

1031 Science(E) -0

718595

Subject Code	S-1031		
Subject	SCIENCE (E)		
Date	15/03/2025		
Supplements attached			
Main Answer Book	No. of Supplements	Total	
1	+	①	= ①
Specific remarks of centre conductor regarding malpractices (in Red Ink)			

- Mobile Phones and other electronic gadgets are strictly prohibited inside the examination hall.
- Use of non-programmable calculator is allowed ONLY in some subjects.
- Writing in any form on the Hollow craft sticker and Bar code sticker is strictly prohibited.
- Only blue ink/ball pen is to be used for writing the answers. Black lead pencil may be used for drawing figures, diagrams and graphs. Use of any other Colour pencil/pen is strictly prohibited.
- Disclosing of identity on the answer book (except in the space provided) in any form is strictly prohibited.
- Candidate should check that the printed seat number is correct and verify that the answer book has all pages serial numbered before filling all other details.

Pg No	Examiner	Moderator	Chief Moderator
03	11.0	11.0	
04 & 05	14.0	14.0	
06 & 07	9.0	9.0	
08 & 09	8.0	8.0	
10 & 11	6.0	6.0	
12 & 13	9.0	9.0	
14 & 15	4.0	4.0	
16 & 17	5.0	5.0	
18	4.0	4.0	
Supp. 1	—		
Supp. 2	—		
Supp. 3	—		
Supp. 4	—		
Supp. 5	—		
Supp. 6	—		
TOTAL	70	70.0	
Total in words	Seventy	Seventy	

MARKS	E	M	CM
Pg. 03	11	11.0	

03

Q. No.

1. Radiation that is highly damaging to organisms and it is known to cause skin cancer in human beings is Ultraviolet radiations. ✓ ✓

2. The decomposition of vegetable matter into compost is an example of Exothermic reaction. ✓ ✓

3. Salivation and vomiting is controlled by Hind Brain. ✓ ✓

4. The first member of the alkyne homologous series is Ethyne. ✓ ✓

5. Gustatory receptors detect taste. ✓ ✓

6. The opening and closing of the stomatal pore depends upon water in guard cell. ✓ ✓

7. The growth of tendril in pea plants is due to rapid cell divisions in tendrillar cells that are away from the support. ✓ ✓

8. The apparent flattening of the sun's disc at sunrise and sunset is due to Atmospheric Refraction. ✓ ✓

9. Metals like Sodium, Magnesium, Calcium are obtained by electrolysis of their molten chlorides. ✓

10. The Enzyme that converts starch into sugar is Amylase. ✓

11. Neutralization reaction among the following is



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12.

Multicellular organisms like Hydra and Planaria can be cut into any number of pieces and each piece grows into a complete organism. ✓

13.

The refractive index of glass is 1.5 velocity of light in glass is 2×10^8 m/s. ✓✓

14.

When an iron nail is immersed in copper sulphate solution, the iron nail becomes brownish and the copper sulphate solution fades in colour and forms a pale green solution. The pale green solution left in the test tube is Iron Sulphate. ✓✓

15.

Biological magnification. ✓

16.

Electromagnetic Induction ✓✓

17.

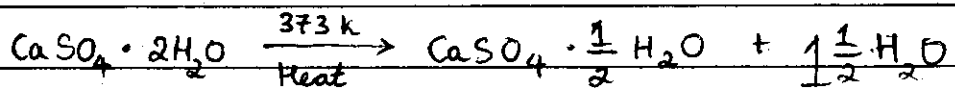
focal length is -0.5 metre (of a concave lens) ✓✓

18.

Potential Difference (V) ✓✓

19.

When gypsum is heated to 373K it loses its water of crystallization and becomes a white powder called calcium sulphate hemihydrate ($\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$) ✓✓



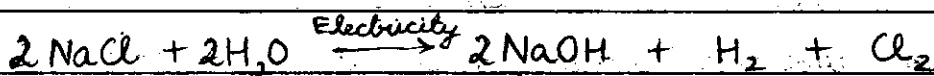
20.

