Question Paper
2011 Delhi set 1

CBSE Class 10 Science

GENERAL 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. However internal choice has been provided in all the three questions of five marks category. Only one option in such question is to be attempted.

(iv) All questions of section A and all questions of section B are to be attempted separately.

(v) Question numbers 1 to 4 in section A are one mark questions. These are to be answered in one word or one sentence.

(vi) Question numbers 5 to 13 are two mark questions, to be answered in about 30 words each.

(vii) Question numbers 14 to 22 are three mark questions to be answered in about 50 words each.

(viii) Question numbers 23 to 25 are five mark questions, to be answered in about 70 words each.

(ix) Question numbers 26 to 41 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. How many covalent bonds are there in a molecule of ethane, C H?

Ans. 7 seven

2. What is Tyndall effect?

Ans. Tyndall effect - scattering of light by the colloidal particles.

3. What will happen if we kill all the organisms in one trophic level?

Ans. It will cause imbalance in the ecosystem.

4. Why did United Nations act to control the production of chlorofluoro-carbons (CFCs) used in refrigerators?

(i) How do you calculate the possible valency of an element from the electronic configuration of its atoms?

(ii) Calculate the valency of an element X whose atomic number is 9.

Ans. To freeze CFC production at 1986 levels as CFC depletes the ozone at the higher levels of the atmosphere.

5. How does the electronic configuration of an atom of an element relate to its position in the modem periodic table? Explain with one example.

Ans. Valency is equal to the number of electrons in the outermost shell or 8 minus the number of electrons in the outermost shell.

Electronic configuration of X = 2, 7

Hence valency of X = 8 - 7 = 1

6. How does the electronics configuration of an atom of an element relate to its position in the modern periodic table? Explain with one example.

Ans. The number of valence electrons indicate the group number of the element.

Example : $_{11}Na$ = 2, 8, 1

It belongs to the first group of the Periodic Table.

7. State the two laws of reflection of light.

Ans. Laws of reflection of light:

i) The incident ray, reflected ray and the normal at the point of incidence, all lie in the same plane.

ii) At the point of incidence, angle of incidence is equal to angle of reflection/ $\angle i = \angle r$

8. What is meant by the dispersion of white light? Draw a diagram to show dispersion of

white light by the glass prism.

Ans. Dispersion of light : splitting up of white light into its constituent colours.
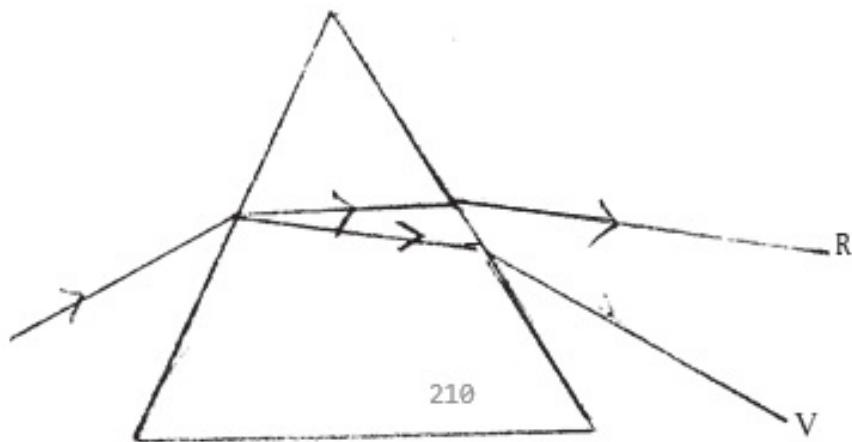
9. Explain why the planets do not twinkle but the stars twinkle.

Ans. Planets, being much closer to the earth are considered as extended source of light. Stars, being distant, are taken as point sized sources of light. The light coming from stars goes on varying due to atmospheric refraction producing twinkling effect.

10. Write Any two difference between binary fission and multiple fission in a tabular form as observed in cells of organisms.

Ans.

Binary Fission	Multiple Fission
a) Two (equal sized) daughter cells are produced. No cyst (protective covering) is formed around the parent cell.	a) Several daughter cells are produced simultaneously. b) A cyst is formed around the parent cell.

