 - (c) The distance between two persons of masses 40 kg and 60 kg is 4m. What is the force of attraction between them? (2)(The value of G need not be substituted in mathematical calculations).

Score (4) Time (10 minute)

Concept : The position of centre of gravity and stability

3. The figure shows the arrangement of three identical ice cream balls in a plastic bottle in different ways. Among the balls B alone is filled with sand.



- (a) Which among those shown in the figure has the highest stability? (1)
 - (b) What change will you notice in the stability if A and C in figure 2 are also filled with sand? (1)
 - (c) In figure 3 the ball A is also filled with sand. Compare the state of stability in both the changed cases. (2)

Score (4) Time (8 minute)

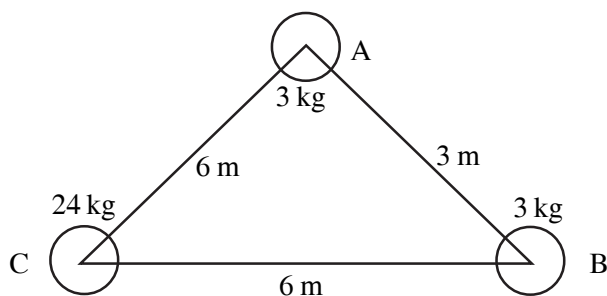
Concept : Gravitational force of the earth

4. The earth and an aeroplane flying in the sky will attract each other.
- (a) If the force of attraction from the earth on the aeroplane is compared to that on the earth from the aeroplane, which of the following is true?
- The force of attraction on the aeroplane by the earth is higher.
 - The force of attraction on the earth by the aeroplane is higher.
 - Both are equal
 - The force of attraction on the earth by the aeroplane is lower. (1)
- (b) If the aeroplane stops functioning, it will fall on the earth. Why does it happen like this alone? (2)

Score (3) Time (5 minute)

Concept : Gravitational force

5. Complete the table by observing the figure

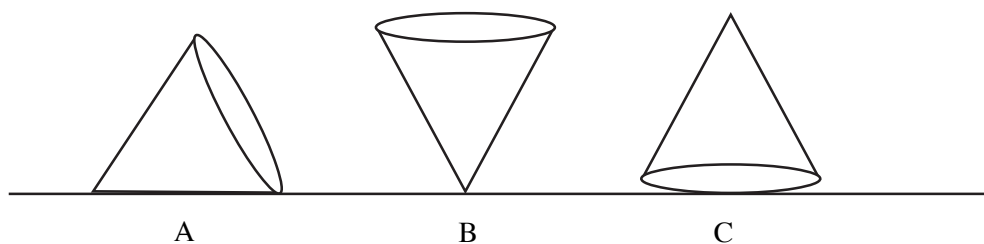


Attracting objects	Gravitational force of attraction (N)
A and B	1 G
B and C	(a)
A and C	(b)

Score (2) Time (8 minute)

Concept : Gravitational force of the earth

6. Which among the following figures represent neutral equilibrium?

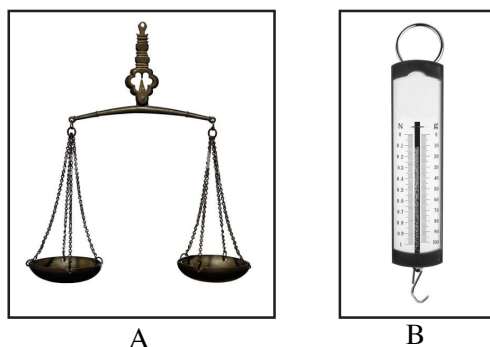


(1)

Score (1) Time (5 minute)

Concept : Mass and weight

7. Write the answer by observing the figure



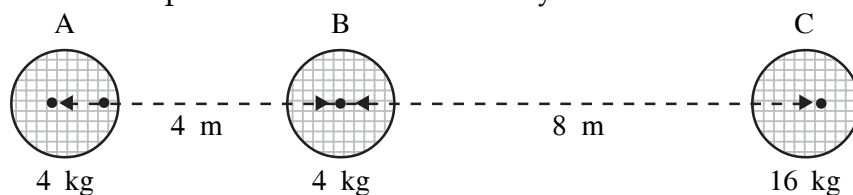
- (a) What is the use of the devices indicated in A and B? (1)
(b) Which among these will show different values when used in the polar region in the equatorial region? Justify your answer. (3)

Score (4) Time (6 minute)

Concept : Gravitational force of the earth

8. Write the answer by analysing the figure.

A, B and C are three spheres. You know that they will attract each other.

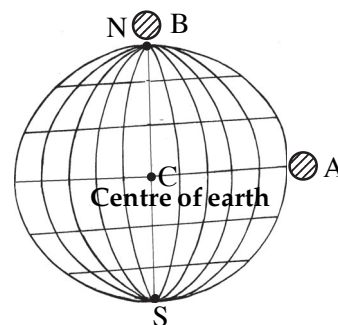


- (a) What is the name for the force of attraction between them? (1)
(b) Compare the force of attraction between A and B with that between B and C. (4)
(The value of G need not be substituted in mathematical calculations)

Score (5) Time (8 minute)

Concept : The value of g at different places

9. A and B are two objects of the same mass situated at two different places on the earth.

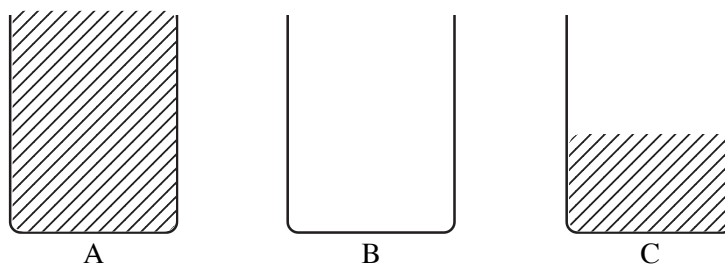


- (a) How is weight calculated from mass? (1)
(b) Which of these will weigh less? Write the reason (2)
(c) What change will happen to the weights if both of these are brought to the centre C of the earth? (1)

Score (4) Time (6 minute)

