Sample Question Paper 2016 – 17
Science
Class – X (SA – II)

Time allowed: 03 Hours **Maximum Marks: 90**

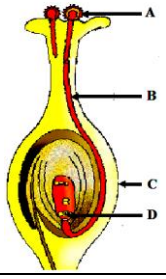
General Instructions:

(i) The question paper comprises two sections, A and B. You are to attempt both the sections.
(ii) All questions are compulsory.
(iii) There is no choice in any of the question.
(iv) All questions of Section-A and B are to be attempted separately.
(v) Question numbers 1 to 3 in Section-A are one mark question. They are to be answered in one word or in one sentence.
(vi) Question numbers 4 to 6 in Section- A are two marks questions. These are to be answered in 30 words each.
(vii) Question numbers 7 to 18 in Section-A are three marks questions. These are to be answered in about 50 words each.
(viii) Question numbers 19 to 24 in Section-A are 5 marks questions. These are to be answered in 70 words each.
(ix) Question numbers 25 to 33 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.
(x) Question numbers 34 to 36 in Section B are two marks questions based on practical skills. These are to be answered in brief.

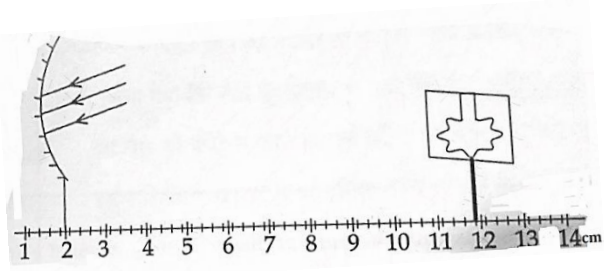
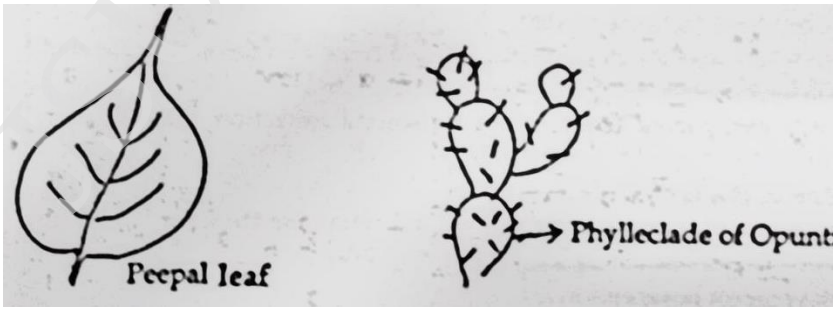
Section A

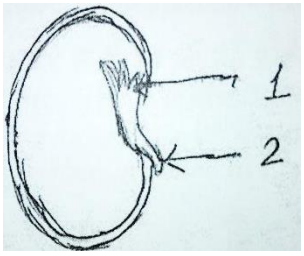
1	Name the process of converting vegetable oil to vegetable ghee.	1
2	List two secondary sexual characters of males that are different from that of females.	1
3	Write the main function of Ozone in the upper atmosphere	1
4	When a concave mirror is placed facing the Sun, the Sun's rays converge to a point 10 cm from the mirror. Now, if you place a 2 cm long candles flame 20 cm away on the principal axis of the mirror, where would you place a screen to obtain the image of the candle? What would see the size of the image? Draw a ray diagram to justify your answer.	2
5	If you find coliform bacteria in a sample of water collected from a river, what would you conclude? Give reason for such kind of water pollution.	2
6	Which natural resources are called the "biodiversity hot spots"? How these hot spots maintain ecological balance?	2
7	What are isomers? "Isomers of the first three members of alkane series are not possible". Give reason to justify this statement and draw structures of two isomers of butane, $C_4 H_{10}$.	3
8	An organic compound 'X' is a liquid at room temperature. It is also a very good solvent and has the molecular formula $C_2 H_6 O$. on oxidation 'X' gives 'Y' which give, break effervescence on reacting with $NaHCO_3$. X reacts with Y in the presence of conc.$H_2SO_4$to give another compound 'Z' which has a pleasant smell. Identify X, Y	3

