jsya
Roll No. | | | | | | | |

Candidates must write the Code on the title page of the answer book.

- Please check that this question paper contains **20** printed pages.
- Code number given on the right hand side of the question paper should be written on the title page of the answer book by the candidate.
- Please check that this question paper contains **39** questions.
- **Please write down the Serial Number of the question before attempting it.**
- 15 minutes time has been allotted to read this question paper. The students will read the question paper only and will not write any answer on the answer-book during this period.

I-PRE BOARD EXAMINATION
SCIENCE (THEORY)

Time allowed : 3 hours ***Maximum Marks : 80***

General Instructions :

i) This question paper consists of 39 questions in 3 sections.

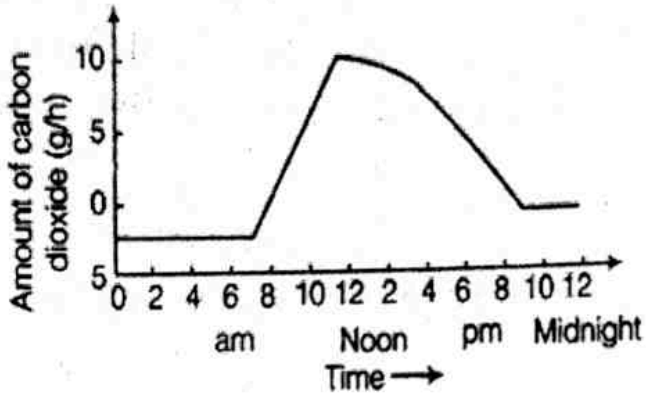
ii) Section A is Biology, Section B is Chemistry and Section C is Physics.

iii) All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.

SECTION - A [BIOLOGY 30 MARKS]

Question 1

The graph shows, how the amount of carbon dioxide taken by a plant. Why is the uptake of CO_2, is more during day time? [1]



a) Due to large number of opened stomata in daytime

b) Due to photosynthesis

c) Due to transpiration

d) Due to more water absorption

Question 2

The characteristic process observed in an aerobic respiration are. [1]

A. Lack of oxygen

B. Release of carbon dioxide

C. Release of high amount of energy

D. Release of lactic acid or ethyl alcohol

a) A and D

b) B, C and D

c) A, B and D

d) A, B, C and D

Question 3

Which of the following represents a reflex action? [1]

A. Beating of heart

B. Withdrawing your hand immediately on touching hot object

C. Riding a bicycle

D. Pulling leg immediately when the foot falls on some sharp object

Choose the correct option

a) A and B

b) C and D

c) A and D

d) B and C

Question 4

The main function of abscisic acid in plant is to [1]