Concept : Stability and the centre of gravity

10. Three flower vases of the same size are shown in the figure

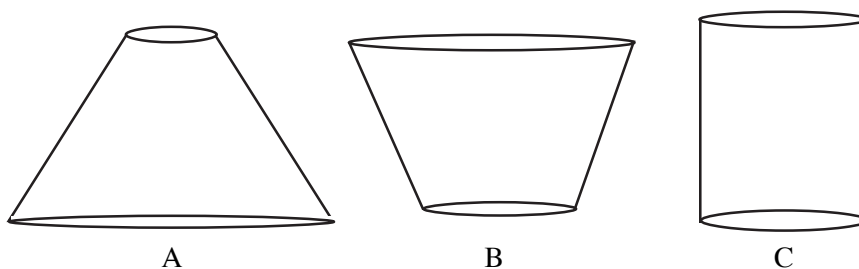


- (a) Which of these is more stable? (1)
(b) What will you do to make another flower vase which has greater stability? (1)

Score (2) Time (4 minute)

Concept : `Stability and the centre of gravity

11. Which of the flower vases with different shapes is more stable? (1)



Score (1) Time (2 minute)

Concept : Weight

12. The weight of an object is not the same at all places on the surface of the earth.

- (a) What do you mean by weight of an object? (1)
(b) Calculate the weight of an object of mass 50 kg. ($g = 10 \text{ m/s}^2$) (1)
(c) Mention two situations when the weight of an object can be zero. (2)

Score (4) Time (7 minute)

Concept : Force of attraction

13. Two different spheres of mass 10kg and 50kg are given

- (a) Are the forces of attraction exerted by the earth on them the same when they are at the same height? (1)
(b) What is the weight of an object that is attracted by the earth with a force 300 N? (1)
(c) What do you know about the time taken by them to reach the ground if these objects are subjected to free fall? Justify the answer. (2)

Score (4) Time (7 minute)

Concept : Centre of gravity and the stability

14. Find out the reason for the following statements and write them down

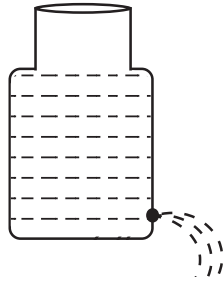
(a) Heavy objects are loaded in the lower decks of ships. (1)

(b) Four wheel vehicles are more stable than two wheel vehicles (1)

Score (2) Time (5 minute)

Concept : Free fall

15. A bottle with water arranged as shown in the figure is subjected to free fall.



(a) What do you mean by free fall? (1)

(b) What happens to the flow of water during freefall? (1)

(c) What will you observe if this activity is performed in Jupiter? Justify the answer. (2)

Score (4) Time (8 minute)

Unit : 7

Work, Energy and Power

Concept : Measurement of work

1. In which of the following is the work done zero?
 - (a) A bag of books is lifted and placed on the shoulder
 - (b) Walking along a ground with the bag of books on the shoulder
 - (c) Climbing a ladder with the bag of books on the shoulder
 - (d) Pushing a wall

(2)

Score (2) Time (5 minute)

Concept : Energy conversion

2. Complete the table

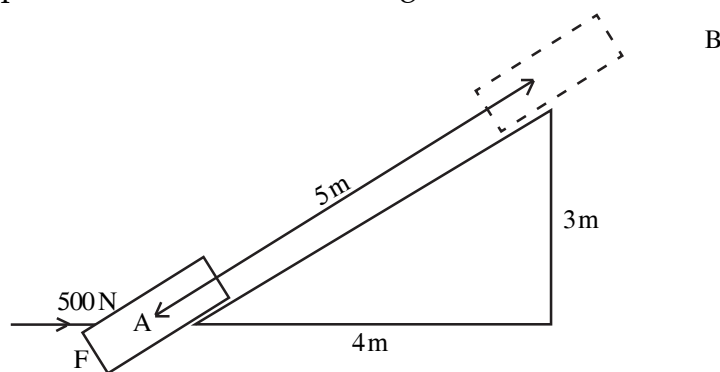
Function	Energy change
1. Electric lamp glows	
2. Fan rotates	
3. Plants prepare food	
4. Firewood burns	

(4)

Score (4) Time (5 minute)

Concept : Factors affecting work.

3. The displacement of an object kept on an inclined surface when a horizontal force of 500 N is applied on it is shown in the figure.



- (a) Is the displacement in the direction of the applied force? (1)
- (b) Which are the factors affecting work? (1)
- (c) Calculate the work done in this activity. (2)

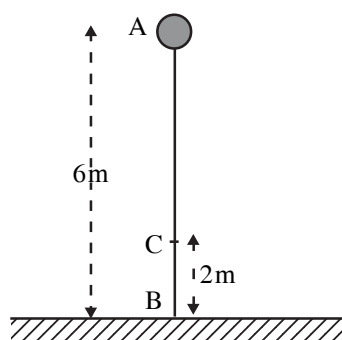
Score (4) Time (5 minute)

Concept : Different forms of energy

4. The different stages of the working of a hydroelectric power station are given below. What is the form of energy in each stage?
- Water is stored in a dam (1)
 - Water flows out through penstock pipe (1)
 - Turbine rotates (1)
 - Formed in the generator, when the turbine turns (1)

Score (4) Time (5 minute)**Concept : Law of conservation of energy.**

5. An object of mass 5 kg remains stationary at A at a height of 6m. It has an energy 300J.



- What is the energy change at the instant of falling down? (1)
- What is the total energy at C? (1)
- What is the kinetic energy when it reaches C? ($g = 10 \text{ m/s}^2$) (2)

Score (4) Time (5 minute)**Concept : Energy, weight**

6. Match the following properly

A	B	C
joule	$\frac{1}{2} mv^2$	newton metre
Kinetic energy	watt x second	spring balance
weight	mv	motion
	mg	common balance

Score (3) Time (5 minute)**Concept : Force and energy**

7. Find out the relationship of the given pair and complete the other.

kg m/s² : N
Nm :

Score (1) Time (1 minute)

Concept : Kinetic energy and potential energy

8. Classify the following into three types as potential energy due to strain, potential energy due to position and kinetic energy.
- A running child
 - Stretched bow
 - A coconut on the top of a wall
 - Compressed spring
 - A ball rolling along a ground
 - Water in a dam