When electricity is passed through an aqueous solution of sodium chloride (called brine) it decomposes to ~~evolve~~ evolve chlorine gas at the anode, hydrogen gas near the cathode and sodium hydroxide in the cathode area. ✓✓

MARKS	E	M	CM
Pg. 04 & 05	14	14.0	

05

Q. No.

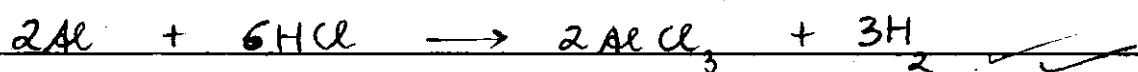


21. The compound formed is magnesium chloride. ✓

Its molecular formula is MgCl_2 and it is an ionic compound or an electrovalent compound. ✓ ✓

22. 1) In ionic compounds, in the solid state, the inter ionic force of attraction is very strong. So they have a rigid structure and there are no free ions to conduct electricity. ✓ ✓

2) However, in the molten state the heat energy is sufficient for the ions to overcome the inter-ionic force of attraction and move freely allowing it to conduct electricity. ✓ ✓



24. The law of conservation of mass states that mass can neither be created nor destroyed in a chemical reaction. This means that the total mass of the reactants before the reaction must be equal to the total mass of the products after the reaction. The mass of each element before and after the reaction must be equal. ~~the~~ ✓
~~the number of atoms is~~ F.C.

25. Milk of Magnesia is a base that acts as an antacid. When taken orally, it neutralizes the excess acid produced in the stomach during acidity to produce salt and water thus providing relief from pain and irritation. ✓

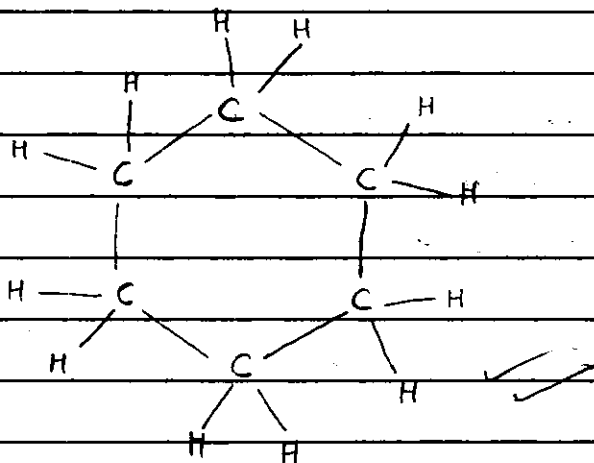
Q. No.

26. The $H^+(aq)$ ions are responsible for the acidic properties of a substance when dissolved in water. When concentration of these ions in our saliva increases it makes the saliva acidic in nature making it taste sour. ✓

27. In ethanone the functional group is Ketone ($-C(=O)-$)

In butanoic acid the functional group is Carboxylic Acid ($-C(=O)OH$) ✓

28.



Cyclohexane $\rightarrow C_6H_{12}$

29. 1) Barrier method: Condom or similar coverings can be worn on the penis. ✓

2) Surgical method: Vasectomy can be performed in which the vas deferens is cut and the ends are tied off. ✓

30. 1) Placenta has blood spaces on the mother's side and villi on the embryo's side which helps to transfer nutrients and oxygen from the mother to the embryo. ✓

MARKS	E	M	CM
Pg. 06 & 07	09	9.0	

07

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the growing embryo. ✓

2) The foetus also generates wastes and carbon dioxide which may be removed by transferring it to the mother's blood via the placenta. ✓

31. a) Starch ✓ ✓

b) ~~B~~ ATP (Adenosine Triphosphate) ✓ ✓

32. 1) Absorption of light energy by chlorophyll. ✓

2) Conversion of light energy into chemical energy. Using this energy to split water into hydrogen and oxygen. ✓

3) Reduction of carbon dioxide into carbohydrates. ✓

~~33. It is used as an oxidising agent in many chemical reactions.~~ F C

33. 1) Bleaching powder is used as an oxidising agent in many chemical reactions. ✓ ✓

2) It is used to remove germs from drinking water by disinfecting it. ✓ ✓

34. Hydrogen gas is not evolved when metals react with HNO_3 (Nitric acid) because nitric acid is a strong oxidising agent. It oxidises the H_2 (hydrogen) gas produced to water and itself gets reduced to any of the nitrogen oxides (N_2O , NO_2 , NO).
But magnesium and manganese react with very dilute nitric acid to evolve hydrogen gas. ✓

