

[ENGLISH VERSION]

DIRECTIONS

For Regular candidates, the questions of Group 'A', 'B', 'C' and 'D' will have to be answered.

Special Instruction for Sightless Candidates

In Group 'D' instead of Question No. 4.1, 4.1(A) will have to be answered.

For External Candidates, the questions of Group 'E' will also have to be answered in addition to Group 'A', 'B', 'C' and 'D'.

Instructions regarding the number of questions to be attempted have been indicated at the beginning of each group.

GROUP—A

(Answer to all questions is compulsory)

1. Write the answer in complete sentence by choosing the correct answer for each question with respective serial number :— 1×15=15

1.1 Select the correct pair –

- (a) Cerebrum – Maintenance of balance of the body
- (b) Hypothalamus – Control of intelligence and emotion
- (c) Cerebellum – Control of body temperature
- (d) Medulla Oblongata – Control of heart beat and swallowing of food

1.2 Identify which of the following statements is not true regarding Insulin –

- (a) Helps in the absorption of glucose from blood into most of the somatic cells
- (b) Converts glucose into glycogen within liver and muscle cells
- (c) Helps in the conversion of fat and protein into glucose
- (d) Inhibits the conversion of protein and fat into glucose

- 1.3 Match the words of Column-A with that of Column-B and select which of the following options is correct –

Column-A	Column-B
A. Flexion	(i) Quadriceps
B. Extension	(ii) Piriformis
C. Rotation	(iii) Biceps

- (a) A –(i) B –(ii) C –(iii)
 (b) A –(ii) B –(iii) C –(i)
 (c) A –(iii) B –(i) C –(ii)
 (d) A –(ii) B –(i) C –(iii)

- 1.4 Determine from the answers given below in which phases of karyokinesis during mitotic cell division following two incidents happen –

(A) Daughter chromosomes tend to move apart from each other towards their own poles

(B) Nuclear membrane and nucleolus disappear

- (a) (A) Prophase (B) Anaphase
 (b) (A) Anaphase (B) Prophase
 (c) (A) Telophase (B) Metaphase
 (d) (A) Metaphase (B) Telophase

- 1.5 Select which of the following is the feature of cross pollination –

- (a) Occurs within the same flower of the same plant
 (b) Agents are not required
 (c) Lesser chance of new characters being transmitted
 (d) More wastage of pollen grains

- 1.6 Determine the number of DNA molecules that get coiled to form each chromosome in a newly formed daughter cell produced by mitotic cell division in human body –

- (a) 46 (b) 1
 (c) 23 (d) Numerous

- 1.7 Identify the genotype of guineapig having black colour and rough hair –

- (a) BbRr, BBRr (b) BBrr, Bbrr
 (c) bbRR, bbRr (d) bbrr, bbRr

- 1.8 Decide which of the following two were selected by Mendel as recessive traits –

- (a) Colour of flower – purple, position of flower – axial
 (b) Length of stem – dwarf, form of ripe seed – wrinkled
 (c) Form of ripe seed – round, colour of seed – yellow
 (d) Position of flower – axial, length of stem – tall

1.9 Assess from the following, the probable genotype of parents having haemophilic son and normal daughter –

- (a) $H||h, h||\uparrow$
- (b) $H||H, H||\uparrow$
- (c) $H||H, h||\uparrow$
- (d) $H||h, H||\uparrow$

1.10 Parthenium is an exotic species in our country. Other indigenous species cannot survive in such places where it grows. This establishes one of the postulates of Darwin's theory. Identify the postulate –

- (a) Intraspecific struggle
- (b) Interspecific struggle
- (c) Struggle with environment
- (d) Origin of new species

1.11 Miller and Urey, in their experiment, were able to synthesize some preliminary constituents necessary for the creation of life. Identify the ones which were amino acids among them –

- (a) Lactic acid, Acetic acid
- (b) Urea, Adenine
- (c) Glycine, Alanine
- (d) Formic acid, Acetic acid

1.12 Decide for which of the following purpose bees demonstrate waggle dance –

- (a) Search for reproductive mates
- (b) Inform other worker bees about the direction and the distance of the source of food from the bee hive
- (c) Selecting place for the construction of the new bee hive
- (d) Avoid attack by probable enemy

1.13 Identify which of the following is the correct information related to biosphere reserve –

- (a) Conservation is promoted to local people and other biotic communities along with conservation of ecosystem
- (b) National Park and Sanctuary are not included within biosphere reserve
- (c) The presence and participation of local people for the conservation of ecosystem are not permissible
- (d) It's size is usually smaller than a Sanctuary

1.14 Decide which of the following pair is **not correct** –

- (a) Poaching – Increase the endangeredness of gorilla
- (b) Exotic species – *Lantana*, *Tilapia*
- (c) Determination of hotspot – Number of endemic species and endangered species
- (d) Greenhouse gas – Eutrophication