Score (3) Time (5 minute)

Concept : Work and energy

9. An object of mass 500 kg is lifted to the second storey of height 6m using a crane.
($g = 10 \text{ m/s}^2$)
- (a) What is the force applied to lift the object? (1)
 - (b) Calculate the work done for this. (2)
 - (c) What is the potential energy gained by the object when it reaches this height? (1)

Score (4) Time (6 minute)

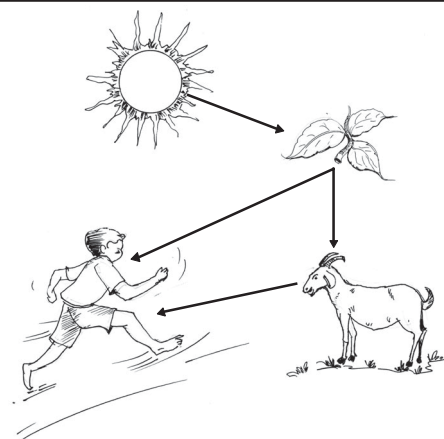
Concept : Kinetic energy

10. A bullet of mass 0.004 kg is fired from a gun at a velocity of 100 m/s.
- (a) Calculate the kinetic energy of the bullet. (1)
 - (b) What change takes place in the kinetic energy of the bullet if its mass is halved and velocity is doubled? (2)

Score (3) Time (8 minute)

Concept : Energy conservation

11. The figure represents the energy chain from which we get energy to do work.



- (a) What is the process by which energy produced in the Sun, which is the principal source of energy? (1)
- (b) In which form do plants store solar energy? (1)
- (c) State the law associated with energy changes. (1)

Score (3) Time (6 minute)

Concept : Power

12. On an electric heater, it is marked 1000 W.
- (a) What is the meaning of 1000W? (1)
- (b) Calculate the energy consumed by this device when it is made to work for 15 minute. (2)

Score (3) Time (6 minute)

Concept : Energy

13. A bird is flying at an altitude of 45 m.
- (a) Which are the factors that influence the kinetic energy of the bird? (1)
- (b) Write any two factors that influence its potential energy. (1)
- (c) With what velocity should the bird fly at this height for the kinetic energy and the potential energy to be the same? (2)
- (Value of $g = 10 \text{ m/s}^2$)

Score (4) Time (8 minute)

Concept : Energy transformation

14. Complete the following properly.
- In the sun : nuclear fusion
- In the plants : - - - - - (1)

Score (1) Time (2 minute)

Concept : Energy and power

15. Complete the table.

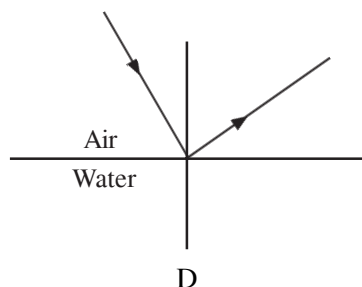
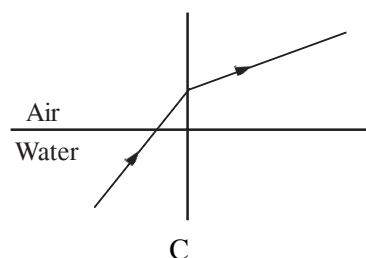
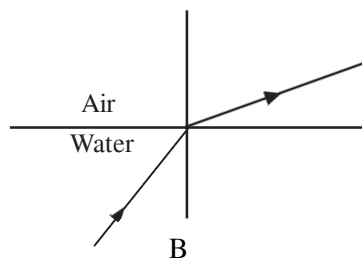
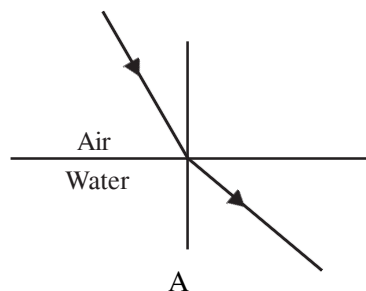
Device	Energy consumed	Time	Power
Bulb	1800 J	20 s
Heater	5 s	800 W
Motor	24000 J	1200 W

Score (3) Time (8 minute)

Unit : 8 Refraction of light

Concept : Refraction

1. Which is the correct figure?

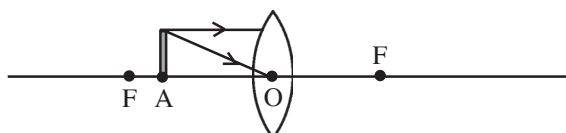


(1)

Score (1) Time (3 minute)

Concept : Image formation

2. The arrangement for an experiment using candle and lens is depicted.

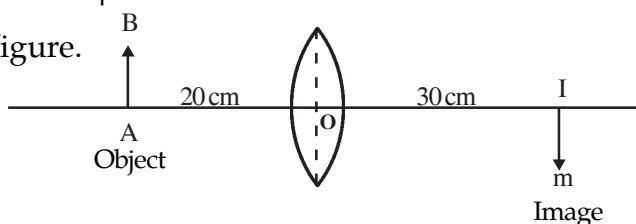


- Which type of lens is used here? (1)
- Find the position of the image by completing the ray diagram using the incident rays shown in the figure (2)
- In this experiment can you directly measure the distance to the object and the image by using a scale? Explain the reason (2)

Score (5) Time (9 minute)

Concept : New Cartesian sign convention and lens equation

3. Write the answers by observing the figure.



- (a) What are the signs of OA and OI according to the new Cartesian sign convention? (1)
- (b) Calculate the focal length of this lens. (3)

Score (4) Time (5 minute)

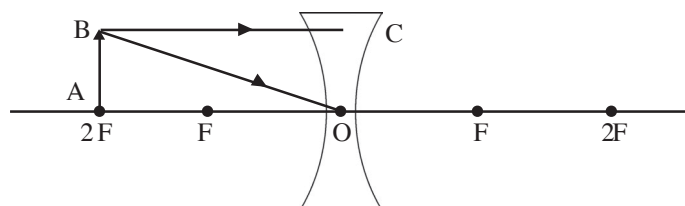
Concept : New Cartesian sign convention

4. Some statements regarding the measurement of distances related to a lens according to the new Cartesian sign convention are given below. Choose the correct ones and write them.
- (a) All distances are measured from F
- (b) Distances measured in the direction of incident rays are positive
- (c) Incident rays are considered travelling from right to left. (2)
- (d) The principal axis is considered as X axis