Q. No.

☐

35. 1) The flowers in field A could be pure bred homozygous flowers where both copies of the chromosomes in the allele pair to express colour of flower are white. So, no variation could be introduced except due to errors in DNA copying. They may also be fertilized only through self pollination. ✓

2) The flowers in field B might be heterozygous flowers wherein one chromosome in the allele pair to express flower colour would be dominant white and other would be recessive yellow. There could also be errors in copying the DNA during reproduction. They may also be fertilized through cross pollination. ✓

36. There are two types of traits dominant and recessive. Both are inherited but only dominant traits are physically expressed as they only need one of the two chromosomes in the allele pair to be dominant to be expressed while recessive traits need both. Hence recessive traits are inherited but may not be expressed. ✓

37. Trophic level. ✓ ✓

38. Decomposers are organisms that act on ~~bad~~ dead and decaying organisms and convert them from complex substances to simpler ones thus keeping the environment clean. Hence decomposers are essential for an ecosystem. ✓ ✓

39. In humans, the mother only contributes an X chromosome to the child's sex chromosomal pair as she has a perfect XX chromosome pair.

MARKS	E	M	CM
Pg. 08 & 09	08	80	

09

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☐

1) The father has an odd ~~p~~ XY pair and may contribute either an X or a Y chromosome to the child. If he contributes X it will be a girl, and if he contributes Y it will be a boy. ✓

40.

X chromosome

Y chromosome

1) It is longer in size ✓

1) It is shorter in size ✓

2) May be contributed to child's sex chromosome pair by either father or mother. ✓

2) Can be contributed to child's sex chromosome pair by only the father. ✓

41. 1) The rule is Right Hand Thumb Rule and is used to determine the direction of the magnetic field around a long straight ~~conductor~~ current carrying conductor. ✓

42. 1) The magnetic field ~~is~~ magnitude at a point in the current carrying copper wire can be increased by increasing the magnitude of the current flowing through the conductor. ✓

43. Given: Resistance of bulb (R) = $200\ \Omega$
 Current through bulb (I) = 1 A
 Power of bulb (P) = ?
 Potential difference across bulb ends (V) = ?

By Ohm's Law,

$$V = IR$$

$$V = 1 \times 200$$

$$V = 200\text{ V} \quad \checkmark$$

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Next

$$P = VI$$

$$P = 200 \times 1$$

$$P = 200 \text{ W} \quad \checkmark$$

$\therefore$ The power of the bulb is 200 W and the potential difference across its ends is 200 V.

44.

The ~~factor~~^{FC} on which heat produced in a resistor by electric current according to Joule's Law of Heating is directly proportional to:

1) Square of the current flowing through the resistor

2) Resistance of the resistor

3) Time for which current flows ~~from~~ through the resistor.

45.

1) Adrenaline hormone is secreted triggering the fight or flight response.

2) The heart rate and breathing rate increase to transport oxygen to the voluntary skeletal muscles.

3) Blood supply to digestive system and skin is reduced to to constriction of arteries by muscles in these organs.

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46. The timing and amount of hormone released is regulated in human body by a feedback ~~loop~~ mechanism. If the sugar in the bloodstream rises then the pancreas secretes insulin to prompt the cells to increase their uptake of sugar. If the blood sugar level drops, insulin secretion is decreased accordingly.

47. The fuse is connected in series with the appliance and only allows a permissible amount of current through it exceeding which the Joule ~~heat~~ heating produced in it causes it to melt and the circuit to break, thus protecting the appliance from getting damaged due to unduly current flowing through it.

48. Magnetic field around bar magnet	Magnetic field around solenoid
1) The strength of the magnetic field is constant (ie. can neither be increased or decreased unless damaged) for a bar magnet at a given point in the magnetic field. ✓	2) The strength of magnetic field around solenoid at a given point increases when is directly proportional to magnitude of current flowing through it and number of turns of wire per unit length. Hence it can vary.

