

INSTRUCTIONS:-

Time:- 2 Hours

Student has to attempt Physics & Chemistry Compulsory.

FROM MATHEMATICS & BIOLOGY ATTEMPT ONLY ONE SUBJECT.

MARKING SCHEME OF SUBJECT PHYSICS, CHEMISTRY & MATHEMATICS

SECTION	NO. OF QUESTIONS & TOTAL MARKS	QUESTION TYPE	MARKING SCHEME
A	3 Questions of 12 marks	Comprehension based MCQ with one Correct option	<ul style="list-style-type: none"> • +4 if the correct option is chosen • 0 if none of the option is chosen • -1 in all other cases
B	4 Questions of 16 marks	MCQ with one Correct option	<ul style="list-style-type: none"> • +4 if the correct option is chosen • 0 if none of the option is chosen • -1 in all other cases
C	8 Questions of 32 marks	Integer type	<ul style="list-style-type: none"> • +4 if the correct option is chosen • 0 if none of the option is chosen • -1 in all other cases
D	5 Questions of 20 marks	MCQ with one or more than one Correct option	<ul style="list-style-type: none"> • +4 ONLY if (all) the correct option(s) is(are) chosen • +3 If all four options are correct but ONLY three options are chosen • +2 If three or more options are correct but ONLY two options are chosen, both of which are correct • +1 If two or more options are correct but ONLY one option is chosen and it is a correct option

**CAREER ACADEMY TALENT SEARCH EXAM(CATSE-2024)
LEVEL-02 (UPDATED-ANSWER KEY)**

CLASS-10th

			<ul style="list-style-type: none">• 0 If none of the options is chosen (i.e. the question is unanswered)• -1 In all other cases
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MARKING SCHEME OF SUBJECT BIOLOGY

SECTION	NO. OF QUESTIONS & TOTAL MARKS	QUESTION TYPE	MARKING SCHEME
A	20 Questions of 40 marks	MCQ with one Correct option	<ul style="list-style-type: none">• +2 if the correct option is chosen• 0 if none of the option is chosen• - 0.5 in all other cases
B	10 Questions of 20 marks	FILL UPS	<ul style="list-style-type: none">• +2 if the correct option is chosen• 0 if none of the option is chosen• - 0.5 in all other cases
C	10 Questions of 20 marks	MCQ with one Correct option	<ul style="list-style-type: none">• +2 if the correct option is chosen• 0 if none of the option is chosen• - 0.5 in all other cases

PHYSICS

SECTION -A

Read the following passage and answer three questions from 1. to 3.

The lenses forms different types of images when object placed at different locations. When a ray is incident parallel to the principal axis, then after refraction, it passes through the focus or appears to come from the focus. When a ray goes through the optical centre of the lens, it passes without any deviation. If the object is placed between focus and optical center of the convex lens, erect and magnified image is formed.

As the object is brought closer to the convex lens from infinity to focus, the image moves away from the convex lens from focus to infinity. Also the size of image goes on increasing and the image is always real and inverted. A concave lens always gives a virtual, erect and diminished image irrespective to the position of the object.

1. The location of image formed by a convex lens when the object is placed at infinity is
- (a) at focus (b) at 2F (c) at optical center (d) between F and 2F

ANS. (a)

2. The size of image formed by a convex lens when the object is placed at the focus of convex lens is
- (a) small (b) point in size (c) highly magnified (d) same as that of object

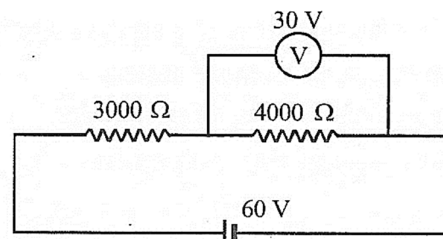
ANS. (c)

3. When the object is placed at 2F in front of convex lens, the location of image is
- (a) at F (b) at 2 F on the other side
- (c) at infinity (d) between F and optical center

ANS. (b)