11. Explain giving one example of each, the unisexual and the bisexual flowers.

Ans. Unisexual flowers are those which contain either stamens or carpets. eg. papaya, watermelon (any one) OR any other suitable example. Bisexual flowers one those which contains both stamens and carpels. eg. Hibiscus, mustard (any one) OR any other suitable

example.

12. List any four characteristics of a good fuel.

Ans. Characteristics of a good fuel :

Environment friendly

Pollution free

High efficiency

Easily accessible

Economical

Easy to store

Easy to transport

13. What are non-renewable resources of energy? Give two examples of such resources.

Ans. Non-renewable sources of energy :- sources of energy that can not be replenished in nature in a short period of time.

Examples — coal, petroleum, wood

or any other suitable example

14. Write one chemical equation to represent each of the following types of reactions of organic substances:

(i) Esterification

(ii) Saponification

(iii) Substitution

Ans.

i) $CH_3COOH + C_2H_5OH \xrightarrow[-H_2O]{Acid} CH_3COOC_2H_5$

ii) $CH_3COO\,C_2H_5 \xrightarrow{NaOH} CH_3COOH + C_2H_5OH$

iii) $CH_4 + Cl_2 \xrightarrow{Sunlight} CH_3Cl + HCl$
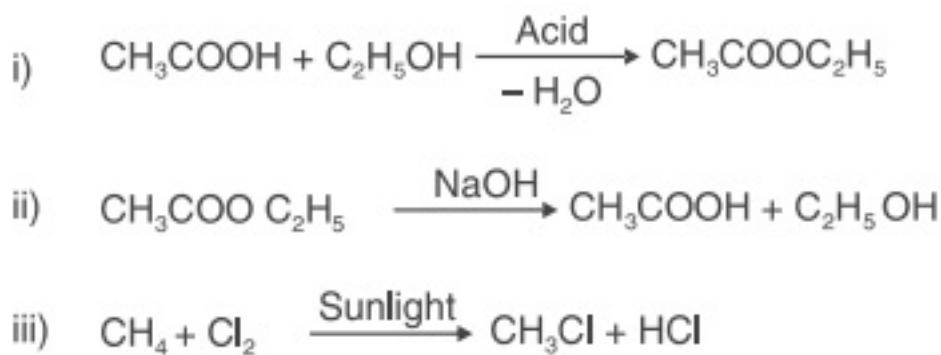
15. Two elements X and Y belong to group 1 and 2 respectively in the same period of periodic table. Compare them with respect to:

(i) the number of valence electrons in their atoms

(ii) their valencies

(iii) metallic character

(iv) the sizes of their atoms

(v) the formulae of their oxides

(vi) the formulae of their chlorides

Ans.

S.N.	Property	X	Y
(i)	Valence Electrons	1	2
(ii)	Valency 1	2	
(iii)	Metallic character	more	less
(iv)	Size of atoms	bigger	smaller
(v)	Formula of oxides	X2O	YO
(vi)	Formula of chlorides	XCI	YCI2

16. Draw the ray diagram and also state the position, the relative size and the nature of

image formed by a concave mirror when the objects placed at the centre of curvature of the mirror.