49. The green or earth wire connects the metallic body of the appliance to a metal plate deep inside the ground. In case of the live wire touching the appliance, the earth wire provides a low

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☐

resistance conducting path for the leaking current to flow through, protecting the user from getting a severe electric shock. ✓

50.

Fallopian tube (labelled 1) is the site of fertilization
uterus (labelled 4) is the site of implantation.

51.

The prenatal sex determination ~~is common~~ and surgical removal of unwanted pregnancies is misused in the form of sex selective abortion of child or female foeticide. ✓

52.

1) The placenta is a disc embedded in the uterine wall having blood spaces on the mother's side and villi on the embryo's side allowing transfer of oxygen and nutrients to the growing embryo.

2) The developing foetus also generates wastes and carbon dioxide which can be removed by transferring to the mother's blood via the placenta. ✓

53.

ARTERY

VEIN

1) Arteries have thick, elastic walls as the blood freshly pumped from the heart through arteries is under high pressure. ✓

1) Veins have thinner, less elastic walls as deoxygenated blood returning through the veins to the heart is ~~not~~ no longer under pressure. ✓

2) ~~but~~ Arteries do not

2) Veins have valves to

MARKS	E	M	CM
Pg. 12 & 13	09	9.0	

13

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have valves.

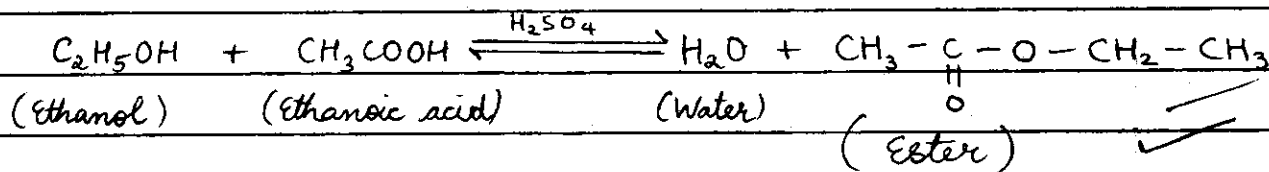
prevent backflow of blood
and ensure that blood
flows unidirectionally.

54. 1) The volume of urine produced depends on the amount of water left in the body, how much excess water needs to be excreted and amount of wastes (nitrogenous waste like urea and uric acid) produced.

2) During summer urine production decreases as we sweat frequently and a majority of water is lost as sweat leaving behind little water in the body to be excreted. The opposite takes place during winter when weather is cooler.

55. Aerobic respiration takes place in the mitochondria. There, pyruvate (3 carbon molecule) is broken down in the presence of oxygen to give, carbon dioxide, water and energy.

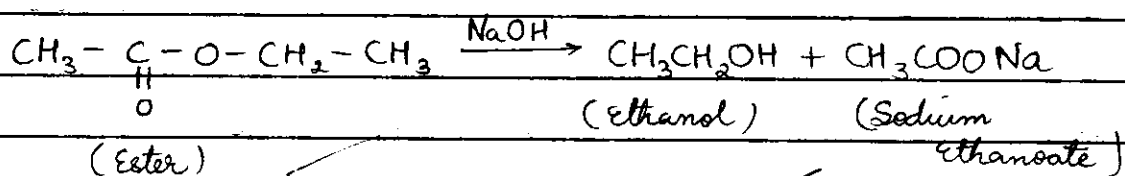
56.



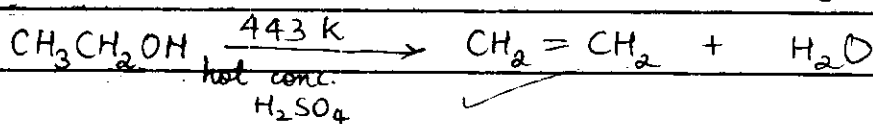
57. When an ester is treated with sodium hydroxide, it gives an alcohol and a sodium salt of carboxylic acid. Here the ester reacts with

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sodium hydroxide to give back ethanol and a salt called sodium ethanoate or sodium acetate. This reaction is used in soap manufacture and so it is called saponification reaction.



58. When ethanol is heated to 443 K in the presence of excess concentrated sulphuric acid, it loses water and gives an ~~an~~ unsaturated hydrocarbon called ethene. Since ethanol loses water, sulphuric acid acts as a dehydrating agent.



