



- (5) Select the correct statement regarding photosystems.
- 1) Light harvesting complex contains only chlorophyll a and chlorophyll b pigments.
 - 2) The primary electron acceptor in photosystem II involves in both linear and cyclic electron flow.
 - 3) Chlorophyll a molecule in photosystem II is known as P_{700} .
 - 4) The special chlorophyll a molecule in photosystems absorb photons and become reduced.
 - 5) The electrons released during hydrolysis of water are used to neutralize the excited photosystem II.
- (6) The common compound to both photosynthesis and cellular respiration is,
- 1) $FADH_2$ ☒
 - 2) $NADPH$ ☒
 - 3) 3-PGA
 - 4) Pyruvate ☒
 - 5) Acetaldehyde ☒
- (7) Which of the following is correct regarding the event related to the evolution of biological diversity and the corresponding time period?
- ☒ 1) 3.5 billion years ago - Origin of first photosynthetic organism.
 - ☒ 2) 700 million years ago - Evolution of sponges.
 - 3) 500 million years ago - Origin of ancestors of arthropods.
 - 4) 380 million years ago - Colonization of land by fungi.
 - ☒ 5) 1.2 billion years ago - Origin of first eukaryotic organism.
- (8) Select the correct statement regarding the evolution of seedless vascular plants.
- 1) According to fossil records, the ancestors of vascular plants had gametophytes and sporophytes that were about equal in size.
 - 2) Producing male and female gametes by the same plant is called heterospory.
 - 3) Xylem vessel elements in the plants transport water and minerals efficiently.
 - 4) All the club mosses are heterosporous, while all the spike mosses are homosporous.
 - 5) Similar tissue arrangements are found in the stems and roots of early vascular plants preserved in fossil.
- (9) Cell wall components, photosynthetic pigments of some organisms in kingdom Protista are given below.
- | Organism | Cell wall component | Photosynthetic pigments |
|----------------------|---------------------|---|
| A - <i>Gelidium</i> | P - Alginic acid | X - Chlorophyll a, c, Carotene, Xanthophyll |
| B - Diatoms | Q - Cellulose | Y - Chlorophyll a, c, Xanthophyll |
| C - <i>Sargassum</i> | R - Pectin | Z - Chlorophyll a, d, Phycobilly protein |
- Select the correct combination.
- 1) AQX, BRY, CPZ
 - 2) AQZ, BRX, CPY
 - 3) APY, BQX, CRZ
 - 4) ARZ, BQX, CPY
 - 5) AQZ, BPY, CRX
- (10) Select the correct response regarding *Allomyces*.
- 1) Ascospores ☒
 - 2) Dikaryotic mycelium ☒
 - 3) Zoospores
 - 4) Exogenous asexual spores ☒
 - 5) Septate hyphae

(11) Which of the following combinations is correct regarding the organisms in phylum Cnidaria?

- 1) Protonephridia, Gastrovascular cavity ~~X~~
- 2) Nematocysts, Mesoglea
- 3) Sensory papillae, Diploblastic ~~X~~
- 4) Papillae, Mesoglea ~~X~~
- 5) Mantle, Tentacles ~~X~~

(12) Which of the following combinations is correct regarding the characteristics of organisms on the phylum Chordata?

- 1) Carp - Placoid scales
- 2) Bat - Cloaca
- 3) Lizard - Skeleton with air cavities
- 4) Eagle - Colour vision
- 5) Cow - Non-glandular skin

(13) Which of the following organisms cannot synthesize carbohydrates using CO_2

- a. *Cuscuta*
 - b. *Nitobacter* ~~X~~
 - c. *Nostoc*
 - d. Purple non-sulphur bacteria
 - e. *Drosera*
- 1) a only ~~X~~
- 2) b and d only ~~X~~
- 3) a and d only
- 4) c and e only ~~X~~
- 5) a, b, and d only

(14) Movement of water along the apoplastic route is occurred by,

- 1) Facilitated diffusion and bulk flow.
- 2) Osmosis and diffusion.
- 3) Osmosis and bulk flow.
- 4) Diffusion and bulk flow.
- 5) Osmosis and facilitated diffusion.

(15) Two *Alocasia* petiole strips with 160° angle of curvature, were immersed in two sucrose solutions X and Y and kept for osmotic equilibrium. Observations were taken after one hour.