a) increase the length of cells

b) promote cell division

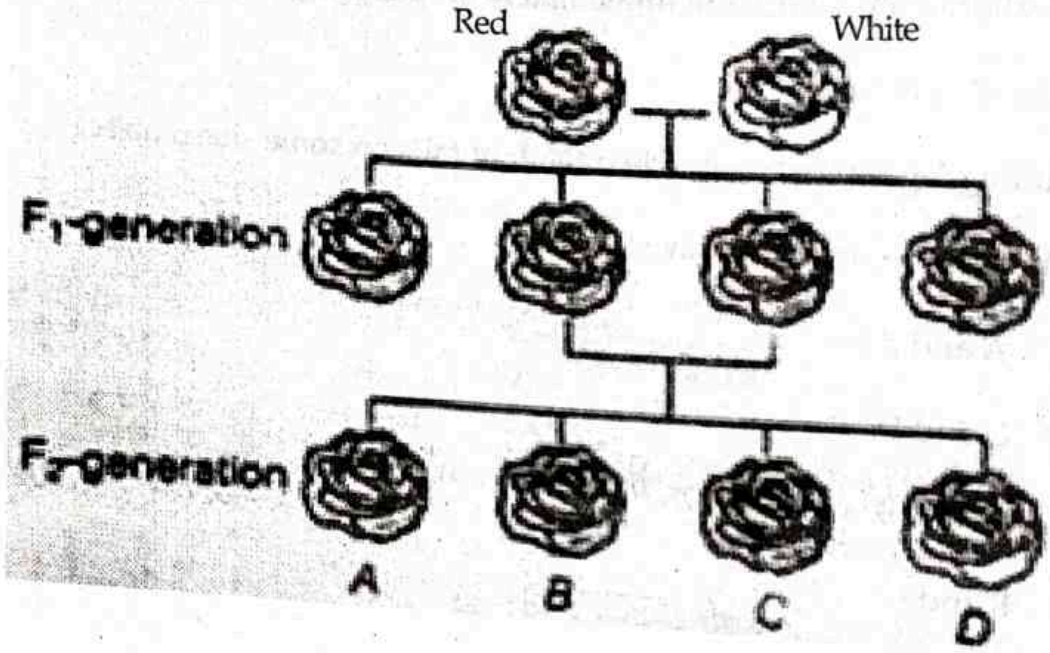
c) inhibit growth

d) promotes growth of stems

Question 5

The diagram given below shows the inheritance of flower colour in pure breeding roses.

[1]



Which of the following flowers are heterozygous for colour in F2-generation?

a) A and C
b) A and B
c) Only C
d) Band C

Question 6

The decomposers are not included in the grazing food chain. The correct reason of the same is because decomposers-

a) Act at every trophic level of the food chain
b) Convert organic material to inorganic
c) Do not breakdown organic compounds forms
d) Release enzymes outside their body to convert organic material to inorganic forms

[1]

Question 7

Select the incorrect food chain. [1]

(a) Grass-Frog-'Vulture

(b) Grass-Grasshopper- 'Frog-'Snake 'Eagle

(c) Grass -Deer -Lion

(d) Phytoplankton-Zooplankton-Perch fish-Bass fish -Man

The following two questions consist of two statements-Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below:

A. Both A and R are true, and R is the correct explanation of A.

B. Both A and R are true, and R is not the correct explanation of A.

C. A is true but R is false.

D. A is false but R is true

Question 8

Assertion (A): DNA copying is necessary during reproduction. [1]

Reason (R): DNA copying leads to the transmission of characters from parents to

Question 9

Assertion (A): Aquarium are known as the man made ecosystem [1]

Reason (R): Aquariums are created and maintained by humans

Question 10

What are the major excretory products of plants and humans? [2]

Question 11

Students to attempt either option A or B. [2]

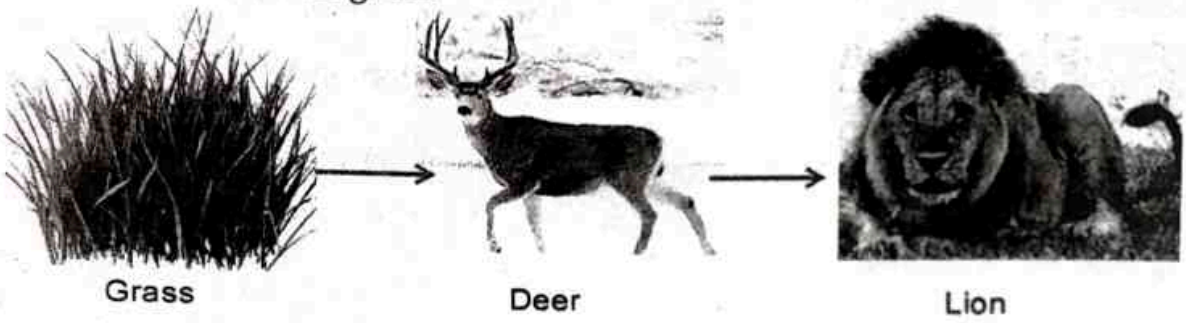
A. In birds and mammals left and right side of the heart are separated. Give reasons.

OR

B. Why diffusion is insufficient to meet the oxygen requirement of multi cellular organisms?

Question 12

Food chains are very important to maintain the balance in an ecosystem. Given below is one such diagram. [2]



(a) How many trophic levels are present in the given food chain?

(b) In the above food chain, only 200 j of energy was available to the lions. How much energy would have been present in green plants?

Question 13

What is the function of receptors in our body think of a situation where receptors do not work properly. What problems are likely to arise? [3]

Question 14 [3]

a) Name the sensory receptors found in nose and the tongue.

b) Name the parts of the nervous system which are involved in the following activities.

i) Maintaining body posture ii) Respiratory activities

Question 15

When we eat something we like, our mouth 'waters'. This is actually not only water, but a fluid called saliva secreted by the salivary glands.

To understand the action of saliva on the food a student performed the following activity and written these steps. [4]

Take 1 mL starch solution (1%) in two test tubes (A and B).

Add 1 mL saliva to test tube A and leave both test tubes undisturbed for 20-30 minutes.