1.15 Decide which of the following Project Tiger is located within our state –

- (a) Bandipur (b) Simlipal
(c) Sunderbans (d) Kanha

GROUP—B

2. Answer any 21 questions out of 26 questions given below as instructed :— $1 \times 21 = 21$

Fill in the blanks with proper words in the following sentences (any five) :— $1 \times 5 = 5$

- 2.1 Acharya Jagadish Chandra Bose proved the property of _____ by sending electrical impulse in *Mimosa* and *Desmodium* plant.
- 2.2 If gametes in human were produced by mitosis instead of meiosis then the number of autosomes in a somatic cell of an offspring would have been _____.
- 2.3 A disease in human population caused by recessive gene located in 'X' Chromosome is _____.
- 2.4 The hoof of modern horse is the transformation of the digit number _____ of their ancestors.
- 2.5 At the _____ phase of nitrogen cycle ammonia is converted into nitrite and nitrate by the action of some bacteria.
- 2.6 To produce the bottled cold drinks widely sold in the market, a lot of _____ water is wasted.

Decide whether the following statements are true or false (any five) :— $1 \times 5 = 5$

- 2.7 Tropic movement is the movement of growth in plants.
- 2.8 Crossing over takes place during mitotic cell division.
- 2.9 Mendel used the term gene while describing his experiments related with heredity.
- 2.10 The leaf of Cactus is modified into spine for the reduction of the rate of transpiration.
- 2.11 Rhododendron is an endangered plant species conserved in Eastern Himalaya hotspot.
- 2.12 Choroid helps in the accommodation of eye by changing the curvature and shape of the lens.

Match the words in Column-A with those which are most appropriate in Column-B and re-write the correct pair mentioning the serial no. of both columns (any five) :— $1 \times 5 = 5$

Column-A	Column-B
2.13 Gibberellin	(a) rrYY
2.14 Cutting	(b) Recharging of ground water
2.15 Genotype of pea plant having wrinkled and yellow coloured seed	(c) Pyrimidine base
2.16 Homologous organ	(d) Causes the breakdown of dormancy of bud and seed
2.17 Wetland	(e) Structure is same but function is different
2.18 Thymine and Uracil	(f) RRYy
	(g) Rose

**Answer in a single word or in a single sentence
(any six) :—** 1×6=6

- 2.19 Choose the odd one and write it :
Cerebrum, Hypothalamus, Pons, Thalamus
- 2.20 Where the Schwann cells are located ?
- 2.21 A pair of related terms is given below. On the basis of the relationship in the first pair write the suitable word in the gap of second pair.
Mitosis : Radicle : : Meiosis : _____
- 2.22 Which law Mendel concluded from his dihybrid cross experiment ?
- 2.23 Give an example of a variation found among healthy persons which is transmitted through generations.
- 2.24 How Chimpanzees break open the hard shells for eating the nuts ?
- 2.25 Among the following four terms, one includes the other three. Find it out and write it : SPM, Air Pollution, Greenhouse gas, Lung disease
- 2.26 Name the practice which jointly the local peoples and forest department maintain for reclamation of forest.

GROUP—C

3. **Answer any 12 questions in 2–3 sentences out of
17 questions given below :—** 2×12=24

- 3.1 Distinguish between the functions of hormone and nervous system on the following parameters :
- Nature of function
 - Pace of function
 - Time span of function
 - Fate

- 3.2 'A person can see distant objects distinctly but is unable to visualize near object in a perfect way' – Predict what would be the probable cause and suggest the corrective measure for such problem.
- 3.3 Analyse the role of synthetic plant hormone in increasing the production and solving the problem of weed in agriculture.
- 3.4 'LH and ICSH control the secretion of hormones of reproductive glands of human body' – judge the validity of the statement.
- 3.5 How can you distinguish between mitosis of plant cells and that of animal cells on the basis of formation of spindle fibre and the process of cytokinesis ?
- 3.6 Establish the relationship between the formation of malignant tumour in human body with the loss of control in the cell cycle.
- 3.7 'The adventitious leaf bud plays significant role in natural vegetative propagation of plant' – Evaluate the validity of the statement with a proper example.
- 3.8 Show with the help of a cross, who is more important among parents in determining the sex of their offspring.
- 3.9 'Different genotypes produce the same phenotype' – Justify the statement in the form a table by taking an example from the result of dihybrid cross of Pea plant.
- 3.10 Give your opinion about probable suggestions which can be given to a pair of contenders before marriage in order to prevent the spread of a genetic disease from the society already known to you.

3.11 A good number of *Tilapia* fishes are released in a pond having only different indigenous fish species grown naturally. Think and write which types of struggle for existence *Tilapia* fishes have to face in order to survive.