Score (2) Time (4 minute)

Concept : Image formation by a concave lens

5. Write the answers by observing the figure.

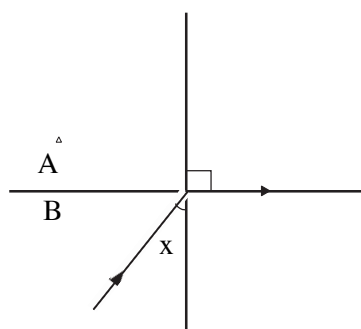


- (a) Is the principal focus of the lens used here real or virtual? (1)
- (b) Find the position of the image by completing the ray diagram. (2)

Score (3) Time (5 minute)

Concept : Critical angle and total internal reflection

6. Observe the figure

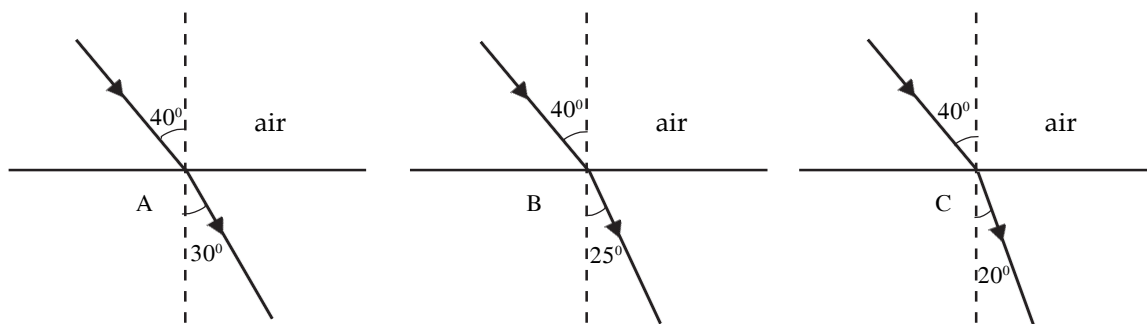


- (a) What is the name of the angle of incidence x ? (1)
- (b) What happens when the incident angle x is increased? (1)
- (c) Of A and B which medium has higher optical density? What is the reason for your inference? (2)

Score (4) Time (6 minute)

Concept : Refraction

7. Figures showing light entering from air to three different media are given.

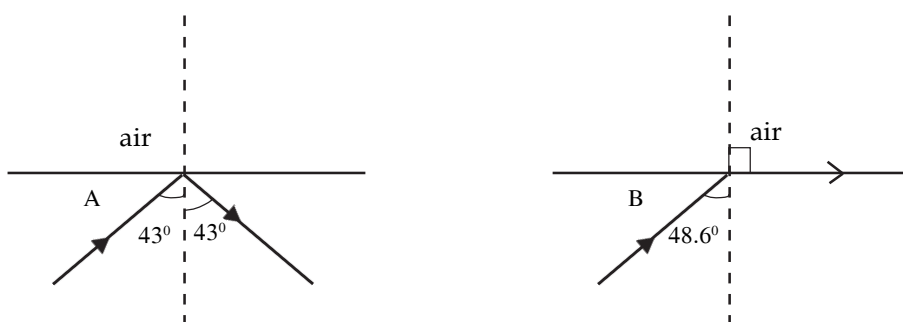


- (a) What is the angle of incidence? (1)
- (b) Which among these has the highest optical density? (1)
- (c) Which of the following is correct with respect to the velocity of light? (2)
- (1) $A > B > C$ (2) $C > B > A$
- (3) $B > A > C$ (4) $A > C > B$

Score (4) Time (6 minute)

Concept : Critical angle and total internal reflection

8. In the figure air, water and glass are the media

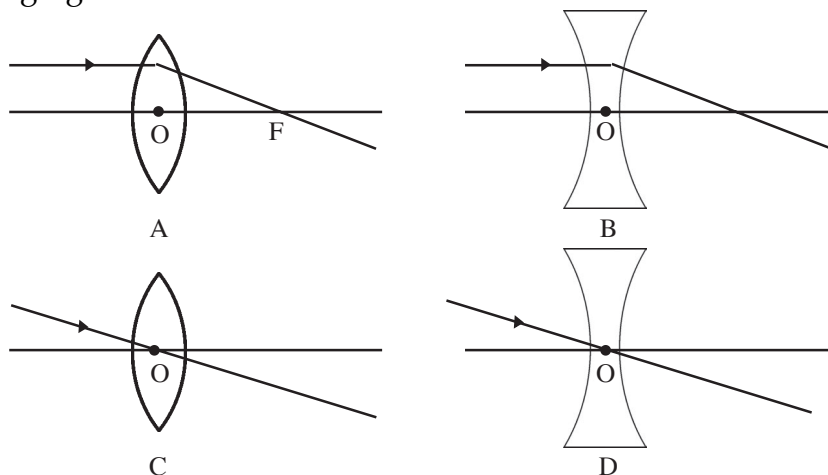


- (a) Is the optical density of A and B greater than that of air or less? (1)
- (b) The angle of incidence in which medium is the critical angle? (1)
- (c) Of A and B which is glass and which is water? What is the reason for your inference? (2)

Score (4) Time (6 minute)

Concept : Refraction in lenses

9. The given figures represent light passing through glass lenses from the air. Find out the wrong figure.



Score (1) Time (3 minute)

Concept : Total internal reflection

10. (a) Select the conditions applicable for total internal reflection from the following and write them down.
- (1) Ray of light enters obliquely from an optically denser medium to an optically rarer medium.
 - (2) Ray of light enters obliquely from an optically rarer medium to an optically denser medium.
 - (3) Angle of incidence is equal to the critical angle (2)
 - (4) Angle of incidence must be greater than the critical angle
- (b) Write two occasions in which total internal reflection is made use of. (2)

Score (4) Time (4 minute)