Now add a few drops of dilute iodine solution to the test tubes.

Now answer the following

a) In which test tube do you observe a colour change?

b) What does this indicate about the presence or absence of starch

c) What conclusion is studied from this experiment?

What does this tell us about the action of saliva on starch?

OR

What would happen if mucus is not secreted in the stomach?

Question 16

A) Given below are certain situations. Analyse and describe its possible impact on the human body [5]

i) Fallopian tube of a female is plugged.

ii) Ovaries are not functional.

iii) Urethra is not functioning properly.

iv) Testosterone is not produced by testis.

v) Progesterone are not produced.

OR

B) I) What happens when

a) leaves of Bryophyllum fall on the soil?

b) Planaria is cut into many pieces?

c) sporangia of Rhizopus on maturation liberate spores? Mention the mode of reproduction in this case.

II) What is the Fate of floral parts after fertilization ? Mention any two

SECTION - B [CHEMISTRY 25 MARKS]

Question 17

Calcium oxide reacts vigorously with water to produce slaked lime. [1]

$CaO(s) + H_2O(t) \rightarrow Ca(OH)_2\,(aq)$

This reaction can be classified as:

(A) Combination reaction

(B) Exothermic reaction

(C) Endothermic reaction

(D) Oxidation reaction

Which of the following is a correct option?

(a) (A) and (C)

(b) (C) and (D)

(c) (A), (C) and (D)

(d) (A) and (B)

Question 18

A student placed a strip of copper in a solution of zinc sulphate. After some time, he did not observe any change. The correct reason is: [1]

a) Copper is more reactive than zinc

b) Copper is less reactive than zinc

c) Both have same reactivity

d) Zinc sulphate is unstable in solution

Question 19

Which of the following equations shows the acidic behaviour of Al_2O_3 [1]

a) $Al_2O_3 + 6HCl \rightarrow 2AlCl_3 + 3H_2O$

b) $Al_2O_3 + 2NaOH \rightarrow 2NaAlO_2 + H_2O$

c) $Al_2O_3 + 3H_2SO_4 \rightarrow Al_2(SO_4)_3 + 3H_2O$

d) None of the above

Question 20

When turmeric indicator is added to a soap solution, the colour changes to: [1]

a) Reddish-yellow

b) Yellow - green

c) Blue

d) Reddish-brown

Question 21

Which acid is injected by the stinging hair of nettle leaves? [1]

a) Hydrochloric acid

b) Sulphuric acid

c) Formic acid

d) Acetic acid

Question 22

A student added dilute HCl to a test tube containing baking soda. He observed brisk effervescence. On passing the evolved gas into lime water, it turned milky. This activity proves that : [1]

a) CO_2 is evolved which forms $CaCO_3$ with lime water

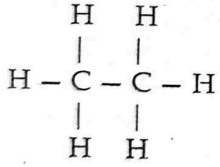
b) H_2 is evolved which burns with a pop sound

c) O_2 is evolved which rekindles glowing splinter

d) N_2 is evolved which extinguishes flame

Question 23

The given image represents the structure of a carbon compound known as ethane. [1]



Which of the following option explains the naming of ethane?

a) The presence of a functional group connected with a single bond

b) As it contains two carbon atoms, and a single bond is present between the two carbon atoms

c) Carbon compound with a total number of eight atoms is named ethane

d) As it contains six hydrogen atoms, and a single bond connects the carbon and hydrogen atom

The following question consists of two statements - Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below:

A. Both A and R are true, and R is the correct explanation of A.

B. Both A and R are true, and R is not the correct explanation of A.

C. A is true but R is false.

D. A is false but R is true

Question 24 [1]

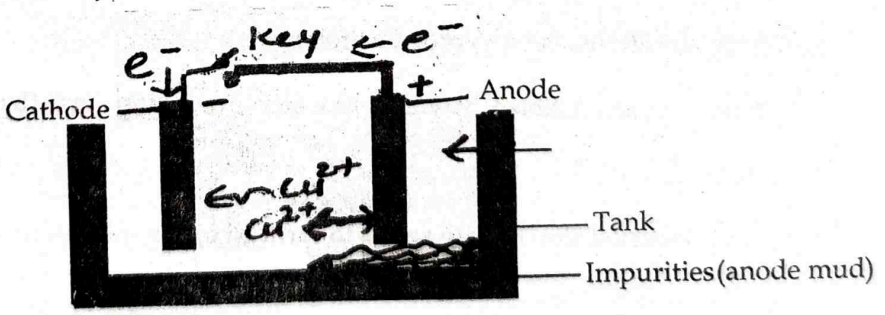
Assertion (A): Methane undergoes substitution reactions in the presence of sunlight.