Ans.
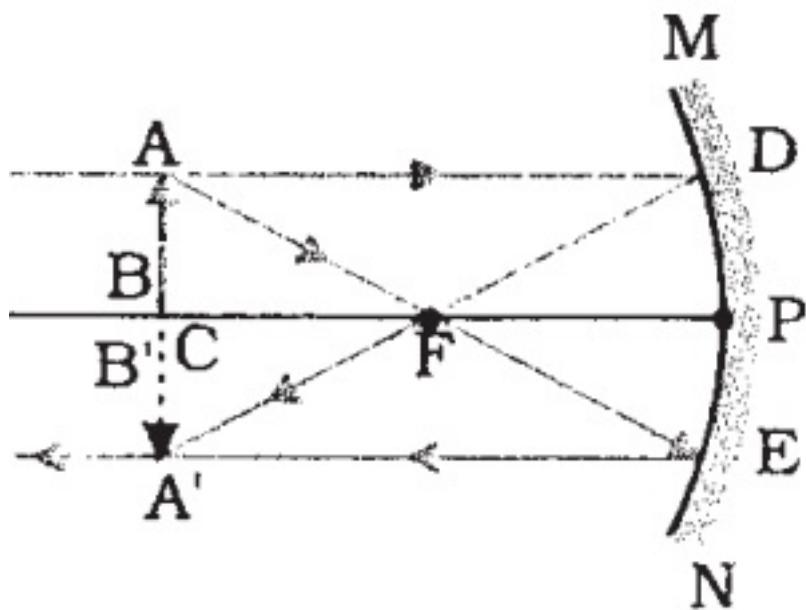
Ray diagram direction of rays

Position of image – at C (centre of curvature)

Size – same size as the object

Nature – real and inverted

17. Define 'refractive index of a transparent medium'. What is its unit ? Which has a higher refractive index, glass or water?

**Ans.** Refractive index — Ratio of speed of light in vacuum (air) to the speed of light in the given transparent medium / refractive index = $= \dfrac{\sin i}{\sin r}$

It does not have any unit

Glass has higher refractive index

18. What eye defect is hypermetropia? Describe with a ray diagram how this defect of vision can be corrected by using an appropriate lens.

Ans. Defect of vision which the person can clearly see distant objects but cannot see nearby objects clearly.
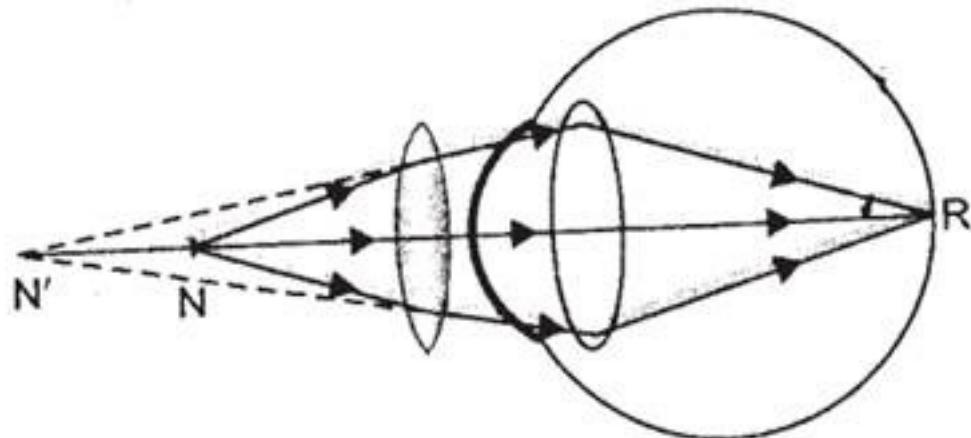
The defect can be corrected using convex lens of appropriate focal length.

19. (a) List two sexually transmitted diseases in each of the following cases:

(i) Bacterial infections

(b) How may the spread of such diseases be prevented?

Ans. (a) (i) Bacterial diseases: Gonorrhoea, Syphilis

ii) Viral diseases: warts, HIV-AIDS

b) By using a covering called condom.

20. Explain with examples how the following are evidences in favour of evolution in organisms.

(i) Homologous organs

(ii) Analogous organs

(iii) Fossils

Ans. i) Study of homologous organs suggests that the organisms having same structure of organs but performing different functions have evolved from a common ancestor.

eg. forelimbs of a frog, lizard, bird and man

(ii) Analogous organs show adaptations of organs for common use eg. wings of butterfly and

wings of bat

(iii) The fossil Archaeopteryx looks like a bird but bears a number of other features found in reptiles. This observation provides a clue that the birds have evolved from reptiles.

21. Explain the terms:

(i) Speciation

(ii) Natural selection

Ans. i) Speciation is evolution of a new species from a group of individuals of a species.

This occurs due to variations / genetic drift / geographical barrier (mountains, rivers etc.) leading to incapability to reproduce amongst themselves in a population.

(ii) Natural Selection: is a process by which the organisms that are adapted suitably to their environmental conditions are allowed to survive and reproduce while those which are not adapted to their environment are eliminated.