SECTION -B

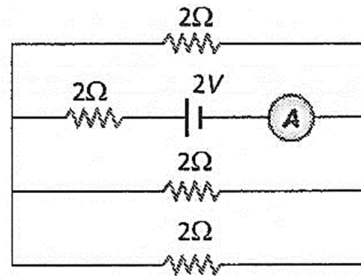
4. In the circuit fig, the voltmeter reads 30 V. What is the resistance of the voltmeter
- (a) 1200 Ω
- (b) 700 Ω
- (c) 400 Ω
- (d) 300 Ω



ANS. (a)

5. The reading of the ammeter as per figure shown is

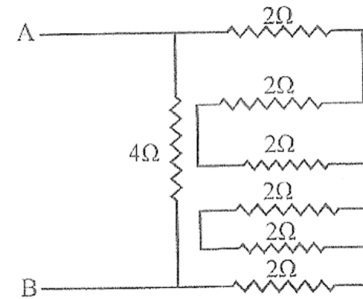
- (a) $\frac{1}{8}A$
- (b) $\frac{3}{4}A$
- (c) $\frac{1}{2}A$
- (d) $2A$



ANS. (b)

6. What is the equivalent resistance between A and B

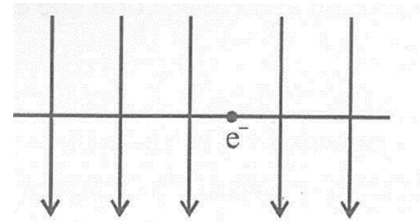
- (a) $16\ \Omega$
- (b) $1\ \Omega$
- (c) $7\ \Omega$
- (d) $3\ \Omega$



ANS. (d)

7. A uniform magnetic field pointing top to bottom in a plane of paper. When an electron is allowed to move perpendicular to it, it gets deflected outwards. The electron must be moving along:

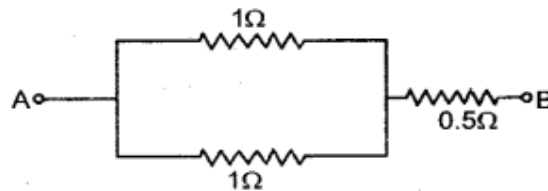
- (a) Left to Right
- (b) Right to left
- (c) It is stationary
- (d) It can't deflect outward



ANS. (a)

SECTION -C

8. Equivalent resistance between points A and B of the following circuit is 1 Ω.

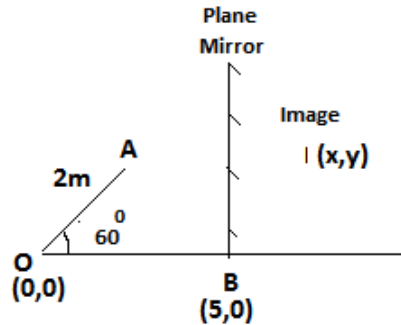


9. Powers of two electric bulbs are 100 W and 200 W. Both are connected from mains of 220 V. The ratio of resistance of their filaments will be 2:1.

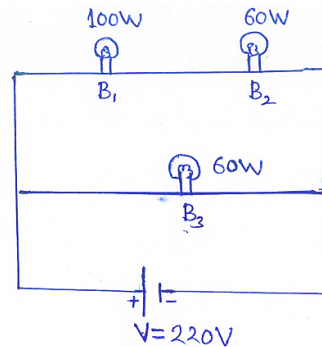
10. The refractive index of diamond is 2.42 and that of carbon disulphide is 1.63. The refractive index of diamond with respect to carbon disulphide is (242/163) OR 1.48.

11. A convex mirror used on a automobile has 3 m radius of curvature. If a bus is located 5 m from this mirror, The position of image will be (15/13) OR 1.15 from the convex mirror.

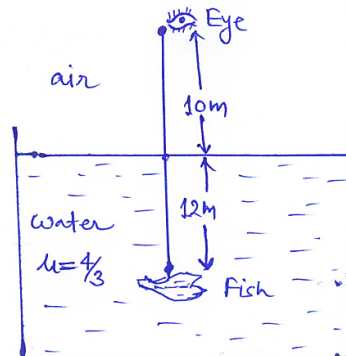
12. Point object is moved from O to A. The image is formed at I. The co-ordinates of I are $9, \sqrt{3}$



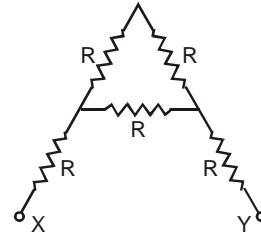
13. The bulb that consumes more power is B_3 .