3.12 Prepare a list of roles air sacs of pigeon play to fly in the air.

3.13 • Structure and function

- Indicating the nature of evolution

Based on the above two features establish the concept of analogous organ with the help of proper example.

3.14 Relate the following phenomena with the trend of disturbance in Nitrogen Cycle resulting from different human activities :

- Global Warming
- Acidification of soil and water of river and lake

3.15 Hilsa, Bee, Penguin, Rauwolfia –

Assess which are the causes of endangeredness of the above-mentioned organisms.

3.16 Discuss any two roles of People's Biodiversity Register (PBR) in conserving local biodiversity.

3.17 Tabulate any of the four activities which are prohibited in a sanctuary following the provisions of Wildlife Act.

(Contd.)

GROUP—D

4. Answer 6 questions or their alternatives given below. Sightless candidates have to answer question No.

4.1(A) instead of 4.1 :— $5 \times 6 = 30$

4.1 Draw a neat diagram of the vertical section of the eyeball of human eye and label the following parts :

$3 + 2 = 5$

- | | |
|-------------|-----------------|
| (a) Choroid | (b) Optic nerve |
| (c) Iris | (d) Yellow spot |

OR

Draw a neat diagram of the metaphase of mitotic cell division in an animal cell and label the following parts :

$3 + 2 = 5$

- | | |
|------------------|-------------------|
| (a) Chromatid | (b) Centromere |
| (c) Polar region | (d) Spindle fibre |

(FOR SIGHTLESS CANDIDATES ONLY)

4.1(A) Write one function for each of the following parts of the human eyeball : $1 \times 5 = 5$

- | |
|--------------------|
| (a) Vitreous humor |
| (b) Sclera |
| (c) Iris |
| (d) Lens |
| (e) Retina |

OR

Write three features of the metaphase stage and two features of the anaphase stage of mitotic cell division in animal cell. $3 + 2 = 5$

4.2 Distinguish between mitotic and meiotic cell divisions in animals on the basis of following features :—

- Site of occurrence
- Nature of division of Chromosomes
- Number of cells produced

List the changes in sense organs and bones occurred during the senescence phase of human development.

3+2=5

OR

Explain the importances of following parts of an eukaryotic chromosome :

- Centromere
- Telomere

Analyse the role of cell divisions in controlling growth, reproduction and repair in an organism.

2+3=5

4.3 Tabulate three pairs of dominant-recessive traits of pea plant as selected by Mendel. State the first law of Mendel as deduced from the experiment of Monohybrid cross.

3+2=5

OR

A colour blind female married a normal male. Judge the probability of colour blindness among their children in the first filial generation. Show with the help of a cross how the first law of Mendel is deviated in the case of Four-O'clock plant in F_2 generation.

3+2=5

4.4 With the help of arrow signs, show the major evolutionary events as occurred gradually after the origin of life.

5

OR

Discuss the following three events as mentioned in the evolutionary theory of Darwin :

- Prodigality of production
- Origin of variation
- Natural selection

'Adaptation is the change of shape, physiological functions and behaviour of organism'—Justify the statement with the help of any two examples.

3+2=5

4.5 Evaluate the effects of following pollutants on environment and human health :

5

- Non-biodegradable insecticides
- Pollen grain
- Chemical fertilizers containing phosphate and nitrate
- Wastes containing pathogens originated from health centres
- Chlorofluorocarbon

OR

Speculate the probable causes of each of the following phenomena :

5

- Insomnia, High blood pressure, Partial or Complete deafness
- Decrease in the concentration of dissolved oxygen in water and floating of dead fishes

- Decrease in the number of Crocodiles
- Inflammation in the respiratory tract of lung
- Decrease in the number of pollinating insects

4.6 'The ever-increasing population in the different cities of India is creating the crisis of groundwater' - Support the statement with reasons on the basis of your experiences. Construct a concept map to show how the increase in human habitat is influencing the ecosystem of Sunderbans. $3+2=5$

OR

Summarise which conservation measures have been adopted to increase the population of an endangered mammal exclusively found in the swampy grass lands under the foothills of the Eastern Himalaya. Discuss the role of biodiversity in maintaining the balance of the ecosystem of a river. $3+2=5$

GROUP—E

(FOR EXTERNAL CANDIDATES ONLY)

5. Answer any 4 questions : $1 \times 4 = 4$

- 5.1 Write one feature of epithelial tissue.
- 5.2 Which cell organelle is termed as 'Suicidal Bag' ?
- 5.3 Write one function of parenchyma tissue.
- 5.4 Give an example of an entomophilous flower.
- 5.5 Give example of a proteolytic enzyme.

6. Answer any 3 questions : $2 \times 3 = 6$

- 6.1 Write two differences between axon and dendron.
- 6.2 Write the name of two processes of plant excretion.
- 6.3 Write one function each of Mitochondria and Plastid.
- 6.4 Write the name of a National Park and a Biosphere Reserve of West Bengal.