Reason (R) : Alkanes are inert towards addition reactions due to the absence of double or triple bonds.

Question 25

a) Identify the given diagram. [2]

b) What would you take as the anode, the cathode and the electrolyte ?



Question 26

Attempt either option A or B. [1+1+1=3]

[A] Give reasons for the following:

i) Why can metals like mercury and copper be obtained from their ores by simply heating them in air.

ii) Aluminium is a highly reactive metal, yet it is used to make utensils for cooking.

iii) Sodium and Potassium are stored under oil.

OR

[B] During a lab experiment, an iron piece coated with zinc does not rust even when exposed to water & air. Can you help Raghav to answer the following question?

i) Name the method of corrosion prevention used here.

ii) Explain why this method protects iron from rusting.

iii) Write the name and chemical formula of the compound formed when silver articles tarnish.

Question 27

During an experiment, few metals were taken in separate test tubes and water was added. Observations were recorded as follows: [1+1+1=3]

Metal 'A' reacted violently with cold water, producing a gas that immediately catches fire

Metal B reacted slowly with steam to form an oxide and hydrogen gas.

Metal C showed no reaction with cold water but start to float after reacting with hot water

a) Identify metals A, B, and C.

b) Write the balanced chemical equation for the reaction of Metal B with steam.

c) Why does Metal C start to float after reacting with hot water ?

Question 28 [1+2+1=4]

Salt of a strong acid and strong base is neutral with a pH value of 7. NaCl, commonly known as common salt is formed by the combination of hydrochloric acid and sodium hydroxide solution. This salt is used in food. Some salt is called rock salt which was formed when seas of bygone ages dried up. The common salt thus obtained is an important raw material for various materials of daily use, such as sodium hydroxide, baking soda, washing soda, and bleaching powder.

1. Name the compound which can be used for removing permanent hardness of water as well as in manufacturing of Borax

   a) Gypsum

   b) washing soda

   c) Baking soda

   d) Sodium hydroxide

2. Name the process used to prepare Sodium hydroxide, using an aqueous solution of sodium chloride. Write the equation of the reaction taking place in that process.

OR

The chlorine produced by the electrolysis of aqueous sodium chloride solution is used in the manufacturing of compound 'A'.Compound 'A' is used for bleaching purposes. Identify the compound 'A' and write the equation of the reaction for the preparation of 'A'.

3. The formula of Baking soda is -

a) NaCl b) $KHCO_3$

c) $NaHCO_3$ d) Na_2CO_3

Question 29

Attempt either option A or B. [1+1+1+2=5]

Option A-

a) What is homologous series? Give example

b) Draw the structural formula of butane.

c) Distinguish between a saturated and unsaturated hydrocarbon by flame test.

d) Explain the following reactions with the help of balanced chemical equations:

i) Substitution reaction

ii) Dehydration of alcohol

OR

Option B- [1+1+1+1+1=5]

A carbon compound 'A' is widely used as a preservative in pickles and has a molecular formula $C_2H_4O_2$. It reacts with ethanol to form a sweet-smelling compound 'B'.

i) Identify the compound 'A' and write its structure.

ii) Write the chemical equation for the reaction of 'A' with ethanol to form compound 'B'.

iii) How can we get a sodium salt of compound 'A' from compound 'B'. Write the equation of the reaction.

iv) Name the gas produced when compound 'A' reacts with Sodium carbonate.

v) Write the name of reaction which is taking place when Compound 'A' reacts with ethanol.

SECTION-C [PHYSICS 25 MARKS]

Question 30

A Student observed the reflection of light from different types of spherical mirrors and made the following statements. [1]

I. A concave mirror can form a magnified and real image of an object.

II. A convex mirror can only form a virtual image of an object.

III. The magnification produced by a concave mirror can be negative.

Choose from the following, the correct option that lists the correct statements.

(a) I and II (b) I and III

(c) I, II and III (d) II and III

Question 31

Twinkling of stars is due to atmospheric : [1]

(a) dispersion of light by water droplets

(b) refraction of light by different layers of varying refractive indices

(c) scattering of light by dust particles

(d) internal reflection of light by clouds.

