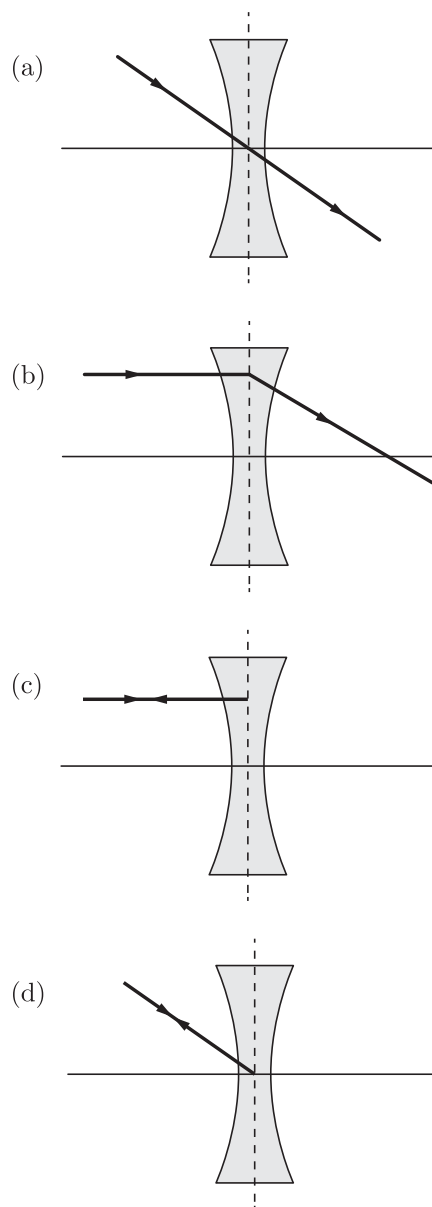


9. Which of the following acid is present in the vinegar?
 (a) Acetic acid (b) Tartaric acid
 (c) Lactic acid (d) Citric acid
10. The reaction in which two compounds exchange their ions to form two new compounds is called:
 (a) displacement reaction
 (b) decomposition reaction
 (c) isomerization reaction
 (d) metathesis reaction or double decomposition reaction
11. Normal range of haemoglobin content in human beings is-
 (a) For men, 12.0 to 15.5 grams per decilitre. For women, 13.5 to 17.5 grams per decilitre.
 (b) For men, 13.5 to 17.5 grams per decilitre. For women, 12.0 to 15.5 grams per decilitre.
 (c) For men, 10.5 to 17.5 grams per decilitre. For women, 10.0 to 15.5 grams per decilitre.
 (d) For men, 15.5 to 20.5 grams per decilitre. For women, 12.0 to 15.5 grams per decilitre.
12. Each organism is adapted to its environment, the type of nutrition taken by them depends on
 (a) Environment
 (b) Availability of food
 (c) How it is obtained by the organism
 (d) All of the above
13. The reason for single cell diffusion inefficiency in multicellular organism is
 (a) Cell diffusion is a complex process
 (b) Big size and complex body designs
 (c) Cell diffusion requires lots of time
 (d) Cell diffusion is rather a simple process to be carried out in multi cell organism
14. Heart is surrounded and protected by
 (a) Retro peritoneum (b) Muscles
 (c) Pericardium (d) Lungs
15. The valve that prevents backward flow of blood from the left auricle to the right auricle is the
 (a) mitral valve
 (b) auriculoventricular valve
 (c) tricuspid valve
 (d) semilunar valve
16. The chief function of lymph in a mammalian body is to
 (a) destroy the worn out blood cells
 (b) produce leucocyte
 (c) destroy pathogens
 (d) produce a hormone

17. The image formed by a concave mirror is real, inverted and of the same size as that of the object. the position of the object should be :
 (a) Beyond C
 (b) Between C and F
 (c) At C
 (d) At F

18. Which of the following correctly shows refraction of a ray of light from a concave lens?



19. A plane glass slab is kept over various coloured letters. The letter, which appears least raised, is-
 (a) blue (b) violet
 (c) green (d) red
20. The radius of curvature of plane mirror is
 (a) infinite
 (b) zero
 (c) $+5\text{ cm}$
 (d) -5 cm