In a population of beetles, a new variation (green colour) gets survival advantage to red beetles whereas others (red) perish.

22. Explain how equal genetic contribution of male and female parents is ensured in the progeny.

Ans. (i) Both male and female parent contribute equally to the DNA of the progeny during sexual reproduction.

(ii) Each parent contributes one set of genes / chromosomes through its germ cell / gamete.

(iii) When the two germ cells/gametes of male and female parent combine during sexual reproduction (fertilisation) normal number / two sets of chromosomes containing genes / DNA is restored to in the progeny.

(Thus, equal genetic contribution of male and female parent is ensured)

23. (a) In a tabular form, differentiate between ethanol and ethanoic acid under the following heads:

(i) Physical state

(ii) Taste

(iii) NaHCO, test

(iv) Ester test

**(b) Write a chemical reaction to show the dehydration of ethanol.**

OR

(a) What is a soap? Why are soaps not suitable for washing clothes when the water is hard?

(b) Explain the action of soap in removing an oily spot from a piece of cloth.

Ans.

S.no.	Property	Ethanol	Ethanoic Acid
(i)	Physical	Liquid	Liquid
(ii)	Taste	Pungent/bitter or any other answer	Sour
(iii)	NaHCO$_3$ Test	No reaction	Evolution of CO$_2$ brisks effervescence
(iv)	Ester Test	Forms ester with ethanoic acid	Forms ester with ethanol

$$CH_3CH_2OH \xrightarrow{Conc.H_2SO_4} CH_2 = CH_2 + H_2O$$
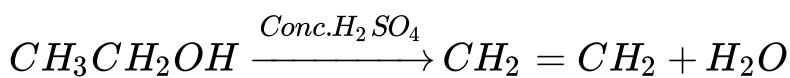
OR

a) Soap is the sodium / potassium salt of a long chain carboxylic acid. Soaps are not suitable for washing in hard water due to formation of scum / insoluble precipitates which are formed due to reaction between soap and calcium / magnesium ions present in hard water.

b) Soap molecules suspend in water to form miscelles, i.e., the ionic part entraps the oily dirt particles. The dirt gets lifted with water and is washed off.

24. (a) If the image formed by a lens is diminished in size and erect, for all positions of the object, what type of lens is it?

(b) Name the point on the lens through which a ray of light passes undeviated.

(c) An object is placed perpendicular to the principalaxis of a convex lens of focal length 20 cm. The distance of the object from the lens is 30 cm. Find(i) the position(ii) the magnification and(iii) the nature of the image formed.

OR

(a) One—half of a convex lens is covered with a black paper. Will such a lens produce an image of the complete object? Support your answer with a ray diagram.

(b) An object 5 cm high is held 25 cm away from a converging lens of focal length 10 cm.

(i) Draw the ray diagram.

(ii) Calculate the position and size of the image formed.

(iii) What is the nature of the image?