Concept : Refraction in daily life

11. Write the reason for the following statements
- (a) We can see the sun for sometime even after the sunset. (1)
 - (b) The inner surface of bicycle reflectors has the shape triangular prisms kept together. (1)
 - (c) Concave lens is not used for fingerprint tests. (1)

Score (3) Time (6 minute)

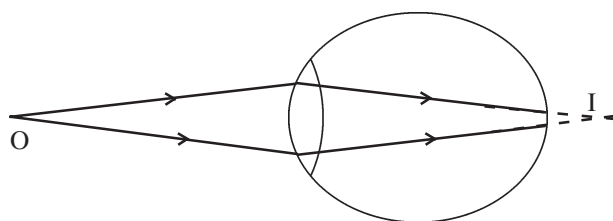
Concept : Total internal reflection

12. The critical angle of light entering from water to air is 48.6° . If so
- (a) What is the angle of refraction when the angle of incidence is 48.6° ? (1)
 - (b) Which phenomenon happens when the angle of incidence is 47° ? (1)
 - (c) Which phenomenon happens when the angle of incidence is 50° ? Justify the answer (2)

Score (4) Time (7 minute)

Concept : : Farsightedness.

13. Figure showing the image formation in an eye is given.



- (a) Where is the image formed in a healthy eye? (1)
- (b) Which defect of the eye is depicted here? (1)
- (c) Depict how this defect is remedied. (2)

Score (4) Time (10 minute)

Concept : Formation of image by a lens

14. Some statements regarding image formation are given. Which of them are related to a virtual image?
- (a) Inverted
 - (b) Erect
 - (c) Cannot be obtained on a screen
 - (d) Can be obtained on a screen
 - (e) The distance to image cannot be measured directly
 - (f) The position of object and that of image are on the same side. (2)
 - (g) Formed by the actual meeting of the rays of light.

Score (2) Time (6 minute)

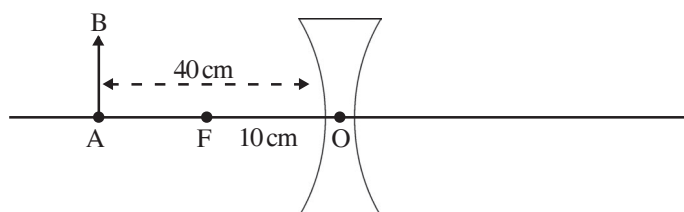
Concept : Power of a lens

15. An object placed 20 cm away from a convex lens gives a virtual image 100 cm away from it.
- (a) What is the focal length of the lens? (2)
 - (b) Calculate the power of the lens. (2)

Score (4) Time (8 minute)

Concept : Power of a lens

16. An object AB placed in front of a concave lens is depicted.

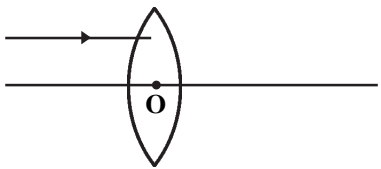
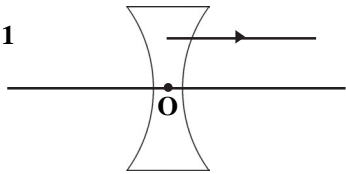
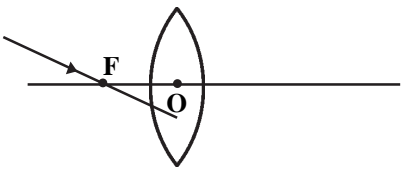
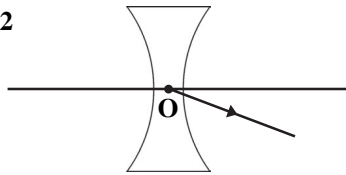
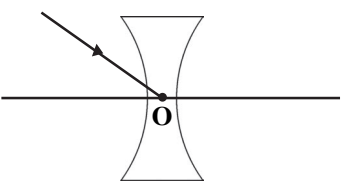
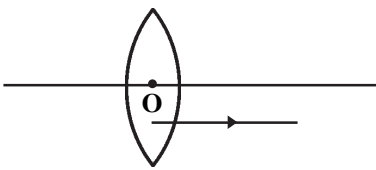
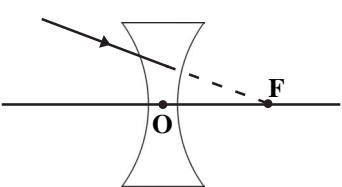
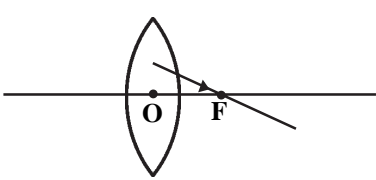


- (a) What is the focal length of the lens according to the new Cartesian sign convention? (1)
- (b) Calculate the distance of the image of this object from the lens. (2)

Score (3) Time (8 minute)

Concept : Refraction in a lens.

17. Match the figures in the first column with that in the second column

(a) 	1 
(b) 	2 
(c) 	3 
(d) 	4 

Score (4) Time (8 minute)

Concept : Power and ray diagram

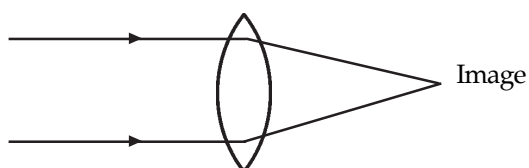
18. The power of a lens used by a person is -2D.