14. The apparent distance of fish from eye is 19 meter If refractive index of water is $\frac{4}{3}$ and of air is 1.



15. The equivalent resistance between X and Y is $\frac{8R}{3}$.



SECTION – D

16. In which of the following kinetic energy is converted into electrical energy?
(a) Tidal energy (b) Hydro energy (c) Wind energy (d) None of these.

ANS. (a), (b), (c)

17. Choose the incorrect statements. Two magnetic field lines:
(a) Intersect at neutral point (b) Never intersect each other
(c) Intersect near north-pole or south pole (d) Intersect at the midpoint of the magnet

ANS. (a), (c), (d)

18. Devices changing electrical energy into mechanical energy are
(a) electric generator (b) electric motor (c) voltmeter (d) ammeter.

ANS. (b)

19. Non-conventional sources of energy are
(a) Inexhaustible (b) Pollution free (c) Too expensive (d) Less expensive

ANS. (a), (b), (d)

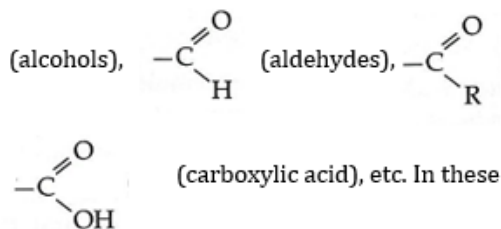
20. When electric current is passed, electrons move from:
(a) high potential to low potential. (b) low potential to high potential.
(c) in the direction of the current. (d) against the direction of the current.

ANS. (b), (d)

CHEMISTRY**SECTION-A**

Read the following passage and answer questions 1 – 3

One of the most important raw material in the world is crude oil. It contains mixture of hydrocarbons. The hydrocarbons in crude oil are not only vital fuels, they are also used as starting materials for many new products such as plastics. Alkanes are main components of crude oils. The alkanes are the simplest saturated organic compounds having the general formula C_nH_{2n+2} . Saturated hydrocarbons are quite unreactive. The reactivity is increased by the presence of double or triple bonds or a functional group are – OH



the functional group is the reactive part of the compounds. These compounds are named by their common names or IUPAC names

1. Which of the following sets contain all unsaturated compounds?
 (a) C_2H_4, C_3H_8, C_3H_4 (b) $C_4H_{10}, C_3H_6, C_2H_2$ (c) C_4H_8, C_3H_4, C_2H_2 (d) C_2H_6, C_3H_6, C_4H_6

ANS. (c)

2. Butanone is a ketone. The number of sigma bonds in it are.
 (a) 10 (b) 13 (c) 12 (d) 11

ANS. (c)

3. Isomers are the compounds having same molecular formula but different structures. The number of isomers possible for C_5H_{12} are
 (a) 2 (b) 3 (c) 4 (d) 5

ANS. (b)

SECTION – B

4. Match the salts with their common names

	Hydrated salt		Common name
A.	$MgSO_4 \cdot 7H_2O$	(i)	Gypsum
B.	$CuSO_4 \cdot 5H_2O$	(ii)	Green vitriol
C.	$FeSO_4 \cdot 7H_2O$	(iii)	Blue vitriol
D.	$CaSO_4 \cdot 2H_2O$	(iv)	Epsom

(a) A-iv, B-iii, C-ii, D-i (b) A-iv, B-ii, C-i, D-iii (c) A-iv, B-ii, C-iii, D-i (d) A-iv, B-i, C-iii, D-ii

ANS. (a)

5. Silver articles become dark on prolonged exposure to air. This is due to the formation of

(a) Ag_3N (b) Ag_2O (c) Ag_2S (d) Ag_2S and Ag_3N

ANS. (c)

6. In the soap micelles

(a) The ionic end of soap is on the surface of the cluster while the carbon chain is in the interior of the cluster

(b) ionic end of soap is in the interior of the cluster and the carbon chain is out of the cluster.