59. Since the effective resistance decreased and is less than each individual resistance, the two resistors must be connected in parallel.

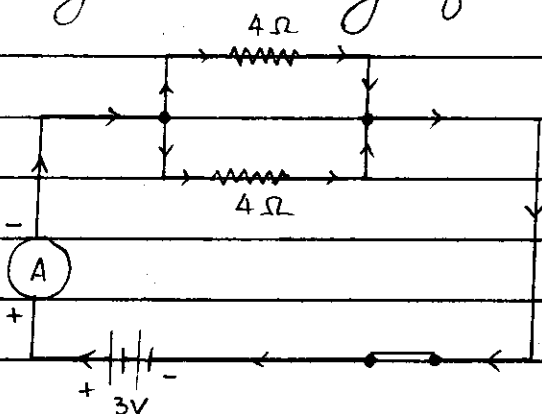
The voltages of the two cells (1.5 V each) will be added to give a battery of 3V.

$$D = 1\frac{1}{2}$$

$$A = \frac{1}{2}$$

$$D = 1\frac{1}{2}$$

$$A = \frac{1}{2}$$



MARKS	E	M	CM
Pg. 14 & 15	04	4.0	

15

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60. Given : Potential difference in circuit (V) = $3V$
 Resistance of each resistor (R) = 4Ω
 Let the New resistance after doubling the cross sectional area be R'

$$R = \rho \frac{l}{A}$$

$$4 = \rho \frac{l}{A} \rightarrow (1)$$

$$R' = \rho \frac{l}{2A}$$

$$R' = \rho \frac{l}{A} \times \frac{1}{2}$$

$$R' = 4 \times \frac{1}{2} \quad [\text{From (1)}]$$

$$R' = 2\Omega$$

The same will apply for the other resistor as both their crosssectional areas are doubled and they have same initial resistance

The new resistances are connected the same way i.e. in parallel,

The total resistance R_t will be

$$\frac{1}{R_t} = \frac{1}{R'} + \frac{1}{R'}$$

$$\frac{1}{R_t} = \frac{1}{2} + \frac{1}{2}$$

$$\frac{1}{R_t} = \frac{2}{2} = 1 \Rightarrow R_t = 1\Omega$$

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By Ohm's Law,

$$V = IR$$

$$3 = I \times 1$$

$$I = 3A \quad \checkmark$$

$\therefore$ The current flowing in the circuit is 3A.

61. Given: $H = 100J$

$$R = 4 \Omega$$

$$t = 1 \text{ second.}$$

$$V = ?$$

According to Joule's Law of Heating,

$$H = I^2 R t$$

$$100 = I^2 \times 4 \times 1$$

$$\frac{100}{4} = I^2$$

$$I^2 = 25$$

$$I = \sqrt{25} = 5A \quad \checkmark \checkmark$$

By Ohm's Law,

$$V = IR$$

$$V = 5 \times 4$$

$$V = 20V$$

$\therefore$ The potential difference across the ends of the resistor is 20V $\checkmark \checkmark$

MARKS	E	M	CM
Pg. 16 & 17	05	5.0	

17

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62. If a person can see nearby objects clearly but distant objects are not visible clearly then the person is myopic.

