Class-X
SCIENCE

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TIME : 3 Hrs

Maximum Marks : 90

Instructions:

(i) The question paper comprises of two sections, A and B. You are to attempt both the sections.
(ii) All questions are compulsory.
(iii) There is no overall choice.
(iv) All questions of section A and all questions of section B are to be attempted separately.
(v) Questions 1 to 3 in section A are one mark questions. These are to be answered in one word or in one sentence.
(vi) Questions 4 to 7 in section A are two marks questions. These are to be answered in about 30 words each.
(vii) Questions 8 to 19 in section A are three marks questions. These are to be answered in about 50 words each.
(viii) Questions 20 to 24 in section A are five marks questions. These are to be answered in about 70 words each.
(ix) Questions 25 to 42 in section B are multiple choice questions based on practical skills. Each question is a one mark question. You are to select one most appropriate response out of the four provided to you.

Section A

1. Name any two phenomena which occur in nature due to atmospheric refraction.
2. Why does carbon have a strong tendency to catenate?
3. How are coal and petroleum formed?
4. What is atomic radius? How does it vary down the group?
5. a) When leaves of the *Bryophyllum* fall on the ground they produce new plants. Why?
   b) Give one difference between sexual and asexual reproduction.
6. a) Why traits such as intelligence and knowledge cannot be passed on to the next generation?
   b) How can we say that birds are closely related to reptiles and have evolved from them?
7. a) Name the functional unit of the environment comprising of the living and non-living components.
   b) What percentage of solar energy is trapped by the plants?
8. Write the function of following in human eye.
   (a) Pupil   (b) Retina   (c) Iris

9. What is dispersion of light? Write any two factors on which the deviation produced by a glass prism depend.

10. (a)   What is meant by the power of a lens?

    (b)   How is it related to its focal length? Write the unit of power of a lens.

    (c)   Calculate the power of a lens having focal length 20cm.

11. A convex mirror used as rear view mirror in a car has radius of curvature 8m. If a bus behind the car is at a distance of 16m from the mirror, find the position and magnification of image of bus in the convex mirror.

12. i)   Write the IUPAC name of following compounds:-

    a) $CH_3—CH_2—CH_2—OH$

    b) $CH_3 — CH = CH - CH_3$

    ii)   Give a chemical test to differentiate between ethane and ethene?

13. An element 'X' (2, 8, 2) combines separately with NO_3^-, SO_4^{2-} radicals. Write the formulae of the compounds formed. To which group of the periodic table does 'X' belong. Will it form covalent or ionic compounds?

14. a)   How does valency change from left to right in periodic table?

    b)   Why atomic number is considered to be a more fundamental property as compared to atomic mass?

15. a)   Mention two secondary sexual characters in human male.

    b)   Why are the testes in males located outside the abdomen?

    c)   What is the function of urethra in males?

16. a)   Draw neat well labelled diagrams to show type of asexual reproduction in *Rhizopus*.

    b)   Name any two methods of vegetative propagation.

17. a)   What are fossils?

    b)   Name the vegetable crops made from wild cabbage by artificial selection when farmers opted for

    i)   arrested flower development   ii)   sterile flowers

    iii)   swollen parts   iv)   large leaves

18. In a cross between plants with purple flowers and plants with white flowers all the offsprings produced in F1 generation had purple flowers. When the F1 generation was selfed, it was observed in the F2 generation that out of 100, 75 flowers were purple. Make a cross and answer the following:

    (a)   What are the genotypes of the F2 progeny?

    (b)   What is the ratio of purple and white flowers in the F2 generation?

19. In the human beings the statistical probability of getting either a male or a female child is 50:50. Justify the statement with the help of a cross.

20. (a)   State the laws of reflection of light.

    (b)   What is meant by refraction of light?

    (c)   How is refractive index of a medium related to the angle of incidence and the angle of refraction? What is the unit of refractive index of a medium?

21.   (a)   What is hypermetropia? Write the two causes of hypermetropia.
       (b)   Draw a ray diagram to show:
           (i)   A hypermetropic eye.
           (ii)   Correction of a hypermetropic eye.

22.   a)   Write the chemical equation for conversion of ethanol into ethanoic acid.
       b)   How does ethanol react with acetic acid in presence of conc.H_2SO_4?
       c)   Differentate between soaps and detergents and which of the two is a better cleansing agent and why?

<div align="center">OR</div>

       a)   Draw the electron dot structure of H_2O.
       b)   Write the chemical equations for the following reactions:
           i)   Ethanoic acid with sodium bicarbonate
           ii)   Ethanol with conc.H_2SO_4 at 443K
           iii)   Ethane undergoes combustion
       b)   What is denatured alcohol?

