**AGA KHAN UNIVERSITY EXAMINATION BOARD**

**HIGHER SECONDARY SCHOOL CERTIFICATE**

**CLASS XI**

**MODEL EXAMINATION PAPER 2023 AND ONWARDS**

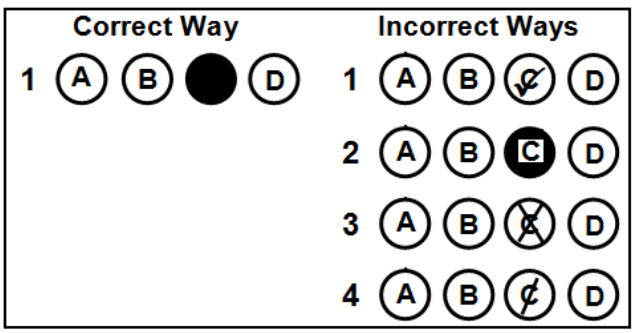
**Biology Paper I**

**Time: 1 hour 30 minutes Marks: 50**



**INSTRUCTIONS**

1. Read each question carefully.
2. Answer the questions on the separate answer sheet provided. DO NOT write your answers on the question paper.
3. There are 100 answer numbers on the answer sheet. Use answer numbers 1 to 50 only.
4. In each question there are four choices A, B, C, D. Choose ONE. On the answer grid black out the circle for your choice with a pencil as shown below.




**Candidate's Signature**

5. If you want to change your answer, ERASE the first answer completely with a rubber, before blacking out a new circle.
6. DO NOT write anything in the answer grid. The computer only records what is in the circles.

1. The jelly fish found in the Pacific Ocean have specialised stinging cells in their ectodermal layer called cnidocytes which contain a bristle-like structure called cnidocil. This structure triggers cnidocytes to respond to danger.

   The CORRECT representation of the hierarchy of biological levels of organisation in ascending order in the given scenario is

   A. Pacific Ocean, jelly fish, ectodermal layer, cnidocytes, cnidocil.
   B. Pacific Ocean, jelly fish, ectodermal layer, cnidocil, cnidocytes.
   C. cnidocil, cnidocytes, ectodermal layer, jelly fish, Pacific Ocean.
   D. cnidocytes, cnidocil, ectodermal layer, jelly fish, Pacific Ocean.

2. An example of inductive reasoning is

   A. all plants are autotrophs and moss is a plant, so moss is an autotroph.
   B. all noble gases are stable and helium is a noble gas, so helium is stable.
   C. all numbers ending in 0 or 5 are divisible by 5, so the number 35 is divisible by 5.
   D. all snakes in the zoo have scales on their body, so all snakes in the world have scales.

3. Zoha burns her finger by touching the side of an iron pot on the stove even though the water in the pot is lukewarm.

   The property due to which there is a difference between the temperature of water and iron pot is

   A. density.
   B. specific heat.
   C. boiling point.
   D. heat of vapourisation.

4. All of the following properties of water are correct EXCEPT that

   A. it has the ability to absorb heat.
   B. it reduces friction between body parts.
   C. it is less dense in liquid form than as a solid.
   D. its molecules dissociate into $H_3O^+$ and $OH^-$ ions.

5. An example of an acidic amino acid is

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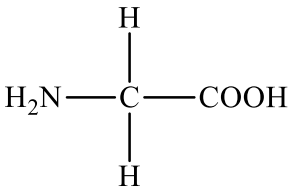
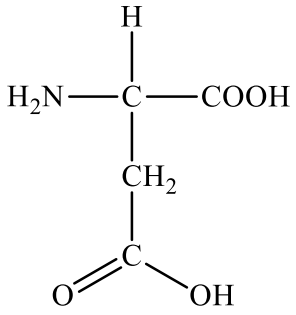
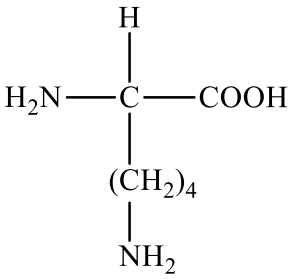
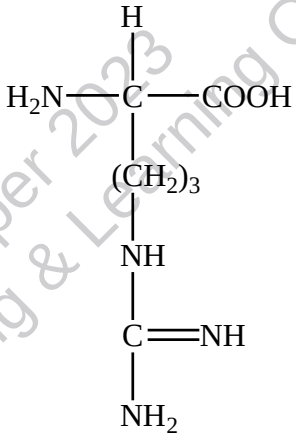
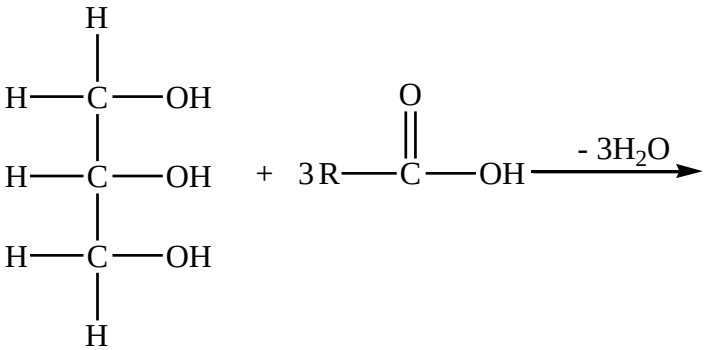
|  |  |
| A | B |
|  |  |
| C | D |