- Which type of lens is this? (1)
- What do you mean by power of a lens? (1)
- Draw the diagram showing the image formation of a distant object in the eye of the person when he does not use this lens. (2)

Score (4) Time (8 minute)

Concept : Defect of eye

19. The figure showing the image formation of a distant object by a lens is given.

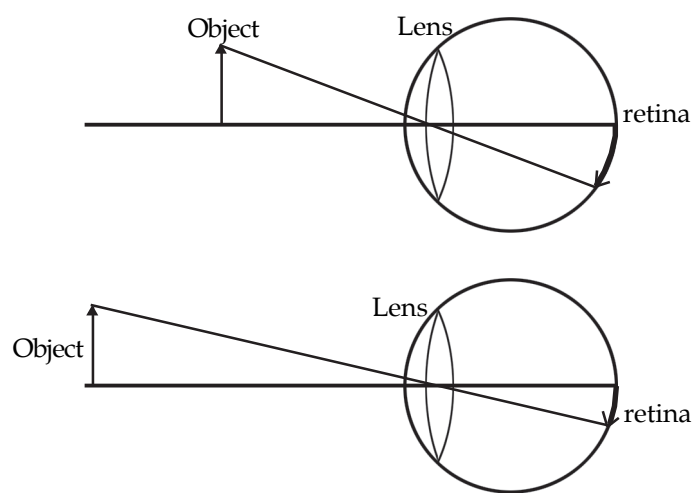


- (a) What is the name for the distance to the image from the lens? (1)
- (b) What happens to this distance when the curvature of the lens is increased? (1)
- (c) By means of a ray diagram, show how you can increase the distance to the image using one more lens. (2)

Score (4) Time (8 minute)

Concept : Accommodation

20. The figure showing the image formation within the eye when an object is placed at different positions is given.

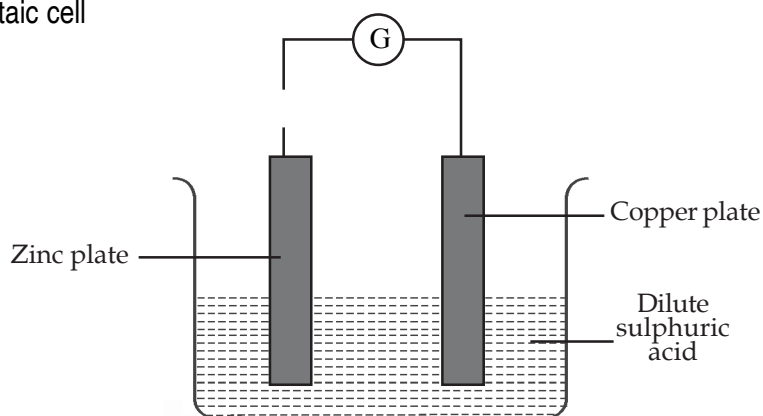


- (a) Where is the image formed in both instances? (1)
- (b) Explain the image formed at the same distance from the lens in both cases. (2)
- (c) Write two reasons for the near sightedness. (1)

Score (4) Time (7 minute)

Concept : Voltaic cell

1.



- What is the device shown in the figure? (1)
- What change do you observe in the galvanometer when it is connected to the zinc plate? (1)
- How does this device maintain potential difference continuously? (1)

Score (3) Time (5 minute)

Concept : Potential difference, Current

2. Match the items in column A, B and C suitably

A Symbol	B Device	C Use
	Rheostat	Device to measure voltage
	Ammeter	To maintain potential difference
	Cell	To change the current
	Voltmeter	To measure current

Score (3) Time (5 minute)

Concept : Electric circuit

3.

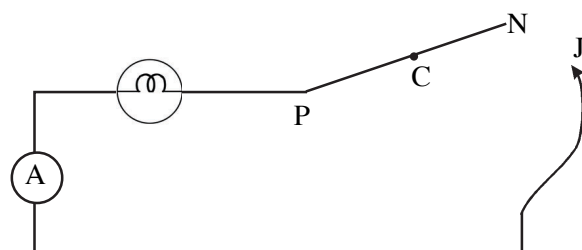


- Write what each symbol represents. (1)
- Draw an electric circuit having these devices in series. (1)
- What is the current in the circuit if 50 C charge flows through this circuit for 10 s? (1)

Score (4) Time (6 minute)

Concept : Electric circuit

4. In the figure PN represents a resistance wire made of nichrome. C is the midpoint of the resistor.

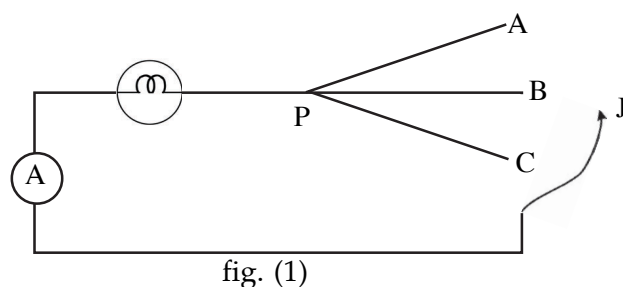


- (a) What is the symbol for a resistor? (1)
- (b) What change do you notice in the brightness of the bulb when the end J of the connecting wire is made to touch N and then C? Justify the answer (2)

Score (3) Time (5 minute)

Concept : Factors affecting the resistance

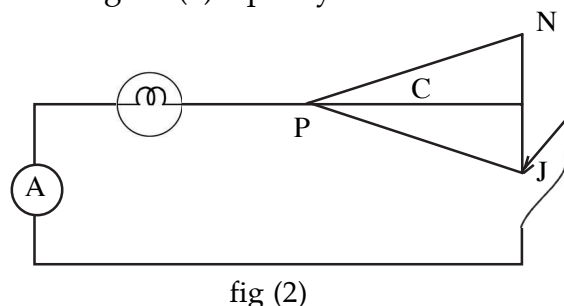
5. In the figure PA, PB and PC are different resistors of the same size.



The ammeter readings when the end J of the connecting wire is brought in contact with the ends A, B and C are given in the box.

The end in contact with J	A	B	C
Ammeter reading	0.2A	0.1A	3A

- (a) What is measured using an ammeter? (1)
- (b) Which has the highest resistance? (PA, PB, PC) (1)
- (C) What change in the brightness of bulb do you notice when the resistors are connected as shown in figure (2) Specify the reason. (2)



Score (4) Time (6 minute)

Concept : Ohm's law

6. Find out the relationship from the given pair and complete the other.

$\frac{\text{Quantity of charge}}{\text{Time}}$: Current

$\frac{\text{Potential difference}}{\text{Current}}$:

Score (1) Time (1 minute)

Concept : Electric circuit

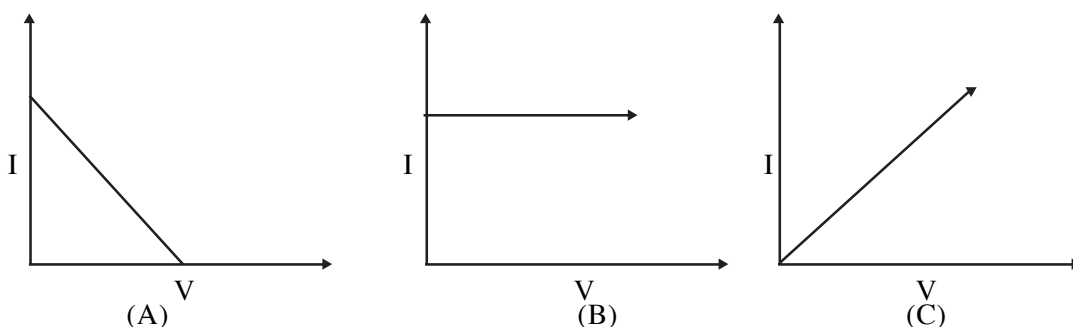
7.