23   You and your friend are walking by a store. Both of you see a poster of on the wall saying "Say no to plastics". Your friend disagrees with the content of the poster and recounts the uses and the advantages of plastic. You contradict him saying that plastics are harmful to the environment.
       a)   How will you convince him that plastics are harmful to the environment?
       b)   Which values are being disrespected by your friend by not agreeing with you?
       c)   Government has banned the use of plastics and has asked to use paper bags and jute bags instead. How will you get the decision implemented effectively?
       d)   Describe how the strategy of reuse and recycle can help in this case.

24.   Observe the diagram and answer the questions below:
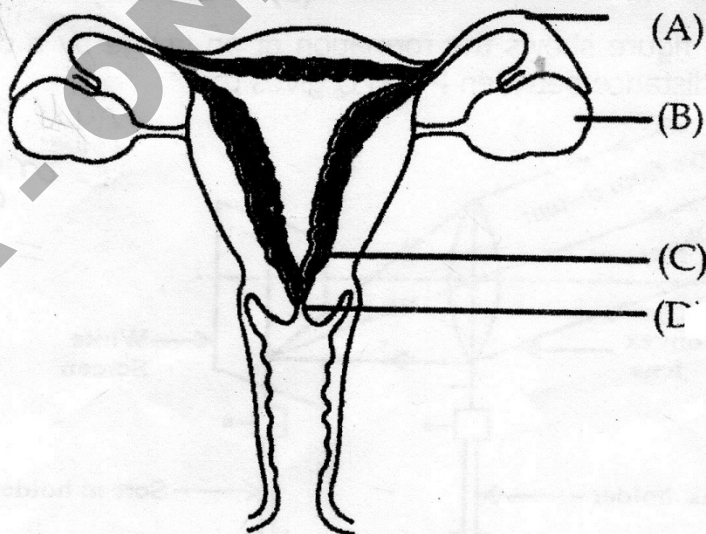

       a)   Label the parts A, B, C and D.
       b)   State the two functions of Part 'B'
       c)   Name the method of sterilization in which part of 'A' is removed.
       d)   Which part helps to transport the egg from the ovary to the uterus?

Section B

25. In the following figure a ray of light is incident on a glass slab.

The correct representation of the refracted ray of light is
(a)   AO   (b)   OB
(c)   OC   (d)   OD

26. In an experiment, the image of a distant object formed by a concave mirror is obtained on a screen. To determine the focal length of the mirror, you need to measure the distance between the

(a)   mirror and the screen.   (b)   mirror and the object.

(c)   object and the screen.   (d)   none of these.

27. While performing the experiment to trace the path of a ray of light passing through a glass slab, the distance between the pins fixed on the incident ray of light should be about

(a)   1cm   (b)   2cm
(c)   0.5cm   (d)   10cm

28. The following figure shows the formation of an image by a convex lens on a white screen. The distance between P and Q gives the

(a)   thickness of the lens   (b)   twice the focal length of the lens

(c)   focal length of the lens   (d)   aperture of the lens

29. A student traced the path of a ray of light ~~though~~ through a glass ~~prism~~ Slab. She marked the angle of incidence ($\angle i$), the angle of refraction ($\angle r$) and the angle of emergence ($\angle e$) as shown in the following figure. Which of these angles are not marked correctly?
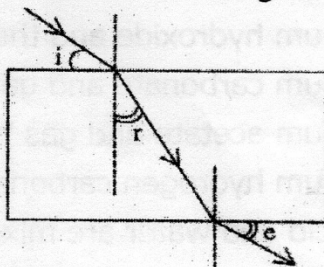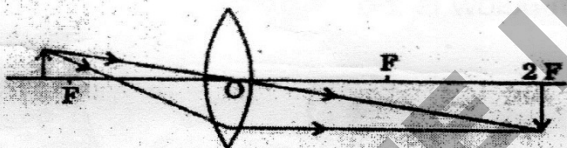

   (a)   the angle of incidence ($\angle i$) only
   (b)   the angle of incidence ($\angle i$) & the angle of refraction ($\angle r$)
   (c) the angle of incidence ($\angle i$) & the angle of emergence ($\angle e$)
   (d)   the angle of refraction ($\angle r$) & the angle of emergence ($\angle e$)

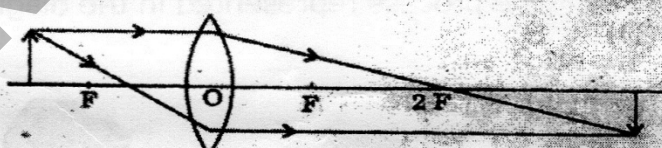30. Which of the following ray diagram is drawn correctly for the image formed by a convex lens?
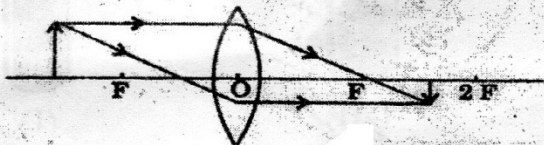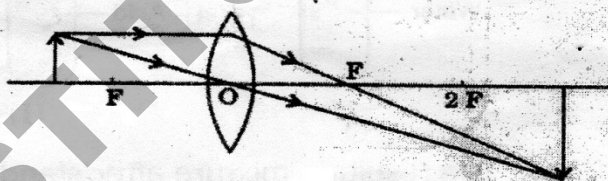
(A)   (B)