Curvature of the petiole strip immersed in solution X was increased, while the curvature of the strip immersed in solution Y was decreased.

Which of the following is correct according to the above observations?

- 1) Solution X is hypertonic compared to the tissue.
- 2) Endosmosis was taken place in the tissue immersed in solution Y.
- 3) Water has moved out of the tissue immersed in solution X.
- 4) Water potential of the tissue is higher than the water potential of the solution Y.
- 5) Water potential of the solution X is lower than the water potential of solution Y.



(16) Which of the following statements is correct regarding *Selaginella*?

- 1) Microsporangia are formed on the lower side of the microsporophyll.
- 2) Numerous megaspores are produced within the megasporangia ~~X~~
- 3) Male and female gametophytes are autotrophic ~~X~~
- 4) Male gametophyte is enclosed within in the microspore wall.
- 5) Male and female gametophytes are macroscopic ~~X~~

(17) Some events in plants triggered by light are given below.

- a. Increase seed germination.
- b. Inhibit hypocotyle elongation.
- c. Stimulate branching.
- d. Trees below canopy grow taller.
- e. Inhibit seed germination.

Which of the following responses is/are triggered by far red light is,

- 1) a and c only.
- 2) b and d only.
- 3) a and d only.
- 4) d and e only.
- 5) c and e only.

(18) Which of the following responses shows correct sequence of plant growth substances responsible for promote leaf abscission, stimulate seed germination, promotes vascular differentiation respectively?

- 1) Absciscic acid, Cytokinins, Gibberellins. ✗
- 2) Ethylene, Gibberellins, Auxin.
- 3) Absciscic acid, Auxin, Cytokinins. ✗
- 4) Absciscic acid, Cytokinins, Ethylene.
- 5) Cytokinins, Gibberellins, Auxin.

(19) Common feature in human cardiac muscle and skeletal muscles.

- 1) Cells are striated.
- 2) Cells have intercalated discs.
- 3) Cells are multinucleated.
- 4) Involuntary function.
- 5) They are composed of bundles of short cells.

(20) Which of the following combinations is correct regarding human small intestine?

<u>Structure</u>	<u>Digestive enzymes</u>	<u>Digestive product</u>
✗ 1) Polysaccharides	Intestinal amylase	Disaccharides
✗ 2) Small polysaccharides	Pancreatic carboxypeptidase	Peptides
✗ 3) Small peptide	Intestinal protease	Amino acids
4) Fats	Pancreatic lipase	Monoglycerides
5) Small polypeptides	Trypsin	Small peptides

(21) Which vitamin deficiency causes the following deficiency symptoms?

Immunity impairment, Numbness, Pellagra, Defective blood clotting

- 1) Folic acid, Retinol, Cobalamin, Vitamin K
- 2) Thiamine, Cobalamin, Vitamin K, Vitamin E ✗
- 3) Retinol, Folic acid, Riboflavin, Cobalamin ✗
- 4) Retinol, Cobalamin, Niacin, Vitamin K
- 5) Cobalamin, Vitamin E, Vitamin D, Vitamin K

(22) Which of the following responses includes organisms with reduced and closed circulatory system that lack a heart?

- 1) Earthworm, Leech
- 2) Snail, Squid
- 3) Prawn, Fluke
- 4) Sea star, Sand dollar
- 5) Millipede, Pinworm

Select the correct response containing the antigen, antibody of a person's blood and the blood group of the recipient that he can transfuse blood.

	<u>Antigen</u>	<u>Antibody</u>	<u>Blood group of the recipient</u>
✗ 1)	A ⁺	Anti-B	O ⁺ , A ⁺ , A ⁻
2)	B ⁺	Anti-A	B ⁻ , B ⁺ , AB ⁺
3)	A ⁻	Anti-B	AB ⁻ , A ⁻ , AB ⁺
4)	O ⁺	No Anti-A or Anti-B	O ⁺ , O ⁻ , AB ⁺
5)	B ⁻	Anti-B	B ⁻ , B ⁺

- (24) The following table shows, average volume and average surface area of mature animals of the animal species P, Q, R, S, T.

Species	P	Q	R	S	T
Average volume of the body (m ³)	11	12	9	10	8
Average surface area of the body (m ²)	27	25	16	21	23

Which of these organisms is likely to use its body surface for respiratory gas exchange?

- 1) P 2) Q 3) R 4) S 5) T

- (25) Which of the following is correct regarding the homeostatic control of breathing?