21. A beam of light composed of red and green rays is incident obliquely at a point on the face of a rectangular glass slab. When coming out on the opposite parallel face, the red and green rays emerge from
- one point propagating in the same direction.
 - one point propagating in two different directions.
 - two points propagating in two different parallel directions.
 - two points propagating in two different non-parallel directions.
22. A candle placed 25 cm from a lens, forms an image on a screen placed 75 cm on the other end of the lens. The focal length and type of the lens should be
- +18.75 cm and convex lens
 - 18.75 cm and concave lens
 - +20.25 cm and convex lens
 - 20.25 cm and concave lens
23. If the power of a lens is +5 D, then its focal length is
- +0.2 cm
 - 0.2 cm
 - +20 cm
 - 20 cm
24. At noon the sun appears white as
- light is least scattered
 - all the colours of the white light are scattered away
 - blue colour is scattered the most
 - red colour is scattered the most

Section B

Section - B consists of 24 questions (Sl. No.25 to 48). Attempt any 20 questions from this section. The first attempted 20 questions would be evaluated.

25. The term pH stands for:
- potential of hydrogen
 - peak of hydrogen
 - push of hydrogen
 - pointed to hydrogen
26. On diluting a solution of $\text{pH} = 4.5$ its pH will
- increase
 - decrease
 - remain same
 - firstly increase then decrease
27. Which of the following only contain non-metals?
- Carbohydrates
 - Proteins
 - Alloys
 - Both (a) and (b)
28. What happens when calcium is treated with water?
- It does not react with water.
 - It reacts violently with water.
 - It reacts less violently with water.
 - Bubbles of hydrogen gas formed stick to the surface of calcium.
- 1 and 4
 - 2 and 3
 - 1 and 2
 - 3 and 4
29. Hard water required for an experiment is not available in a school laboratory. However, following salts are available in the laboratory. Select the salts which may be dissolved in water to make it hard for the experiment.
- Calcium Sulphate
 - Sodium Sulphate
 - Calcium Chloride
 - Potassium Sulphate
 - Sodium Hydrogen Carbonate
 - Magnesium Chloride
- 1, 2 and 4
 - 1, 3 and 6
 - 3, 5 and 6
 - 2, 4 and 5
30. $2\text{Fe}(s) + 2\text{H}_2\text{O}(l) \longrightarrow X + 4\text{H}_2(g)$. Here X is.
- Fe_2O_3
 - Fe_3O_4
 - FeO_2
 - Fe_2O_2
31. **Assertion :** Silver articles become black after sometime when exposed to air.
Reason : Silver is very less reactive.
- Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
 - Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
 - Assertion is true but Reason is false.
 - Both Assertion and Reason are false.
32. **Assertion :** The balancing of chemical equations is based on law of conservation of mass.
Reason : Total mass of reactants is equal to total mass of products.
- Both Assertion and Reason are True and Reason is the correct explanation of the Assertion.
 - Both Assertion and Reason are True but Reason is not the Correct explanation of the Assertion.
 - Assertion is True but the Reason is False.
 - Both Assertion and Reason are False.



33. Assertion : Liver is known as the largest gland of the body.

Reason : It secretes salivary amylase.

- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
- (b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
- (c) Assertion is true but Reason is false.
- (d) Assertion is false but Reason is true.

34. Assertion : A concave mirror of focal length ' f ' in air is used in a medium of refractive index 2. Then the focal length of mirror in medium becomes double.

Reason : The radius of curvature of a mirror is double of the focal length.

- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
- (b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
- (c) Assertion is true but Reason is false.
- (d) Both Assertion and Reason are false.

35. During the preparation of hydrogen chloride gas on a humid day, the gas is usually passed through the guard tube containing calcium chloride. The role of calcium chloride taken in the guard tube is to

- (a) absorb the evolved gas
- (b) moisten the gas
- (c) absorb moisture from the gas
- (d) absorb Cl^- ions from the evolved gas.

36. Which of the following is correct for a physical change?

- 1. Only physical properties change.
- 2. Large amount of heat is absorbed or evolved.

Which of the above statements is/are correct?

- (a) Only 1
- (b) Only 2
- (c) Both 1 and 2
- (d) Neither 1 and 2

37. During vigorous physical exercise, lactic acid is formed from glucose inside the muscle cells because

- (a) there is excess of carbon dioxide
- (b) there is lack of water
- (c) there is lack of oxygen
- (d) none of the above

38. Which of the following is carried by lymph which is digested and absorbed from intestine?

- (a) Fat
- (b) Protein
- (c) Minerals
- (d) Carbohydrates

39. An object 5.0 cm in length is placed at a distance of 20 cm in front of a convex mirror or radius of curvature 30 cm. The position of the image is-

- (a) 8.57 cm
- (b) 9.10 cm
- (c) 8.15 cm
- (d) 7.15 cm

40. For the same angle of incidence in media P , Q and R , the angles of refraction are 45° , 35° and 15° respectively. In which medium will the velocity of light be minimum?