- (a) Which are the materials needed to burn a bulb in a simple electric circuit? (1)
- (b) Which of the following devices can be used to measure current in the circuit?
(volt meter, volta meter, ammeter, ohm meter) (1)
- (c) Draw the electric circuit which includes the devices to measure current in the circuit and the potential difference between the terminals of the bulb. (2)

Score (4) Time (8 minute)

Concept : Ohm's law

8. Observe the given graphs



- (a) Which is the graph that denotes Ohm's law? (1)
- (b) Explain the reason for your inference. (1)

Score (2) Time (3 minute)

Concept : Combination of resistors

9. Three resistors of $6\ \Omega$ each are given.

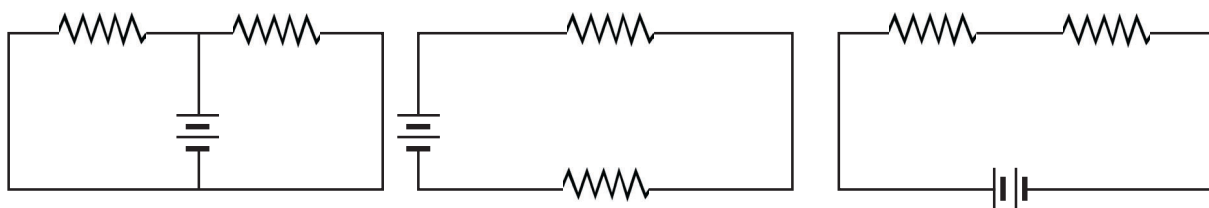
- (a) In which way are they to be connected to get effective minimum resistance? (1)
- (b) Draw the circuit showing the three resistors in parallel and calculate the effective resistance. (3)

Score (4) Time (5 minute)

Concept : Combination of resistors

10.

(a) Observe the figure and find out which is the circuit having parallel connection. (1)



(b) Write two advantages of connecting resistors in parallel. (1)

Score (2) Time (3 minute)

Concept : Ohm's law

11.

(a) Complete the given table (1)

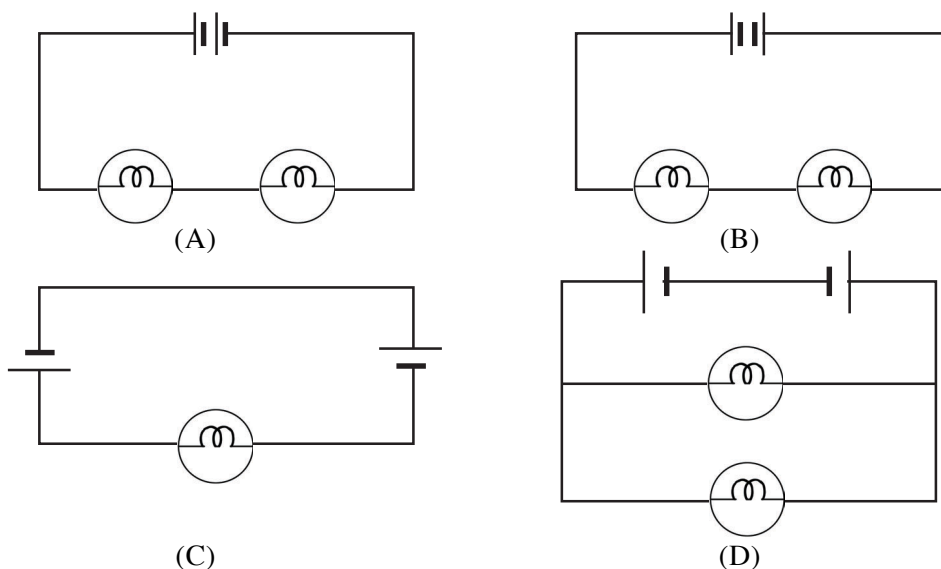
V	I	R
.....	2 A	6 Ω

(b) Write the law used for completing the table. (1)

Score (2) Time (4 minute)

Concept : Combination of resistors

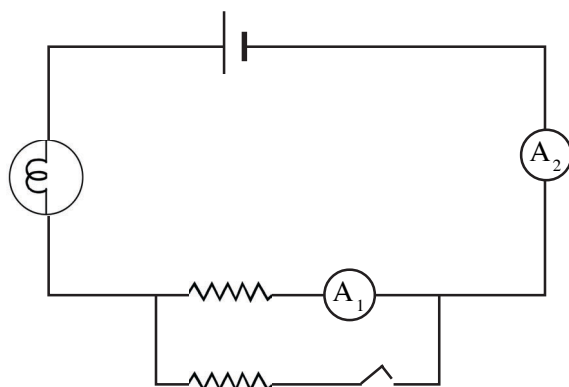
12. In which of the following circuits will the bulbs glow?