	and Z. also write chemical equations to show the formation of Y and Z.	
9	An element 'A' belongs to 3rd period and 17th group of the periodic table. a) Write atomic member and electronic configuration of 'A' b) State whether A is a metal or a non – metal. c) Write the nature of bond formed if A reacts with another element B of electronic configuration 2, 8, 1. d) Write the chemical formula of the compound formed.	3
10	Consider the following elements $_4$Be, $_9$F, $_{19}$K, $_{20}$Ca a) Select the element having one election in the outer most shell. b) Select two elements of the same group. c) Write the formula and state the nature of the Compound formed when the element K reacts with an element X of electronic configuration 2, 8, 7.	3
11	Explain with the help of labelled diagrams the development that takes place in each of the body parts of a Planaria where body is cut into three pieces. None this process and give an example of an organism in which a similar process can be observed.	3
12	List any four methods of contraception used by humans. How does the use of three methods have a direct effect on the heath and prosperity of a family?	3
13	List two functions each of the following points of human female reproductive system a) Ovaries b) Fallopian tubes c) Uterus	3
14	"Different species use different strategies to determine sex of a new born individual. It can be environmental cues or genetically determined". Justify this statement giving reason/example.	3
15	List in tabular form, two distinguishing features between the acquired traits and the inherited traits with one example of each.	3
16	A student has to project a three times magnified image of a candle flame on a wall. Name the type of the lens (converging/ diverging) required for the purpose. It the candle flame is at a distance of 6 m from the wall, find the focal length of the lens.	3
17	A child while playing with his father's spectacles burnt a hole in a piece of them tissue paper by focusing the image of the Sun on at. a) Name the defect of vision his father is suffering form. b) List two causes of the defect. c) Draw a ray diagram to show how this defect may be corrected using a suitable lens.	3
18	Some residents of your colony are planning to cut trees to create a place for parking vehicles. You are upset by knowing all this and wanted to do something to create awareness about the importance of trees. (a) List any three reasons that you will use to convince residents of your colony not to cut the existing trees. (b) List any three values that would be inculcated amongst them with such approach.	3

19	a) State two main reasons for carbon forming a very large number of compounds. b) Give reason why carbon forms compound (i) Namely by Covalent bonding (ii) Having low melting and boiling points c) What happens when (Write chemical equations of the reactions) (i) A piece of sodium metal is added to ethanol. (ii) Ethanoic acid reacts with sodium hydroxide.	5
20	A. Draw a longitudinal section of a flower and label the following parts – a) Part that develops into a fruit b) Part that produces pollen grain c) Part that transfers male gametes d) Part that is sticky to trap B. Write the names of the parts labeled as A, B, C, D in the diagram given below: 	5
21	A. How does speciation take place? B. Define the term GENE. C. The gene for red hair is recessive to the gene for black hair. What will be the hair colour of a child if he inherits a gene for red colour from his mother and a gene for black hair from his father? Express with the help of flow chart.	5
22	A. Explain the formation of rainbow in the sky with the help of a diagram. List the three phenomena of light involved. Which colour – violet or red appears at top of the rainbow? B. What is the difference in colours of the sun observed during sunrise/sunset and noon? Give explanation for each.	5
23	(i) Which property of concave mirror is utilized for using them as shaving mirrors? (ii) Light passes through a rectangular glass slab and through a triangular glass prism. Using proper ray diagram, explain in what way does the direction of the two emergent beams differs with respect to the incident beam of light. (iii) A concave lens has a focal length of 50 cm Calculate its power.	5
24	(i) Rohit claims to have obtained an image twice the size of object with a concave lens. Is he correct? Give reason for your answer. (ii) Where should an object be placed in case of a convex lens to form an image of same size as of the object? Show with the help of ray diagram the position and the nature of the image formed. (iii) With the help of ray diagram, illustrate the change in position, nature and size of the image formed if the convex lens in case of (ii) is replaced by concave lens of same focal length.	5

	Section B	
25	In the preparation of soap, sodium chloride causes: (a) complete saponification. (b) complete hydrolysis. (c) complete neutralization. (d) complete precipitation.	1
26	Vishakha carried out saponification reaction in the lab and she gave following comments as: (i) Soap is salt of fatly acid. (ii) Heat is absorbed in this reaction. (iii) Reaction mixture is basic in nature (iv) These are neutralization reaction The correct statements are: (a) (i) & (iii) (b) (ii) & (iv) (c) (i) & (ii) (d) (i), (ii) & (iii)	1
27	Select from the following salts which may be used to prepare hard water required for the experiment. A. $CaSO_4$ B. Na_2SO_4 C. $CaCl_2$ D. K_2SO_4 E. $NaHCO_3$ F. $MgCl_2$ 1. A, B and D 2. A, C and F 3. B, D and E 4. C, E and F	1
28	Four students A,B,C and D did their experiment of finding the focal length of convex lens by obtaining image of a distant object as follows: • Student A used the window grill in the laboratory as the object and a white paper sheet held in hand as the screen. • Student B used a distant tree in the shade and a white thick held in a stand as the screen. • Student C used a well illuminated laboratory window grill as the object and a white paper sheet held in a stand as the screen. • Student D used a well illuminated distant tree as the object and a white thick board held in a stand as the screen. Which student has used the correct method for performing experiment out of the above setups? (a) A (b) B (c) C (d) D	1