(C)   (D)

   (a)   A   (b)   B   (c)   C   (d) D

31. The process of formation of soap is known as
   (a)   Saponification   (b)   Decarboxylation
   (c)   Esterification   (d)   Fermentation

32. When a few drops of acetic acid are added to blue litmus solution it was observed that the:
   (a)   blue litmus turns red   (b)   no colour change occurs
   (c)   blue litmus turns green   (d)   blue litmus becomes colourless

33. Saponification process is made faster by adding:
   (a)   Sodium hydroxide   (b)   Ethanol
   (c)   Sodium chloride   (d)   None of the above

34. Which of the following salts makes water Hard?
   (a)   Sodium chloride   (b)   Calcium chloride
   (c)   Sodium bicarbonate   (d)   all of the above

35. Acetic acid was added to a solid 'X' kept in a test tube. A colourless and odourless gas 'Y' was evolved. The gas was passed through lime water which turns milky. It was concluded that

   (a) solid 'X' is sodium hydroxide and the gas 'Y' is carbon dioxide

   (b) solid 'X' is sodium carbonate and gas 'Y' is carbon dioxide

   (c) solid 'X' is sodium acetate and gas 'Y' is carbon dioxide

   (d) solid 'X' is sodium hydrogen carbonate and gas 'Y' is sulphur dioxide.

36. 5 ml each of acetic acid and water are mixed together and shaken well.

Acid / Water (I)   Water / Acid (II)   Homogeneous mixture (III)   Heterogeneous mixture (IV)
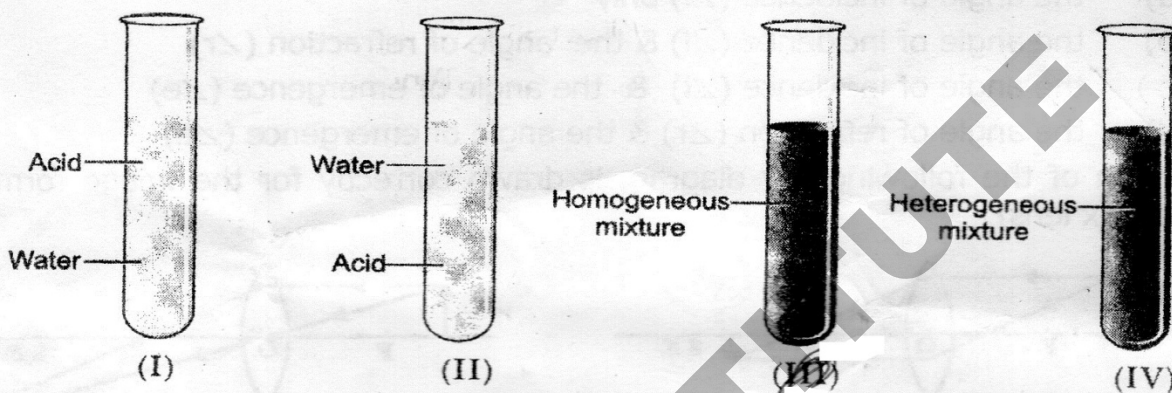
   The resulting mixture after standing for some time would appear as

   (a) I   (b) II   (c) III   (d) IV

37. The process represented in the diagram below is the
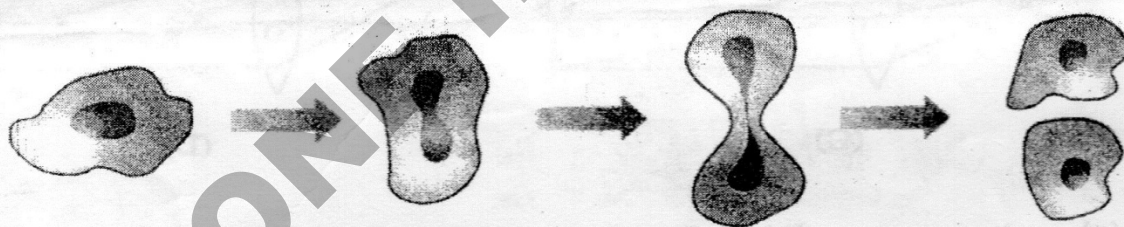
   (a) Formation of spores in *Amoeba*

   (b) Formation of bud taking place in *Amoeba*

   (c) Identical gametes being formed in *Amoeba*

   (d) Formation of daughter cells in *Amoeba*

38 Students were given bean seeds and were asked to observe the embryo. They carried out the following steps.

   I. Separated the cotyledons from each other.

   II. Soaked the seeds overnight.

   III. Observed the embryo using magnifying glass.

   IV. Peeled off the seed coat carefully.

   What is the correct order of the steps?

   (a) II, I, IV, III   (b) II, IV, I, III

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