The following question consists of two statements - **Assertion (A) and Reason (R).**

Answer these questions by selecting the appropriate option given below:

(a) Both A and R are true, and R is the correct explanation of A.

(b) Both A and R are true, and R is not the correct explanation of A.

(c) A is true but R is false.

(d) A is false but R is true.

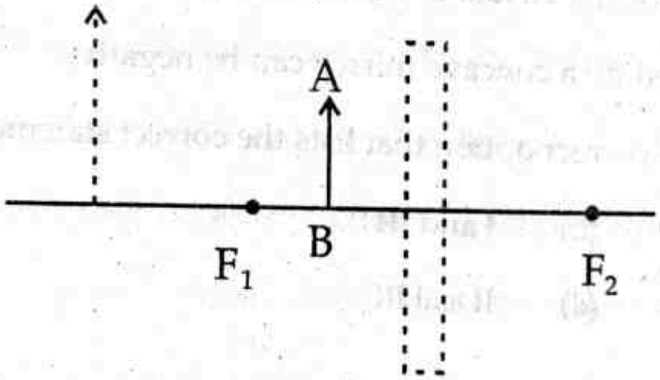
Question 32 [1]

Assertion: The centre of curvature lies outside the reflecting surface of spherical mirror and is not a part of the mirror.

Reason : The reflecting surface of a spherical mirror forms a part of a sphere which has a centre.

Question 33

The diagram given below shows an object AB and an image A'B'



Without actually drawing the ray diagram, state the following: [2]

(a) Identify the lens (shown schematically as a rectangle) in the diagram.

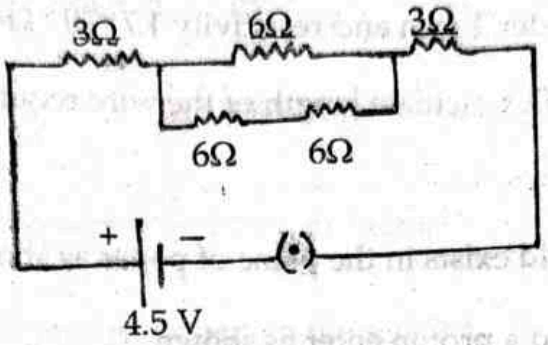
(b) Name two optical instruments where such an image is obtained.

(c) List three characteristics of the image formed if this lens is replaced by concave mirror of focal length f and an object is placed at a distance f/2 in front of the mirror.

Question 34

Attempt either option A or B

A. Find out the following in the given electric circuit-

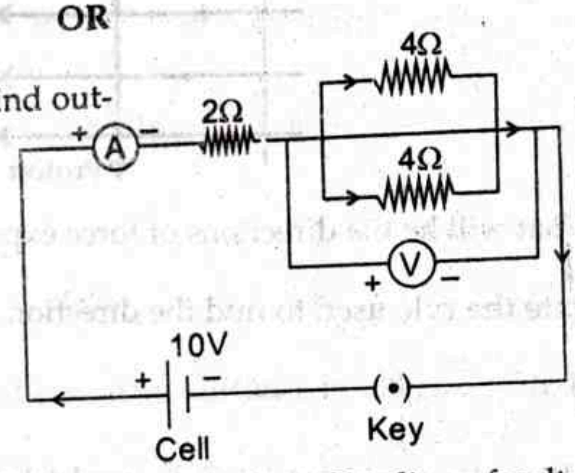


i) Effective resistance of the combination.

ii) Current flowing through the 3 Ω resistor.

OR

B. Study the below circuit and find out-



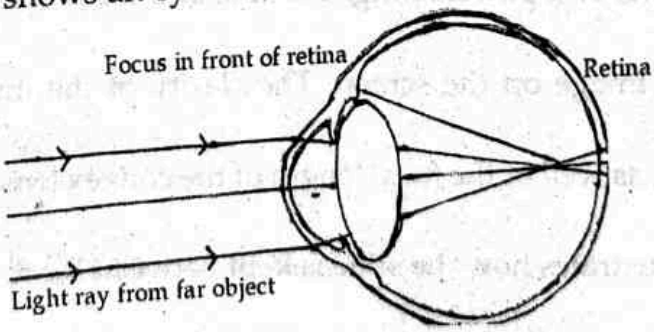
i) Current in 2 Ω resistor

ii) Reading of voltmeter

Question 35

[3]

The below image shows an eye defect



i) Name the defect of vision represented in the diagram. Give reason for your answer.

ii) List two causes of this defect.