(c) both ionic end and carbon chain are in the interior of the cluster.

(d) both ionic end and carbon chain are on the exterior of the cluster.

ANS. (a)

7. Which of the following have equal number of electrons?

(a) Cl^- and Br^- (b) Na^+ and Mg^{2+} (c) Ar and Ne (d) Mg^{2+} and Ca^{2+}

ANS. (b)

SECTION-C

8. OXIDATION is a process in which there is loss of electrons. .

9. The gas produced on addition of dilute sulphuric acid on powdered zinc is H_2 .

10. The chemical formula of plaster of Paris is $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$.

11. pH of 10^{-6} N KOH solution is 8 .

12. The phenomenon of producing a characteristic sound when a material is struck on the metallic surface is SONARITY .

13. The formula of ethanoic acid is CH_3CooH .

14. The general formula for alkynes is $\text{C}_n\text{H}_{2n-2}$.

15. How many periods include the elements of atomic numbers 1 to 18 in the periodic table 3 .

SECTION-D

16. Which of the following is a physical change?
- (a) Boiling of water to give water vapour (b) Melting of ice to give water
(c) Dissolution of salt in water (d) Combustion of Liquefied Petroleum Gas (LPG)

ANS. (a),(b),(c)

17. Common salt besides being used in kitchen can also be used as the raw material for making
- (a) washing soda (b) Bleaching powder (c) Baking soda (d) Slaked lime

ANS. (a), (b)

18. Which of the following property is generally shown by metals
- (a) Electrical conduction (b) Sonorous in nature (c) Dullness (d) Ductility

ANS. (a), (b), (d)

19. Which of the following statements are usually correct for carbon compounds? These
- (a) are good conductors of electricity
(b) are poor conductors of electricity
(c) have strong forces of attraction between their molecules.
(d) do not have strong forces of attraction between their molecules

ANS. (b),(d)

20. Which of the following statements (s) about the Modern Periodic Table are incorrect
- (a) The elements in the Modern Periodic table are arranged on the basis of their decreasing atomic number
(b) The elements in the Modern Periodic Table are arranged on the basis of their increasing atomic masses
(c) Isotopes are placed in adjoining group (s) in the Periodic table
(d) The elements in the Modern Periodic Table are arranged on the basis of their increasing atomic number

ANS. (a),(b),(c)

MATHEMATICS

SECTION-A

Given two Arithmetic progression series
 $S_1: 2 + 6 + 10 \dots \dots \dots 104$

$S_2: 5 + 8 + 11 \dots \dots \dots 140$

An A.P, S is formed by taking the common terms of S_1 and S_2 for the resulting A.P, S

1. Common difference is

- (a) 3 (b) 4 (c) 6 (d) 12

ANS. (d)

2. Number of terms common to two AP's is

- (a) 6 (b) 7 (c) 8 (d) 9

ANS. (c)

3. Third term of series S is

- (a) 26 (b) 38 (c) 50 (d) 62

ANS. (b)

SECTION - B

4. Two circles, both of radius R touch each other and each of them touches internally a circle of radius 2R. Then the radius of the circle which touches at the three circle is

- (a) $\frac{R}{2}$ (b) $\frac{2R}{3}$ (c) $\frac{3R}{4}$ (d) R

ANS. (b)

5. If α and β are the roots of the quadratic equation $2x^2 - 5x - 6 = 0$ and $a_{n+1} = \alpha^n - \beta^n$, then the value of $\frac{a_9 - 3a_7}{4a_8}$ is

- (a) $\frac{3}{8}$ (b) $\frac{5}{8}$ (c) $\frac{7}{8}$ (d) $\frac{9}{8}$

ANS. (b)

6. A box contains four cards numbered as 1, 2, 3, 4 and another box contains four cards numbered as 1, 4, 9 and 16. One cards is drawn at random from each box. What is the probability of getting the product of two numbers so obtained, more than 16.