29	In the setup shown below, a clear image of a distant object is obtained on the screen. The focal length of the concave mirror is:  (a) 11.4 cm (b) 9.4 cm (c) 9.8cm (d) 9.9cm	1
30	In the experiment on refraction of light through a rectangular glass slab done by four students A, B, C and D, the following observations were made: (A) The emergent ray moves towards the normal after second refraction through glass slab with $\angle i = \angle e$ (B) The emergent ray moves away from the normal after second refraction through glass slab $\angle i < \angle e$ (C) For any angle of incidence, always $\angle I > \angle e$, always. (d) The emergent ray moves away from normal after second refraction through glass slab with $\angle i = \angle e$ The student who has made the correct observation is: (a) (A) (b) (B) (c) (C) (d) (D)	1
31	To trace the path of ray of light through the triangular glass prism, a student observes that the emergent ray has (a) bent away from the base of the prism (b) bent towards the base of the prism (c) moved parallel to the direction of incident ray (d) gone perpendicular to incident ray.	1
32	The diagrams A and B represents the following relationship:  (a) homologous organs (b) analogous organs (c) vestigial organs (d) rudimentary organs	1

33	Identify the parts labeled 1 and 2 in the adjoining figure.  (a) 1- micropyle, 2- epicotyls (b) 1- cotyledon, 2- embryo (c) 1-radicle , 2-plumule (d) 1-plumule, 2-radicles	1
34	When you add sodium hydrogen carbonate to acetic acid in a test tube, a gas liberates immediately with a brisk effervescence. None the gas and describe the method of its testing in the laboratory.	2
35	Mention about the four events that occur during binary fission in amoeba.	2
36	A student obtained a sharp image of a lighted candle on a screen using a convex lens. Now he wants to focus a distant lamp on a far away electric pole. In which direction should the lens be moved for this purpose with respect to the screen, to get a sharp image on the screen? Justify your answer.	2

Marking Scheme 2016-17
Science
Class - X (SA - II)

1	Hydrogenation	1
2	Moustaches, Beard, Hoarse voice, Thick growth of hair on the body (Any two)	1
3	To prevent u-v radiation from reaching the earth.	1
4	f= -10cm (since the image is formed at the focus) Now u= - 20cm, i,e. the candle flame is at C ∴ The image would form at C and would be of the same size Ray diagram (Refer Fig. 10.7(c) Page 166 NCERT Text-book)	½ ½ 1
5	Conclusion: Water is polluted by sewage Coliform is a group of bacteria found in human intestine whose presence in river water indicates contamination by disease causing micro-organisms.	1 1
6	• Forests • Range of different life forms plays an important role in maintaining ecological balance as they all depend on each other for their survival.	½ 1½
7	• Isomers: Compounds which have same molecular formula and different structural formula. • In first three members of alkane series, branching is not possible, therefore isomers are not possible. • Two isomers of butane C_4H_{10} 	1 1 ½+½
8	• X- Ethanol C_2H_5OH Y- Ethanoic acid CH_3COOH Z- Ester $CH_3COOC_2H_5$ • CH_3CH_2OH (X) $\xrightarrow[\text{or Acidified } K_2Cr_2O_7 + \text{Heat}]{\text{Alkaline } KMnO_4 + \text{Heat}}$ CH_3COOH (Y) • CH_3COOH (Y) + CH_3CH_2OH (X) $\xrightarrow{\text{Acid}}$ $CH_3COOC_2H_5$ (Z)	½ ½ ½ 1 ½
9	• Atomic number of A - 17	½

- Electronic configuration of A = (2, 8,7) ½
- A is a non-metal. ½
- B $\rightarrow$2,8,1
  B will give one electron to A to form an ionic compound- Ionic bond 1 ½
- Formula of the compound B^+A^-

10 (a) K, Electronic configuration of K is 2,8,8,1 1

(b) Be and Ca Be (4) = 2,2
Ca (20) = 2,8,8,2 1

- K^+X^-K= 2,8,8,1
  X= 2,8,7

K will give one electron to X to form ionic bond. So the compound formed K^+X^- will be an ionic compound. 1