- (a) P
- (b) Q
- (c) R
- (d) Q and R

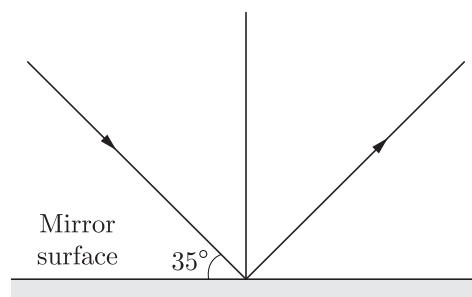
41. Opening of oesophagus is:

- (a) Gullet
- (b) Glottis
- (c) Larynx
- (d) Pharynx

42. The normal rate of heart beat in an adult is per minute.

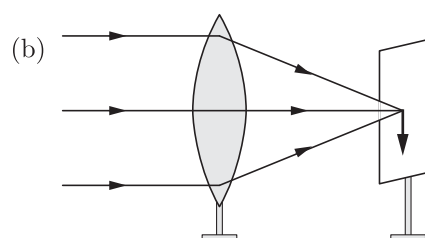
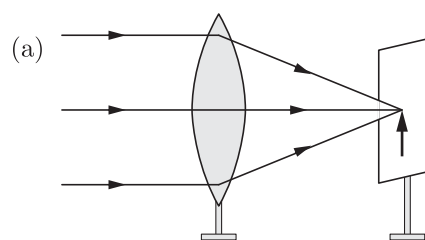
- (a) 67 times
- (b) 72 times
- (c) 90 times
- (d) 100 times

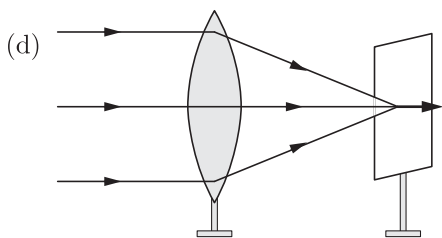
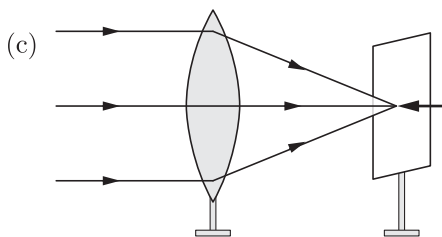
43. The angle of incidence and angle of reflection in the following diagram.



- (a) 45° , 40°
- (b) 55° , 55°
- (c) 60° , 60°
- (d) 30° , 30°

44. Parallel rays from a distant object incident on a convex lens form an image on the screen. The diagram showing correctly the image of the object on the screen in figure is :





45. No matter how far you stand from a mirror, your image appears erect. The mirror is likely to be-
- Plane
 - Concave
 - Convex
 - Either plane or convex

46. As light travels from a rarer to a denser medium it will have
- increased velocity
 - decreased velocity
 - decreased wavelength
 - both (b) and (c)
47. When linear magnification is negative, the image formed by a concave mirror must be-
- erect
 - virtual
 - real or virtual
 - real and inverted
48. Metals are solid at room temperature except:
- Sodium
 - Mercury
 - Gallium
 - Both (b) and (c)

Section C

Section- C consists of three Cases followed by questions. There are a total of 12 questions in this section. Attempt any 10 questions from this section. The first attempted 10 questions would be evaluated

Case Based Questions: (49-52)

In pure water, the concentrations of hydrogen ions and hydroxide ions are equal. Due to this, pure water is neither acidic nor basic, it is neutral.

Acidic solutions have excess of hydrogen ions. Even the acidic solutions contain hydroxide ions which come from the ionisation of water but the concentration of hydroxide ions in acidic solutions is much less than that of hydrogen ions.

The basic solution have excess of hydroxide ions. Even the basic solutions have hydrogen ions in them which come from the ionisation of water but the concentration of hydrogen ions in basic solutions is much less than that of hydroxide ions.