- 1) Breathing is regulated by voluntary and involuntary mechanisms.
- 2) The O₂ level has no influence on the breathing control centers.
- 3) There are two pairs of breathing control centers found in medulla oblongata.
- 4) When CO₂ concentration in blood increases, it reacts with water forming H₂CO₃.
- 5) High CO₂ concentration in blood is detected by sensors in aorta.

- (26) Internal defence in innate immunity and the functions of relevant substances are given below.

Substance	Function
A. Interferons	P. Promote phagocytosis.
B. Complementary proteins	Q. Stimulate uninfected neighbouring cells to produce anti-viral proteins.
C. Natural killer cells	S. Detect the cells with abnormal surface molecules and kill them.

Select the response that correctly states the substance-function combination.

- 1) A-P, B-S, C-Q 2) A-P, B-P, C-S ~~3) A-Q, B-S, C-P~~
 4) A-Q, B-P, C-S 5) A-S, B-P, C-S

- (27) Which of the following combination is incorrect?

- | | |
|----------------------|--|
| 1) Hypothalamus | - Regulate sleep and wake cycles. |
| 2) Medulla oblongata | - Control heart and blood vessel activities. |
| 3) Cerebellum | - Coordinates involuntary muscular movements ✓ |
| 4) Pons Varolii | - Helps to regulate respiration. |
| 5) Mid brain | - Coordinates visual reflexes. |

- (28) Several functions of autonomic nervous system are given below.

- a) Constricts bronchi in lungs. ✓
- b) Stimulates activity of stomach.
- c) Stimulates adrenal medulla.
- d) Promotes ejaculation. ✗

Which of the above functions are conducted by sympathetic division?

- 1) a and b only 2) b and c only ✗ ~~3) c and d only~~
 4) a and c only 5) a, b and c only

- (29) Which of the following correctly represents the hormone-function relationship?
- 1) Thymosin - Increases the basal metabolic rate.
 - 2) Calcitonin - Stimulates calcium absorption through small intestine.
 - 3) Oxytocin - Stimulates milk production.
 - 4) Aldosterone - Stimulates excretion of potassium.
 - 5) Cortisol - Coordination of diurnal rhythms of many tissues.

- (30) During the luteal phase of ovarian cycle,
- 1) Follicle tissues are stimulated by FSH.
 - 2) Corpus luteum secretes progesterone.
 - 3) Positive feedback regulates the secretion of FSH and LH. ✗
 - 4) Estradiol is secreted by follicles. ✗
 - 5) Increased levels of estradiol stimulates the secretion of GnRH from hypothalamus.

- (31) Select the incorrect statement regarding human skeleton.
- 1) Human fingers can be circumducted.
 - 2) Knee joint shows rotatory movements.
 - 3) The joints between metacarpal and phalanges permit the power grip.
 - 4) hip joint acts as a pivot joint too.
 - 5) Elbow joint permits only flexion and extension of the forearm.

- (32) Select the incorrect statement regarding the progeny resulted from the cross between $TtYyrr \times ttYYRr$.
- 1) There are eight different types of zygotes.
 - 2) Probability of organisms exhibiting all three dominant characters is $1/4$
 - 3) Dominant homozygotes for all the characters are not found in progeny.
 - 4) None of the organisms in the progeny ^{are} triple recessive. ✗
 - 5) Probability of having two dominant characters in the phenotype is $3/4$.

- (33) Several statements regarding substitution of a nucleotide pair are given below.
- a. It results in a missense mutation.
 - b. This can results in a non-functional protein.
 - c. It is a frameshift mutation.
 - d. A protein with higher activity can be resulted.
 - e. This will never result in a detrimental protein.

Which of the above statements are correct?

- 1) a and b only
- 2) b and c only
- 3) c and e only
- 4) a, b and d only
- 5) b, c and e only

- (34) Which of the following responses shows the order of decreasing risk of threatened species?
- 1) Buttercup, Elephant, Marbled rock frog.
 - 2) Dusky-striped jungle squirrel, Buttercup, Maha madu.
 - ✗ 3) Maha madu, Wesak orchid, Dusky-striped jungle squirrel.
 - 4) Marbled rock frog, Dusky-striped jungle squirrel, Elephant.
 - 5) Maha madu, Elephant, Black ruby barb.