- (a) $\frac{5}{8}$ (b) $\frac{1}{2}$ (c) $\frac{3}{8}$ (d) $\frac{1}{4}$

ANS. (c)

7. If $S = 2^{2024} + 3^{2024} + 7^{2024} + 8^{2024}$ then last digit of S is

- (a) 2 (b) 4 (c) 6 (d) 9

ANS. (b)

SECTION-C

8. In a certain year there were exactly four Friday & exactly four Monday in January. On what day of the week did the 20th of January that year

ANS. (SUNDAY)

9. Write the value of p for which the pair of linear equations in two variables have infinitely many solutions $px + 3y - (p - 3) = 0$, $12x + py - p = 0$

ANS. (6)

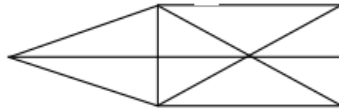
10. Ravi tore out several successive pages from a book. The number of the first page he tore out was 183, and it is known that the number of the last is written with the same digits in some order. How many pages did Ravi tear out of the book.

ANS. (68)

11. The ages of the members of the club are in A.P with common difference 3 months. The sum of ages of all the members is 300 years and the youngest member is a child of age 9 years. Then the write age of eldest member in years

ANS. (15)

12. How many triangles are there in the following diagram?



ANS. (17)

13. The mean of first ten odd natural numbers is k , then write the values of k

ANS. (10)

14. Volume of two sphere are in the ratio 64:27. The ratio of their surface area is $a:b$ then write the minimum value of $a + b$ if a and b are natural numbers

ANS. (25)

15. When a polynomial $P(x)$ is divided by $x - 1$, the remainder is 3. When $P(x)$ is divided by $(x - 3)$, the remainder is 5. If $r(x)$ is the remainder when $P(x)$ is divided by $(x - 1)(x - 3)$ then write the value of $r(-2)$

ANS. (0)

SECTION-D

16. If $\frac{1-\cos\theta}{\sin\theta} = \frac{1}{5}$, $0^\circ \leq \theta \leq 90^\circ$ then which of the following is/ are may be possible

(a) $\tan\theta = 0$

(b) $\tan\theta = \frac{5}{12}$

(c) $\cos\theta = \frac{5}{13}$

(d) $\cos\theta = \frac{12}{13}$

ANS. (a),(b),(d)

17. If $a + b + c = 2$ and $a^2 + b^2 + c^2 = 4$ then which of the following is/ are correct
- (a) maximum value of $ab + bc + ca$ is 2 (b) maximum value of $ab + bc + ca$ is 4
- (c) minimum value of $ab + bc + ca$ is -2 (d) minimum value of $ab + bc + ca$ is -1

ANS. (BONUS)

18. If $a, 7, b, 23, c$ are in A.P then which of the following is/ are correct
- (a) $a = 2$ (b) $b = 15$ (c) $c = 31$ (d) $c = 30$

ANS. (b),(c)

19. A number is selected from the numbers from 11 to 60
- (a) Probability of selecting a prime number is $\frac{13}{50}$ (b) Probability of selecting a square number is $\frac{3}{25}$
- (c) Probability of selecting a multiple of 3 is $\frac{6}{25}$ (d) Probability of selecting a multiple of 7 is $\frac{7}{50}$

ANS. (a),(d)

20. Given the system of equations $mx + 2y = 10$; $3x - 2y = 0$ have the integer solution. The which of the following options is correct
- (a) sum of all possible values of m is -6 (b) sum of all possible values of m is 6
- (c) produce of all possible values of m is 16 (d) produce of all possible values of m is -16

ANS. (BONUS)

BIOLOGY

SECTION – A

1. If 20 Jule of energy is trapped at producer level, then how much energy will be available to peacock, as food in the following chain
- Plant → Mice → Snake → Peacock
- (a) 0.02 Jule (b) 0.002 Jule (c) 0.2 Jule (d) 0.0002 Jule.