11
- This process is called regeneration. ½
- Diagram (Refer Fig 8.3 Page 131 NCERT Text-book) 1
- When a Planaria is cut into three pieces, each of its pieces grow into separate individual; specialized cells proliferate; mass of cells get differentiated into various cells and tissues. 1
- Another example of an organism showing the characteristics is Hydra ½

12
- Four methods of contraception
  (i) Mechanical/ Barrier method
  (ii) Use of hormonal preparations
  (iii) Use of loop/Copper-T/ IUCD
  (iv) Surgical method (Tubectomy/ Vasectomy) 4 x ½
- Effect on health and prosperity (Any two)
- Health of women is maintained
- Better attention of children by the parents 2 x ½
- More resources for better living standard

13 Two functions each of
- Ovaries: (i) Production of female sex hormone.
  (ii) Production of female gamete. 2 x ½
- Fallopian tube (i) Transfer of female gamete from ovary
  (ii) Site of fertilization. 2 x ½
- Uterus (i) Implantation of zygote
  (ii) Nourishment of developing embryo. 2 x ½

14 Environmental Cue –
- In some animals, the temperature at which fertilized eggs are kept determines whether the developing animal in egg is male or female 1½
- In some animals like snail, individual can change sex.

Genetical Cue –
A child who inherits an x chromosome from her father will be a girl and one who inherits a y chromosome from the father will be a boy. 1½

15

	Acquired Traits	Inherited Traits
•	Does not bring about change in the DNA of germ cells	Bring about change in the DNA of the germ cells
•	Cannot be passed on to the progeny	Can be passed on to the progeny
•	Cannot direct evolution	Can direct evolution (Any two)
•	Examples: Acquiring knowledge/ less of body parts.	Skin colour/ color of the eyes

2 x 1

1

16 • Converging lens (Convex lens) ½

• Here $u+v=6m$

$v=3u$

$\therefore u+3u=6m$

$\Rightarrow u=15m$ 1

$\frac{1}{f}=\frac{1}{v}-\frac{1}{u}\Rightarrow f=\frac{uv}{u-v}$ ½

$\therefore f=\frac{(-1.5m)(4.5m)}{-1.5m-(4.5m)}=+1.125m$ 1

17 a) Hypermetropia ½

b) Two causes: (i) The focal length of the eye lens is too long 2 x ½

(ii) The eye ball has become too small

c) Ray diagram (Refer fig 11.3 (c) page 190 NCERT textbook) ½

18 (a) Importance of green plants, reducing air pollution, reducing noise levels, aesthetic value, sapling distribution, giving potted plants in place of bouquet, creating awareness (any three) 1 ½

(b) To protect and improve the natural environment, social awareness, environmental conservation, eco-friendly approach value for life (any three) 1 ½

19 (a) Two reasons for large number of carbon compounds

(i) Catenation: Unique ability of carbon to form bonds with other atoms of carbon giving rise to long chains of different types of compounds 1

(ii) Tetravalency: Since carbon has a valency of 4, it is capable of bonging with fair other atoms of carbon or atoms of the other elements such as Oxygen, Nitrogen, Hydrogen, Sulphur, chlorine etc. 1

(b)

(i) Carbon has 4 elements as its outmost shell and needs to gain or lose 4 electrons to attain noble gas configuration. Losing or gaming 4 electrons is not possible for energy consideration, hence it shares electrons to form the covalent bands 1

(ii) The forces of attraction between the molecules are not very strong hence the carbon compounds generally have low melting and boiling points. 1

(c)

(i) $2Na + 2CH_3CH_2OH \rightarrow 2CH_3CH_2ONa + H_2$ ½

(ii) $NaOH + CH_3COOH \rightarrow CH_3COONa + H_2O$ ½

20 A.

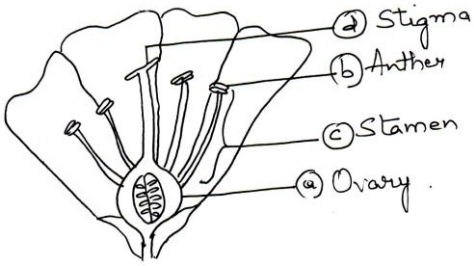


Diagram: 1
Lebellings: 4x½

B. A – Pollen grain
B – Pollen tube
C – Ovary
D – Female gamete

4x½

21 A. Speciation may take place by 1

(i) Migration
(ii) Natural selection
(iii) Mutation
(iv) Genetic Drift
(Any two)