- (35) International conventions that can be contributed to prevent the penetration of solar UV-B radiation through atmosphere is,
- 1) Kyoto protocol.
 - 2) Montreal protocol
 - 3) Cartagena protocol
 - 4) MARPOL convention
 - 5) Basal convention

(36) How are phytoplasmas differ from mycoplasmas?

- a) Transmitted by leafhoppers.
- b) Visible under electron microscope.
- c) Infects plants.
- d) Facultative anaerobic.
- e) Reproduce by binary fission.

Correct response is,

- 1) a and b only
- 2) a and c only
- 3) b, c and d only
- 4) b, d and e only
- 5) a, c and e only

(37) Commercial products made by microorganisms and relevant microorganisms are given below.

Commercial products

- A. Cheese
- B. Vitamin B₁₂
- C. Citric acid
- D. Acetic acid.
- E. Lipase

Microorganisms

- P. *Rhizopus*
- Q. *Gluconobacter*
- R. *Penicillium*
- S. *Pseudomonas*
- T. *Aspergillus niger*

Select the correct response with the commercial product and the relevant microorganism

- 1) AS, BQ, CR, DT, EP
- 2) AR, BS, CT, DQ, EP
- 3) AP, BR, CS, DQ, ET
- 4) AT, BQ, CP, DR, ES
- 5) AR, BQ, CT, DS, EP

(38) Several diseases caused by Microorganisms and the relevant microorganisms and the relevant organism are given below.

Disease

- a) Typhoid
- b) Bacterial meningitis
- c) Conjunctivitis
- d) Chicken pox
- e) Genital herpes

Microorganism

- *Streptococcus pyogenes*
- *Haemophilus influenzae*
- *Haemophilus influenzae*
- Varicella-zoster
- Herpesvirus

Correct combination with the disease and the responsible microorganism is,

- 1) a and e only.
- 2) b and c only.
- 3) b, c and d only
- 4) c, d and e only.
- 5) a, d and e only.

(39) Select the task that should be performed fortnightly and monthly when maintaining an aquarium

- 1) Remove the dead parts of the plants
- 2) Check the terminals of light source.
- 3) Suck out the organic debris by siphoning.
- 4) Scrape excess algal growth.
- 5) Replace poorly grown plants.

(45) Select the response's regarding the sensory receptors in human.

- A) Light touch - Merkel discs ✓
- B) Sound vibrations - Hair cells in the organ of corti ✓
- C) Cold - Ruffini corpuscles
- D) Gravity - Hair cells of vestibule ✓
- E) Light sensitivity - Cones ✓

(46) Cranial bone/s with sinuses is/are,

- A) Sphenoid
- B) Vomer
- C) Ethmoid
- D) Frontal
- E) Maxilla

(47) Select the correct statement/s regarding polyploidy.

- A) Gigas effect is resulted due to polyploidy in plants.
- B) In polyploidy, more than two sets of homologous chromosomes are present in each nucleus.
- C) Genetic balance is lost in polyploids. X
- D) Polyploids can be used as a bridge for gene transferring when the crossing between two species.
- E) Decrement of heterozygosity is due to polyploidy. X

(48) Which of the following statements is/are correct regarding DNA/genes in living cells?

- A) A gene is comprised of a segment of DNA on a specific site on a chromosome.
- B) A pair of homologous chromosomes contains same genes.
- C) DNA replication in eukaryotes is a continuous process.
- D) t-RNA can be resulted as a final gene product.
- E) Non - functional DNA fragments present in between the genes in eukaryotes are known as introns.

(49) Contribution factors for the ozone layer depletion is/are,

- A) HFC
- B) PFC
- C) HCFC
- D) CFC
- E) HF₆

(50) Live attenuated vaccines provide immunity against,

- A) Chickenpox
- B) Mumps
- C) Cholera
- D) Polio
- E) Rabies

5) a) Explain mechanism of enzyme reaction

b) Explain characteristics of kingdom fungi

6) a) Explain responses of plants against gravity using statolith hypothesis

b) explain about Tundra biome

7) a) Explain the structure of human ovary

b) Explain hormonal and nervous regulation of lactation

8) Explain structure and function of skeletal system in animal kingdom

9) a) Explain the mutations occur due to the changes in chromosomal number

b) Explain the principles of tissue culture

10) short notes

a) Antibodies

b) Sickle cell anemia

c)

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