ANS. (a)

2. The minamata disease in Japan was caused through the pollution of water by
- (a) CN (b) Hg (c) DDT (d) BHC.

ANS. (b)

3. World ozone day is celebrated on
(a) 5th June (b) 21st June (c) 24 March (d) 16th September

ANS. (d)

4. Which one of the following is the correct percentage of the two greenhouse gases that contribute to the total global warming
(a) N_2O 6%, CO_2 86% (b) Methane 20%, N_2O 18%
(c) CFCs 14%, Methane 20% (d) CO_2 40%, CFCs 30%.

ANS. (c)

5. Which one of the following are analogous structure
(a) Wings of bats and wings of pigeon (b) Gills of prawn and lungs of man
(c) Flippers of dolphin and legs of horse (d) All of above.

ANS. (a)

6. How many gametes participate in double fertilisation
(a) 2 (b) 4 (c) 3 (d) 5

ANS. (c)

7. A child's blood group is 'O'. The parent's Blood Group cannot be –
(a) A and B (b) A and A (c) AB and O (d) B and O.

ANS. (c)

8. Apical dominance means
(a) Suppression of growth of apical BUD due to presence of axillary BUD
(b) Suppression of growth of axillary BUD due to presence of apical BUD
(c) Stimulation of apical BUD growth by removal of axillary BUD
(d) Inhibition of growth of axillary BUD by removal of apical BUD.

ANS. (b)

9. Which of the following is not a part of female reproductive system in human being
(a) Ovary (b) Fallopian tubule (c) Vas deference (d) Fallopian tube.

ANS. (c)

10. Time for cardiac cycle is

- (a) 8 second (b) 0.8 second (c) 0.08 minute (d) 008 second.

ANS. (b)

11. In anaerobic respiration pyruvic acid in muscle form

- (a) Lactic acid (b) Alcohol (c) Glucose (d) None of these.

ANS. (a)

12. Eucleated cell is

- (a) RBC (b) WBC (c) Companion cell (d) Neuron.

ANS. (a)

13. Which of the following is a plant hormone

- (a) Insulin (b) Thyroxine (c) Oestragon (d) Cytokinin.

ANS. (d)

14. Which of the sequence represent a reflex action

- (a) Sensory neuron → Brain → Motor Neuron → Effector
(b) Sensory neuron → Spinal cord → Motor Neuron → Effector
(c) Motor Neuron → Spinal cord → Sensory neuron → Effector
(d) Effector → Motor Neuron → Spinal cord → Sensory neuron.

ANS. (b)

15. Which is a heterocrine gland

- (a) Testis (b) Ovary (c) Pancreas (d) All of these.

ANS. (d)

16. Select the mismatched pair.

- (a) Adrenalin – Adrenal cortex
(b) Testosteron – Testis
(c) Estrogen – Ovary

(d) Adrenalin – Adrenal medulla.

ANS. (a)

17. If a heterozygous tall plant is crossed with a homozygous dwarf plant, the proportion of dwarf progeny will be

(a) 50% (b) 75% (c) 100% (d) 25%.

ANS. (a)

18. Which set include all homologous organ

(a) Hind legs of Dog, Duck & Kangaroo (b) Wings of Bats, Butterflies and bird
(c) Tail of Rat, Peacock, Earthworm (d) Wing of Bat & Flipper of whale.

ANS. (a)

19. Which part of the heart received deoxygenated blood

(a) Right atrium (b) Right ventricle (c) Left atrium (d) Left ventricle.

ANS. (a)

20. Corpus callosum is present in

(a) Medulla oblongata (b) Pons (c) Cerebrum (d) Cerebellum.

ANS. (c)

SECTION – B

21. In photosynthesis, LIGHT energy is changed into CHEMICAL energy by utilizing CO₂ and H₂O.

22. Human heart is 4 chambered. It has upper ATRIUM and lower VENTRICLE.

23. G.J.MENDAL performed his experiment on pea plant. He choosed 7 pair of character in pea plant.

24. PLFURA is covering of lungs and PERICARDIUM is the covering of heart.

25. Central nervous system includes BRAIN and SPINAL CORD.

26. SYNAPSE is the gap between two neuron and neurotransmitter ACETYLCHOLINE help in conduction in nerve impulse.

27. STOMATA in plant help in transpiration, which help in COOLING the temperature.

28. In human, blood consists of FORMED ELEMENT and PLASMA.
29. The onset of menstrual cycle in female is called as MENARCHE and cease of menstrual is MENOPAUSE.
30. An ecosystem has ABIOTIC and BIOTIC component. PRODUCER, CONSUMER and DECOMPOSER are biotic component.