In 1909 Sorenson devised a scale (known as pH scale) on which the strength of acid solutions as well as basic solutions could be represented by making use of the hydrogen ion concentrations in them. Sorensen linked the hydrogen ion concentrations of acid and base solutions to the simple numbers 0 to 14 on his pH scale. The pH of a solution is inversely proportional to the concentration of hydrogen ions in it.

pH may be defined as a number by which negative power of 10 has to be raised in order to express the concentration of hydrogen ion of the solution i.e., $[H^+] = 10^{-pH}$ where the concentration of H^+ ions is expressed as moles/litre and is written as $[H^+]$.

S. No.	Solution	pH limit
1.	Saliva	6.5-7.5
2.	Lemon juice	2.2-2.4
3.	Tomato juice	4.0-4.4
4.	Coffee	4.5-5.5

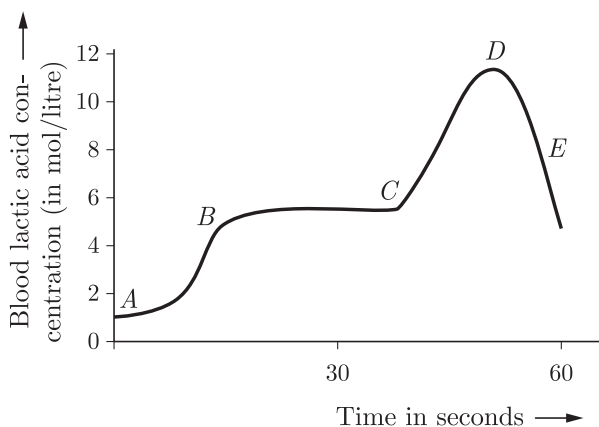
49. When drops of tomato juice are dropped on litmus paper than litmus paper will turn
- red
 - yellow
 - green
 - black
50. The nature of saliva in given table is
- acidic
 - basic
 - Neither acidic nor basic
 - cannot be define
51. The effect of acid on litmus paper is
- blue to red in colour
 - red to blue in colour
 - red to green in colour
 - green to red on colour

52. The effect of base on litmus paper is
- Turns red litmus to blue in colour
 - Turns blue litmus to blue in colour
 - Turns red litmus to orange
 - None of these

Case Based Questions: (53-56)

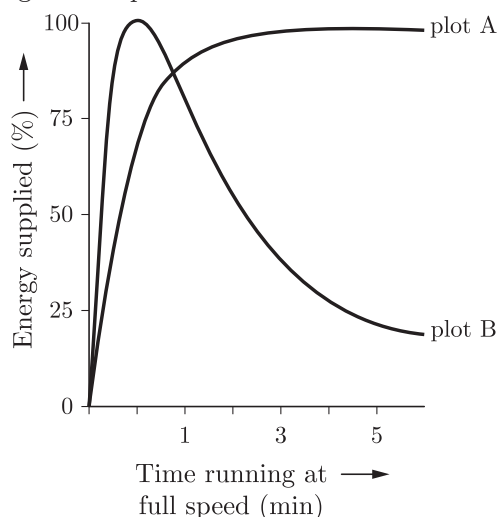
All living cells require energy for various activities. This energy is available by the breakdown of simple carbohydrates either using oxygen or without using oxygen.

53. Energy in the case of higher plants and animals is obtained by:
- Breathing
 - Tissue respiration
 - Organ respiration
 - Digestion of food
54. The graph below represents the blood lactic acid concentration of an athlete a race of 400 m and shows a peak at point *D*. The blood of an athlete was tested before, during and after a 400 m race: Lactic acid production has occurred in the athlete while running in the 400 m race. Which of the following processes explains this event?



- Aerobic respiration
- Anaerobic respiration
- Fermentation
- Breathing

55. Study the graph that represents the amount of energy supplied with respect to the time while an athlete is running at full speed.



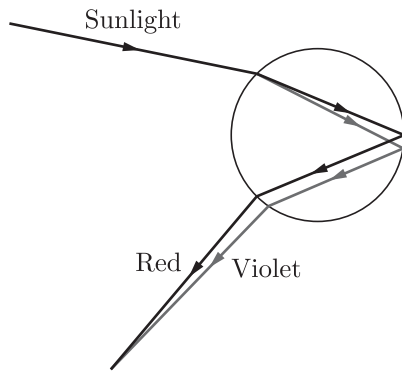
Choose the correct combination of plots and justification provided in the following table:

	Plot A	Plot B	Justification
(a)	Aerobic	Anaerobic	Amount of energy is low and inconsistent in aerobic and high in anaerobic
(b)	Aerobic	Anaerobic	Amount of energy is high and consistent in aerobic and low in anaerobic
(c)	Anaerobic	Aerobic	Amount of energy is high and consistent in aerobic and low in anaerobic
(d)	Anaerobic	Aerobic	Amount of energy is high and inconsistent in anaerobic and low in anaerobic

56. The characteristic processes observed in anaerobic respiration are:
- Presence of oxygen
 - Release of carbon dioxide
 - Release of energy
 - Release of lactic acid
- (i), (ii) only
 - (i), (ii), (iii) only
 - (ii), (iii), (iv) only
 - (iv) only

Case Based Questions: (57-60)

A beautiful atmospheric phenomenon commonly seen after rain is the rainbow. The colourful arc of a rainbow across the sky is the result of several optical effects: refraction, internal reflection and dispersion. But the conditions must be just right. As we all know, a rainbow is seen after a rain but not after every rain. Following a rain, there are many tiny water droplets in the air. Sunlight incident on the droplets in air produces a rainbow. But whether a rainbow is seen depends on the relative positions of the Sun and the observer. As you may have noticed, the Sun is generally behind you when you see a rainbow. To understand the formation and observation of a rainbow, consider what happens when sunlight is incident on a water droplet. On entering the droplet, the light is first refracted and then dispersed into component colours as it travels in the water. These seven colours strike the inner surface of the water drop and get internally reflected. The reflected light is refracted again as it comes out of the drop as shown in figure.



57. Which of the following phenomena of light are involved in the formation of a rainbow?
- Reflection, refraction and dispersion
 - Refraction, dispersion and total internal reflection
 - Refraction, dispersion and internal reflection
 - Dispersion, scattering and total internal reflection

58. Which phenomenon does not occur during rainbow formation?
- Refraction
 - Induction
 - Dispersion
 - Reflection
59. The order of wavelength of red, yellow and orange is
- yellow < orange < red
 - yellow > orange > red
 - orange > red > yellow
 - none of these
60. The order of frequency of the seven colours of rainbow is
- $V = I = B = G = Y = O = R$
 - $V > I > B > G > Y > O > R$
 - $I < B < Y < G < O < R < V$
 - none of the above

SAMPLE PAPER - 13 Answer Key

Paper Q. no.	Correct Option	Chapter no	Question Bank Q. no.
1	(c)	Ch-1	52
2	(d)	Ch-2	185
3	(c)	Ch-3	112
4	(d)	Ch-1	28
5	(b)	Ch-2	13
6	(d)	Ch-1	104
7	(a)	Ch-1	94
8	(a)	Ch-2	115
9	(a)	Ch-2	80
10	(d)	Ch-1	120
11	(b)	Ch-4	78
12	(d)	Ch-4	44
13	(b)	Ch-4	12
14	(c)	Ch-4	98
15	(c)	Ch-4	99
16	(c)	Ch-4	100
17	(c)	Ch-5	84
18	(a)	Ch-5	111
19	(d)	Ch-5	134
20	(a)	Ch-5	144
21	(c)	Ch-5	147
22	(a)	Ch-5	163
23	(c)	Ch-5	165
24	(a)	Ch-6	3
25	(a)	Ch-2	74
26	(a)	Ch-2	78
27	(d)	Ch-3	130
28	(d)	Ch-3	57
29	(b)	Ch-2	96
30	(b)	Ch-3	85
31	(b)	Ch-3	150

Paper Q. no.	Correct Option	Chapter no	Question Bank Q. no.
32	(a)	Ch-1	161
33	(c)	Ch-4	234
34	(d)	Ch-6	194
35	(c)	Ch-2	7
36	(a)	Ch-1	127
37	(c)	Ch-4	174
38	(a)	Ch-4	194
39	(a)	Ch-5	17
40	(c)	Ch-5	32
41	(a)	Ch-4	217
42	(b)	Ch-4	93
43	(b)	Ch-5	174
44	(b)	Ch-5	118
45	(d)	Ch-5	13
46	(d)	Ch-5	48
47	(d)	Ch-5	107
48	(c)	Ch-3	64
49	(a)	Ch-2	223
50	(c)	Ch-2	224
51	(a)	Ch-2	225
52	(a)	Ch-2	226
53	(b)	Ch-4	New
54	(b)	Ch-4	New
55	(b)	Ch-4	New
56	(c)	Ch-4	New
57	(c)	Ch-5	82
58	(b)	Ch-5	83
59	(a)	Ch-5	84
60	(a)	Ch-5	85