Ans. (a) Concave

(b) Optical Centre

(c) (i) $\dfrac{1}{f} = \dfrac{1}{v} = \dfrac{1}{u}$

$\dfrac{1}{v} = \dfrac{1}{f} + \dfrac{1}{u}$

$= \dfrac{1}{(+20)} + \dfrac{1}{(-30)}$

$= \dfrac{1}{20} - \dfrac{1}{30} = \dfrac{3-2}{60}$

$$\frac{1}{v} = \frac{+1}{60}$$

$$\therefore v = +60cm$$

(ii) $m = \frac{v}{u}$

$$= \frac{+60cm}{-30cm}$$

M = - 2

(iii) Nature: Real and inverted

OR

(a) yes
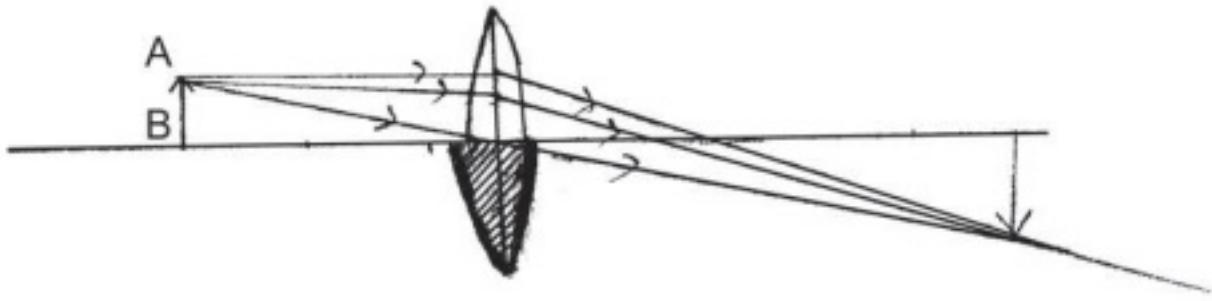
(b) (i)
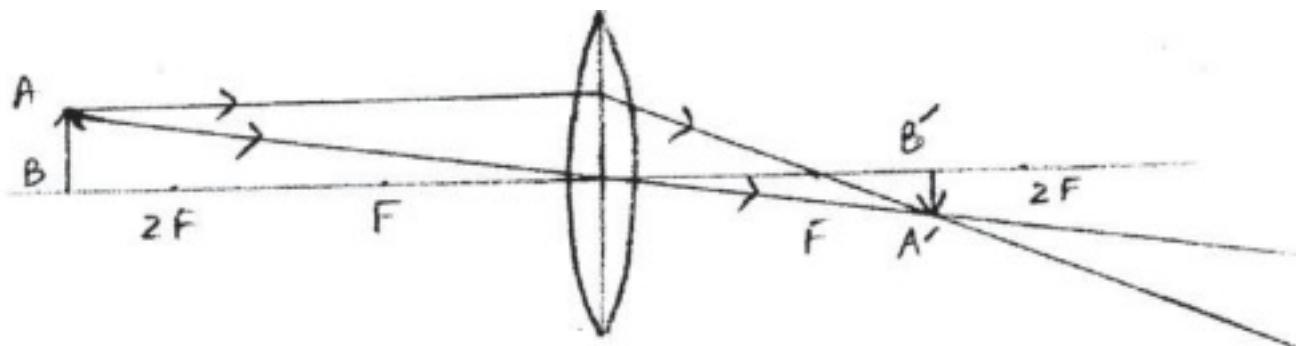
(ii) $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$

$$\therefore \frac{1}{v} = \frac{1}{f} + \frac{1}{u}$$

$$= \frac{1}{(+10)} + \frac{1}{(-25)} = \frac{(5-2)}{50} = \frac{+3}{50}$$

$$\therefore v = \frac{+50}{3} = +16.67 cm$$

$$\frac{h'}{h} = \frac{v}{u}$$

$$h' = \frac{v}{u} \times h$$

$$= \frac{+50}{3} \times \frac{1}{(-25)} \times (+5)$$

$$h' = \frac{-10}{3} = -3.33 \ cm$$

Nature: real and inverted

**25. (a) Draw a diagram of the longitudinal section of a flower and label on it sepal, petal, ovary and stigma.**

(b) Write the names of male and female reproductive parts of a flower.

OR

(a) What is fragmentation in organisms? Name a multicellular organism which reproduces by this method.

(b) What is regeneration in organism? Describe regeneration in Planaria with the help of a suitable diagram.

Ans. Correct diagram od (bisexual/ unisexual female flower)
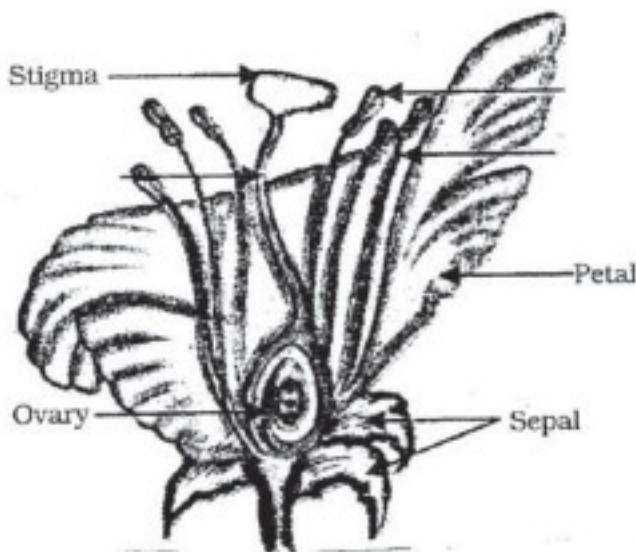
4 labels

Male part : stamen.