B. Segment of DNA which is functional and are made of nucleic acids and protein 1
(Any other definition)

C. Given
Red hair – Mother – Recessive ∴ bb ½
Black hair – father Dominant ∴ BB ½

Parents	Father BB/Bb	X	Mother Bb/bb
F1	Bb (Black)		

1
1

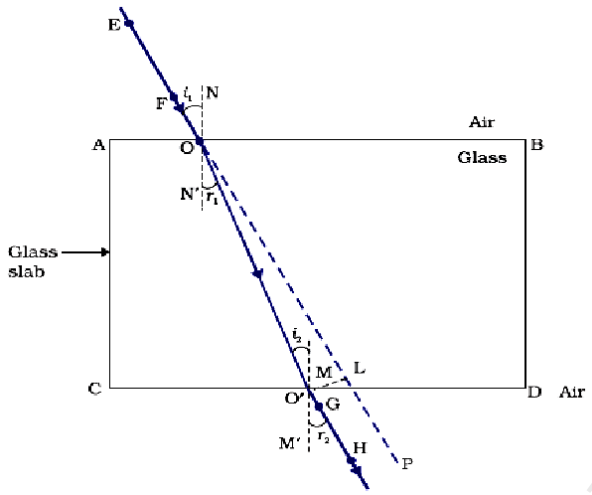
Thus, the child will have black hair

22 a) The water droplets act like small prisms. They refract and disperse the incident sunlight, then reflect it internally and finally refract it again when it comes out of rain drop. Due to dispersion and internal reflection of light, different colours reach the observer's eye along different pairs. 1
Therefore the three phenomena involved are refraction, dispersion, internal reflection of light. 1½
Red ½

b) At sunrise / sunset, sunlight has to travel a larger distance. So, it come across more number of particles which scatters most of blue colour and the light reaching our eyes has more of reddish light. This makes sun orange. At noon, the distance travelled by light is comparatively less that results in lesser scattering. Thus sun looks white. 2

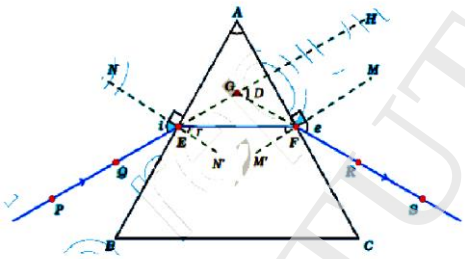
23 (i) When an object is placed between the pole and focus of concave mirror a magnified, erect and virtual image is obtained. 1

(ii) For glass slab refer:



1

For prism refer:



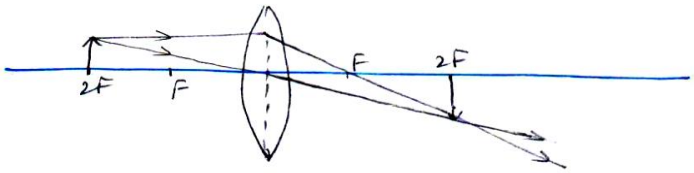
1

In case of a rectangular glass slab, emergent rays of light are always parallel to the direction of incident rays. Whereas when an incident light passes through a prism, it bends towards the base of the prism hence incident ray and emergent ray are not parallel to each other. 1

(iii) $f = -50cm \quad p = \frac{100}{f} D = \frac{100}{-50} = -2D$ 1

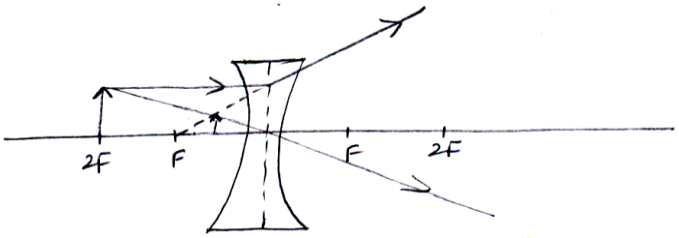
24 (i) No, magnified image of an object cannot be formed by a concave lens ever. 1

(ii) At 2f. 1



1

(iii)



1

Image obtained is virtual, erect and diminished in case of concave lens

1

25 (a) 1

26 (a) 1

27 2 1

28 (d) 1

29 (c) 1

30 (d) 1

31 (b) 1

32 (b) 1

33 (d) 1 – plumule, 2- radicle 1

34
- Carbon dioxide/CO_2 1
- line water terms milky when CO2 gas is passed through it/ the gas liberated extinguishes a boring splinter 1

35 Turnip, Carrot, Sweet Potato – are modified root – Homologous organs 2
Potato – modified stem.

36 He should move the lens towards the screen. As the distance of object increased, the image formed by a convex lens will be more close to the focus. 2