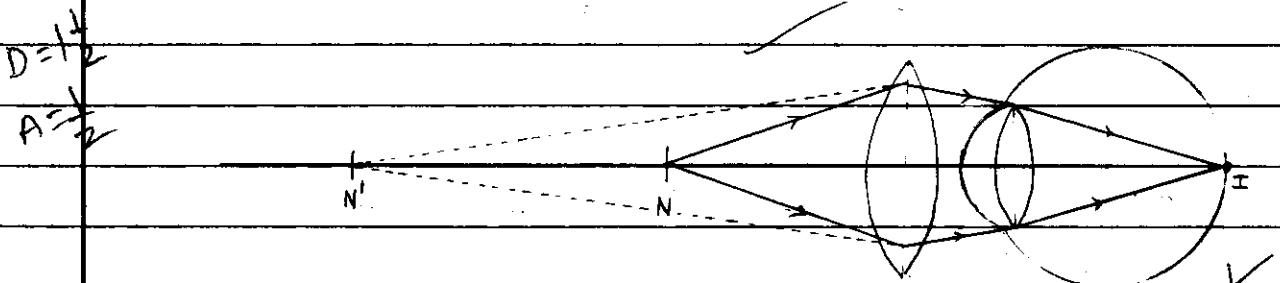
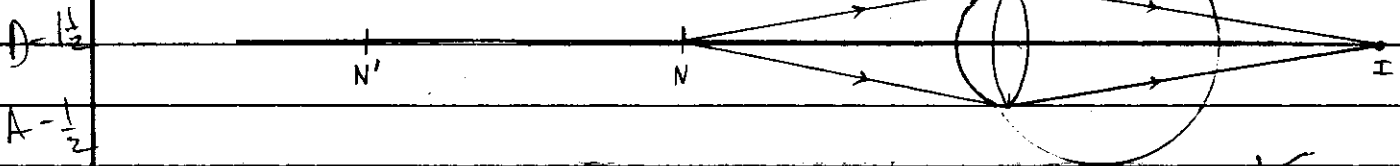
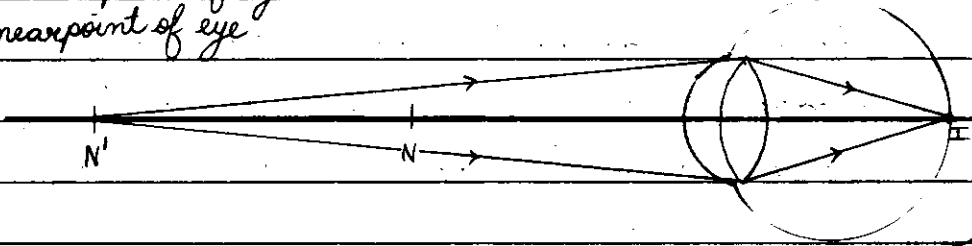
$\frac{1}{2} + \frac{1}{2}$
 $\frac{1}{2} + \frac{1}{2}$ If a person can see distant objects clearly but nearby objects are not visible clearly then the person is hypermetropic.

63. In bifocal lens, the upper part of the lens is concave to facilitate distant vision and the lower part of the lens is convex to facilitate near vision. This helps people suffering from both myopia and hypermetropia as is often the case in presbyopia due to weakening of ciliary muscles.

64. Hypermetropia can be corrected with a suitable converging lens (convex lens)

N' = Receded nearpoint of eye

N = Actual nearpoint of eye



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65.

Given: $m = -2$

$V = -30 \text{ cm}$ [Since the image is real, inverted and formed by a spherical (concave) mirror]

For spherical mirrors,

$$m = -\frac{V}{u}$$

$$-2 = -\frac{(-30)}{u}$$

$$u = \frac{30}{-2}$$

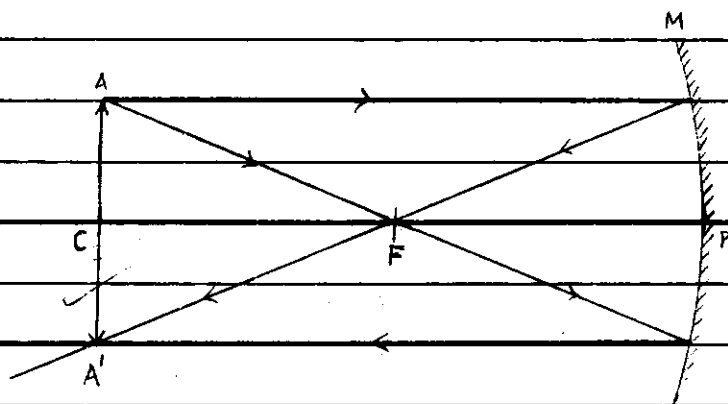
$$u = -15 \text{ cm} \checkmark \checkmark$$

$\therefore$ The object is located 15 cm in front of the mirror. $\checkmark$

66.

- 1) Concave mirrors are used in shaving mirrors to produce a magnified image of the face during shaving.
- 2) Concave mirrors are used in dentists' mirrors to produce a highly magnified image of tooth being examined.

67.



Object AC when placed at C produces image $A'C$ which is also at C and is real, inverted and same size as object. $\checkmark$