SECTION – C

31. Find out a true statement from following
- (i) Only 10% energy is transferred to next trophic level
- (ii) Energy transfer is multi direction in ecosystem
- (iii) Pyramid of energy is straight.
- (a) i & ii (b) i & iii (c) ii & iii (d) i, ii & iii

ANS. (b)

32. Regarding double fertilisation which is true
- (i) It is main feature of flowering plants
- (ii) It involve syngamy and triple fusion
- (iii) It involve total 2 gametes
- (iv) It form zygote and endosperm.
- (a) (i), (ii) (b) (ii), (iii) (c) (i), (iv) (d) (i), (ii), (iv).

ANS. (d)

33. In case of inheritance of 2 gene, we obtained following result in F_2 generation
- (i) phenotypic ratio – 9 : 3 : 3 : 1
- (ii) Genotypic ratio – 1 : 2 : 1, 2 : 4 : 2 : 1 : 2 : 1
- (iii) Phenotype number – 4.
- (a) (i), (ii) (b) (i), (ii), (iii) (c) (i), (iii) (d) None of these.

ANS. (b)

34. After fertilisation in plants, what changes occur in flower. Find wrong statement
- (i) Ovary change into seed
- (ii) Ovule changed into fruit
- (iii) Integument change into fruit wall

(iv) Zygote form endosperm.

- (a) (i), (ii) (b) (i), (ii), (iii) (c) (i), (iii), (iv) (d) All of these

ANS. (d)

35. Regarding contraception how many statement are true

- (i) Surgical removal of vas differentia is tubectomy
(ii) Surgical removal of vas differentia is vasectomy
(iii) Surgical removal of fallopian tube is tubectomy
(iv) Surgical removal of fallopian tube is vasectomy
(v) Removal of testis is tubectomy.

- (a) iv (b) ii (c) iii (d) None of these.

ANS. (b)

36. Which of the following are truly match with their hormone and source

- (1) Progesteron – Carpusluteum
(2) Relaxin – Ovary
(3) Growth hormone – Pituitary
(4) Calcitonin – Thyroid.

- (a) 1, 2 (b) 1, 3 (c) 1, 4 (d) 1, 2, 3, 4.

ANS. (d)

37. Which of the following hormone are growth premotor
Auxin, Gibberallin, Cytokinin, Ethylene, Abscissic acid

- (a) Auxin, Gibbrellin, Ethylene (b) Ethylene, Abscissicacid
(c) Auxin, Gibberallin, Cytokinin (d) Auxin, Ethylene.

ANS. (c)

38. How many statement regarding pituitary gland are true

- (i) It is smallest endo crine gland
(ii) It is master endocrine gland
(iii) It secretes hormone FSH, LH, GH, PRL, ADH
(iv) Defficiency of GH result in acromegaly.

- (a) (i), (ii) (b) (i), (iii), (iv) (c) (i), (ii), (iii), (iv) (d) (i), (ii), (iii).

ANS. (d)

39. Find any wrong statement related with photosynthesis

- (i) Chemical energy is changed into light energy
- (ii) Light reaction occur in grana of chloroplast
- (iii) Light reaction occur in stroma of chloroplast
- (iv) Chlorophyll occur in stroma of chloroplast
- (v) Dark reaction occur only in dark.

(a) (i), (iv), (v) (b) (i), (iv), (ii) (c) (i), (ii), (iii) (d) (i), (ii), (iv), (v)

ANS. (a)

40. Regarding blood, how many statement are true

- (i) Blood is formed in liver
- (ii) WBC are 2 type means granulocyte and agranulocyte
- (iii) Platelets also called as thrombocyte
- (iv) Granulocyte include monocyte and lymphocyte.

(a) (i), (ii), (iii) (b) (i), (iv), (iii) (c) (ii), (iii) (d) (i), (ii), (iii), (iv)

ANS. (c)