Female part : Carpel / Pistil

OR

a) Fragmentation is a mode of reproduction in which an individual breaks up into a (multiple) number of pieces/fragments. Each fragment grows into a new individual

Example: Spirogyra reproduces by this method / any other suitable example.

b) Regeneration is the ability of an organism to replace its lost body parts. If Planaria is cut into pieces, a small fragment (about 1/6 mm) is capable of regenerating into a complete individual.

Diagram
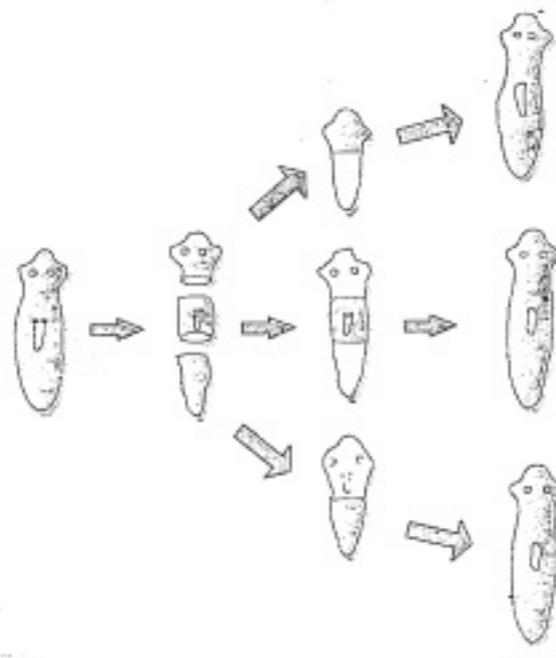
SECTION B

26. To find the focal length of a concave mirror Rahul focuses a distant object with this mirror. The chosen object should be:

(1) a tree

(2) abuilding

(3) a window

(4) the sun

Ans. (4)

27. For finding the focal length of a convex lens by obtaining the image of a distant object, one should use as the object:

(1) a well-lit distant tree

(2) window grill in the class room

(3) any distant tree

**(4) a lighted candle kept at the other end of the table**

Ans. (1)

28. Mohan obtained a sharp inverted image of a distant tree on the screen placed behind the lens. He then moved the screen and tried to look through the lens in the direction of the object. He would see:

(1) a blurred image on the wall of the laboratory.

(2) an erect image of the tree on the lens.

(3) no image as the screen has been removed.

(4) an inverted image of the tree at the focus of the lens.

Ans. (4)

29. Four students A, B, C and D traced the paths of incident ray and the emergent ray by fixing pins P and Q for incident ray and pins R and S for emergent ray for a ray of light passing through a glass slab.
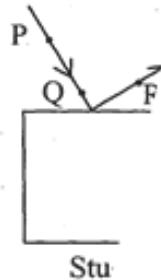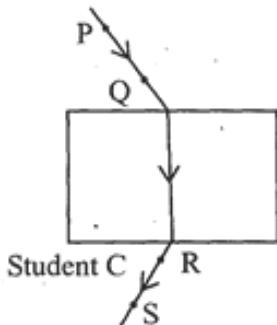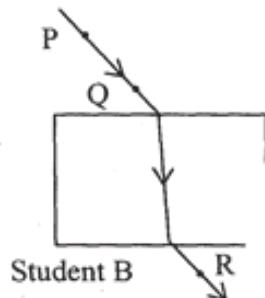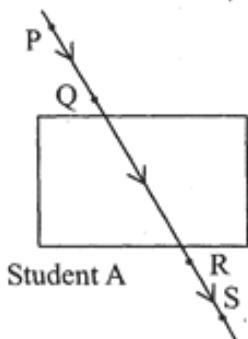
The correct emergent ray was traced by the student:

(1) A

(2) B

(3) C

(4) D

Ans. (2)

30. Rahim recorded the following sets of observations while tracing the path of a ray of light passing through a rectangular glass slab for different angles of incidence.