Score (2) Time (4 minute)

Concept : Combination of resistors and current

13. Observe the circuit



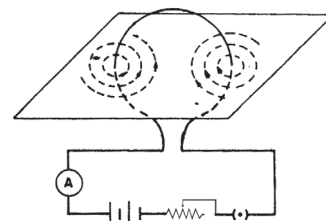
- (a) The reading of ammeter A_1 is 1 A when the switch is off. If so what will be the reading of ammeter A_2 ? (1)
- (b) What change do you see in the ammeter reading when you turn the switch on? Specify the reason. (3)

Score (4) Time (8 minute)

Unit : 10 Electromagnetism

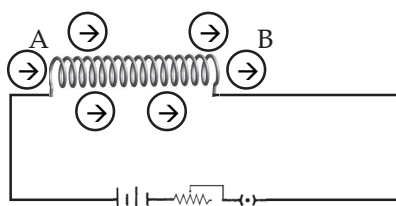
Concept : Direction of current and magnetic polarity

1. What is be the polarity formed at the end of the coil we see in the figure?



Score (1) Time (2 minute)

Concept : Magnetic field around a solenoid



2. The figure shows the arrangement of magnetic compasses placed around a solenoid.
 - (a) What do you see at the instant the circuit is switched on. (1)
 - (b) What change do you observe when switched on after inserting a soft iron core into the solenoid? Explain the reason. (2)
 - (c) What will be the polarity at the end A of the solenoid if current flows there in the clockwise direction? (1)

Score (4) Time (6 minute)

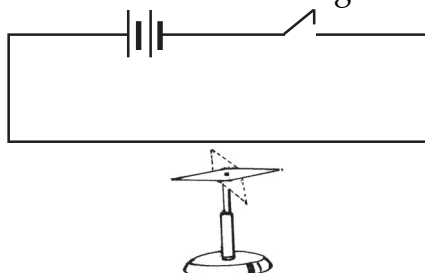
Concept : Magnetic field around a solenoid

3. You know that a magnetic field will be developed around a current carrying solenoid and also that it will work as an electromagnet.
 - (a) Write two methods to increase the strength of the electromagnet. (1)
 - (b) Write two situations in which electromagnets are made use of. (1)

Score (2) Time (6 minute)

Concept : Magnetic field around a current carrying conductor.

4. A conductor is held parallel to a pivoted magnetic needle. The conductor is connected to a battery and switch. You know that the magnetic needle will deflect when you turn the switch on.

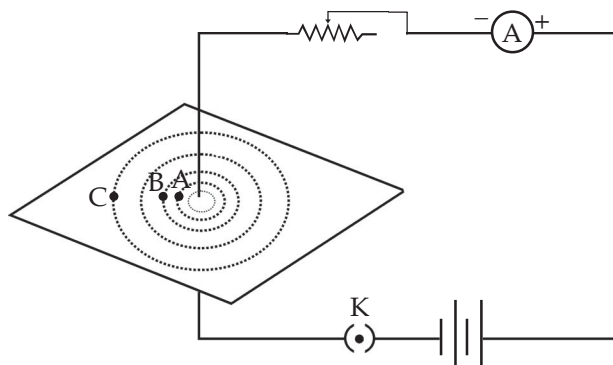


- (a) What is the reason for the deflection? (1)
- (b) Suggest two methods to make the needle deflect in the opposite direction. (1)

Score (2) Time (5 minute)

Concept : Magnetic field around a current carrying conductor.

5. The figure shows a straight conductor connected to a battery, rheostat, ammeter and switch. A card board is arranged perpendicular to the conductor. Magnetic compasses are kept at A, B and C

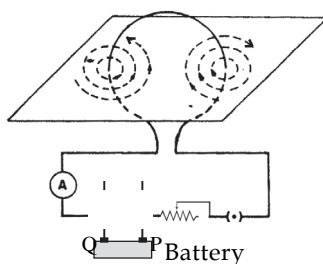


- (a) Which compass will show least deflection when you switch on the circuit? Explain the reason. (2)
- (b) Suggest one method to increase the deflection of the compass. (1)

Score (3) Time (5 minute)

Concept : Magnetic field around a current carrying conductor.

6. The magnetic field around a current carrying coil is depicted.

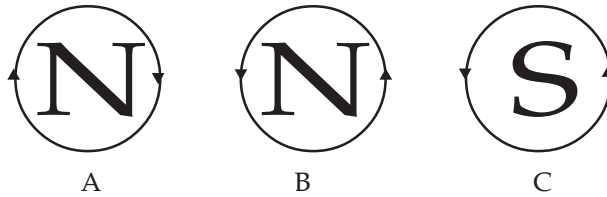


- (a) Which is the positive terminal of the battery? (1)
- (b) State the fundamental law regarding the direction of magnetic field depicted. (1)

Score (2) Time (4 minute)

Concept : Magnetic polarity formed in a solenoid

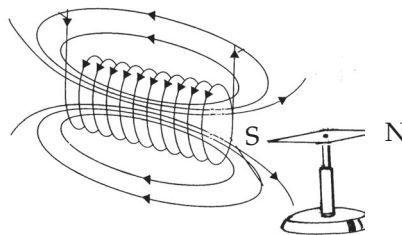
7. The direction of current through one end of a solenoid and the polarity at that end is depicted. Which is the correct figure?



Score (1) Time (3 minute)

Concept : Magnetic field around a solenoid

8. A solenoid carrying current and a magnetic needle kept near to one end of it is depicted.

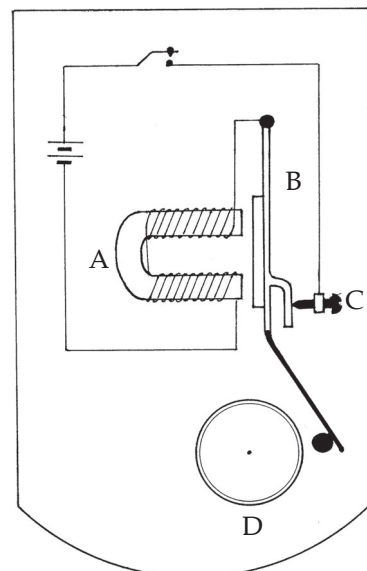


- What do you mean by a solenoid? (1)
- Here does the south pole of the magnetic needle attracted or repelled? Justify the answer. (2)
- Write two methods to increase the deflection of the magnetic needle (1)

Score (4) Time (5 minute)

Concept : Electric bell

9. The diagram of an electric bell is given.



- Which is the electromagnet in it? (1)
- What arrangement is there to make the bell work continuously? (1)
- Can you use steel instead of soft iron core? Why? (2)

Score (4) Time (8 minute)