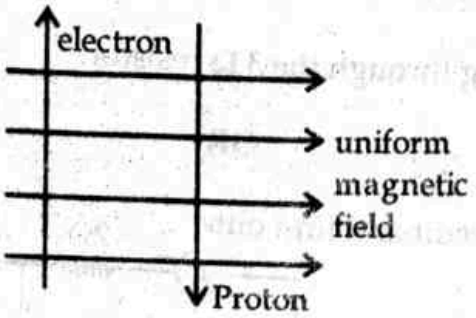
iii) With the help of a diagram show how this defect of vision is corrected.

Question 36

A copper wire of diameter 1 mm and resistivity 1.7×10^{-8} Ω-m is used to prepare a resistor of resistance 2 Ω. Calculate length of the wire required. [3]

Question 37

A uniform magnetic field exists in the plane of paper as shown in the diagram, in this field an electron and a proton enter as shown. [3]

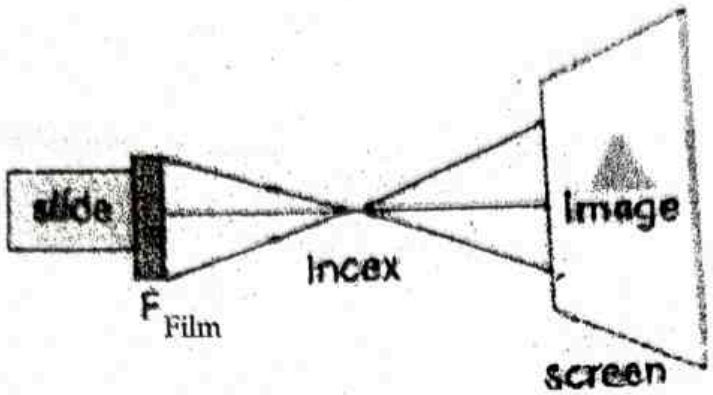


i) What will be the directions of force experienced by the electron and the proton?

ii) State the rule used to find the direction in the above case.

Question 38

A multimedia projector is often used in classrooms and seminar halls to project enlarged images of slides or digital content onto a distant screen. The arrangement generally consists of a powerful light source and a convex lens, which is adjusted to obtain a sharp image on the screen. The clarity of the image depends on the lens screen distance, as well as the focal length of the convex lens used in the projector. The figure below illustrates how the slide is kept between the focus and the lens to form a magnified real image on the screen.



(a) Which type of lens is used in the projector? [1]

(b) What type of image is formed on the screen? [1]

Attempt either sub part (c) or d)

(c) The projector lens has focal length f= 10 cm. The sharp image is obtained on a screen 200 cm behind the lens. Find the object (slide) distance u from the lens. [2]

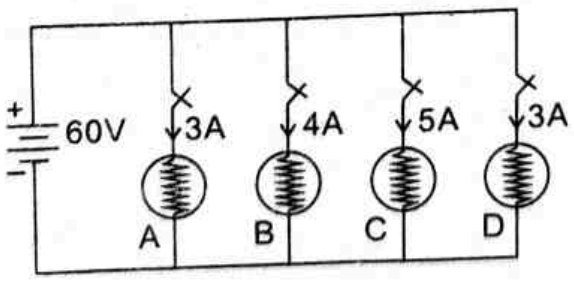
OR

(d) If the slide height is 2.0 cm and the image distance is 200 cm (with the same lens as above), calculate the image height. [2]

Question 39

Attempt A or B

(A)



In the given circuit, A, B, C and D are four bulbs connected with a 60 V battery.

Analyse the circuit and answer the following questions: [5]

(i) What kind of connection are the bulbs connected in? (series/Parallel)

(ii) What are any two advantages of the above combination method?

(iii) Explain with proper calculations which lamp glows the brightest?

(iv) Find out the total resistance in the circuit.

OR

(B) (i) write one advantage and one disadvantage of AC over D.C. [1]

(ii) A household uses the following electric appliance

(a) A Refrigerator of rating 400 watt for 10 hours each day.

(b) Two electric fans of rating 80 watt each for 6 hours daily.

(c) Six electric tubes of rating 18 watt each for 6 hours daily.

Calculate the electric bill for the household for month of June, if cost of electrical energy is Rs 3.00 per unit. [4]

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