S.no.	Angle of incidence	Angle of refraction	Angle of emergence
I	45°	41°	45°

II	40°	38°	38°
III	45°	41°	40°
IV	41°	45°	41°

The correct observation is recorded at serial number:

(1) I

(2) II

(3) Ill

(4) IV

Ans. (1)

31. The colour of an aqueous solution of zinc sulphate as observed in the laboratory is:

(1) Green

(2) Yellow

(3) Blue

(4) Colourless

Ans. (4)

32. To show that zinc is a more active metal than copper, the correct procedure is to:

(1) add dilute nitric acid on strips of both the metals.

(2) observe transmission of heat through strips of zinc and copper.

(3) prepare solution of zinc sulphate and hang strip of copper into it.

(4) prepare solution of copper sulphate and hang strip of zinc into it.

Ans. (4)

33. Acetic acid smells like:

(1) a banana

(2) vinegar

(3) an orange

(4) a lemon

Ans. (2)

34. Acetic acid solution tums:

(1) blue litmus red

(2) Red litmus blue

(3) blue litmus colour less

(4) red litmus colour less

Ans. (1)

35. On adding NaHCO, to acetic acid, a gas is evolved which tums lime water milky due to the formation of:

(1) Calcium bicarbonate

(2) Calcium hydroxide

(3) Calcium carbonate

(4) Calcium acetate

Ans. (3)

36. A yeast cell in which budding occurs was seen to have:

(1) one bud cell

(2) two bud cells

(3) three bud cells

(4) a chain of bud cells

Ans. All options correct.

37. A student was given two permanent slides, one. of binary fission in amoeba and other of budding in yeast. He was asked to identify anyone difference in the nucleus of the two. One such difference, he identified correctly was:

(1) Presence of one nucleus in. amoeba, two in yeast cell and one in bud.

(2) Presence of two nuclei in centrally constricted amoeba, one in yeast cell and one in its bud.

(3) Presence of two distant nuclei in amoeba, one in yeast cell and two in bud.

(4) Presence of a single nucleus each in amoeba, yeast cell and its attached bud.

Ans. (2)

38. Binary fission is observed in which one of the following figures?
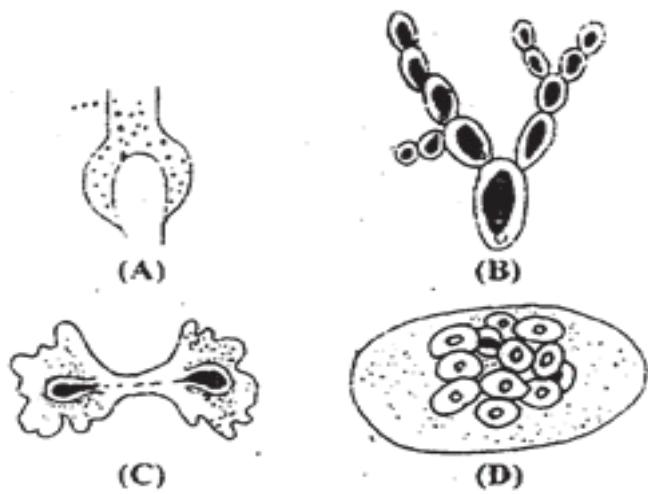
(1) A

(2) B

(3) C

(4) D

Ans. (3)

39. To determine the percentage of water absorbed by raisins, raisins are soaked in water for:

(1) 30 seconds

(2) 10 minutes

(3) 2 to 3 hours

(4) 24 hours

Ans. (3)

40. Raisins are wiped off gently before fmalweighing with help of:

(1) a filter paper

(2) a cotton piece

(3) a cloth piece

(4) a polythene piece

Ans. (1)

41. The step(s) necessary for determining the percentage of water absorbed by raisins is/are:

(1) Raisins should be completely immersed in water

(2) Raisins should be soaked in water for sufficient time

(3) Gently wipe dry the soaked raisins

(4) All of the above steps

Ans. (4)