6. Consider the given reaction.



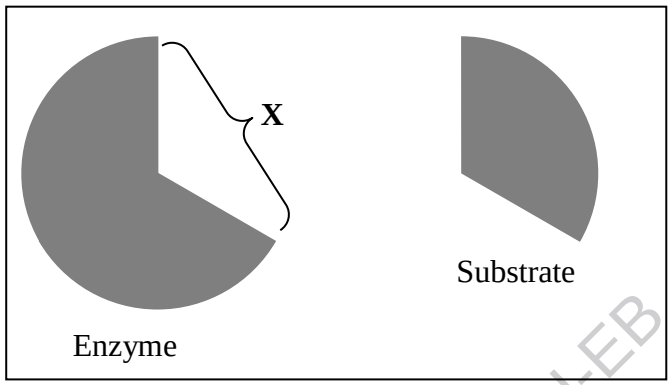
Upon condensation, the given reactants will yield a molecule of

A. steroid.
B. carotenoid.
C. acylglycerol.
D. phospholipid.

7. Nucleohistones are conjugated molecules that function in

A. RNA coiling.
B. regulating chromatin.
C. transporting mRNA to cytoplasm.
D. formation of phosphodiester linkages.

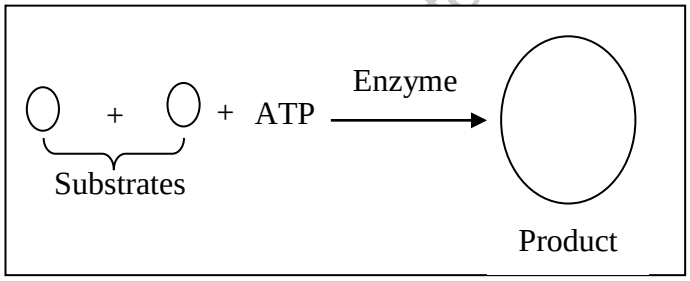
8. The given diagram shows the substrate can fit at site **X** of the enzyme.




This is because the enzyme and the substrate have similar

A. types of amino acids.
B. chemical composition.
C. number of amino acids.
D. geometric configuration.

9. The given diagram illustrates the type of reaction catalysed by a specific group of enzymes.




The group of enzymes that catalyses the given type of reaction is

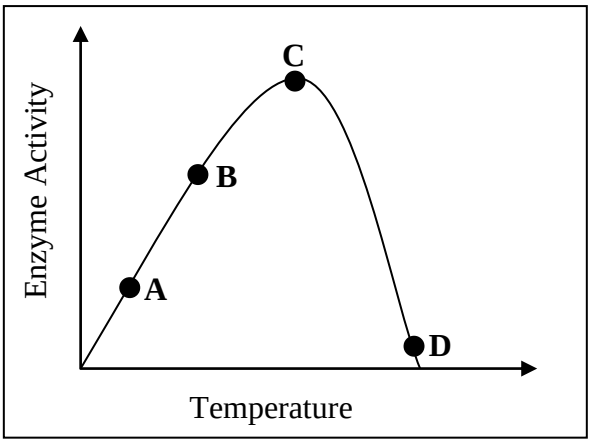
A. lyase.
B. ligase.
C. hydrolase.
D. isomerase.

10. The Induced Fit Model considers enzymes to be

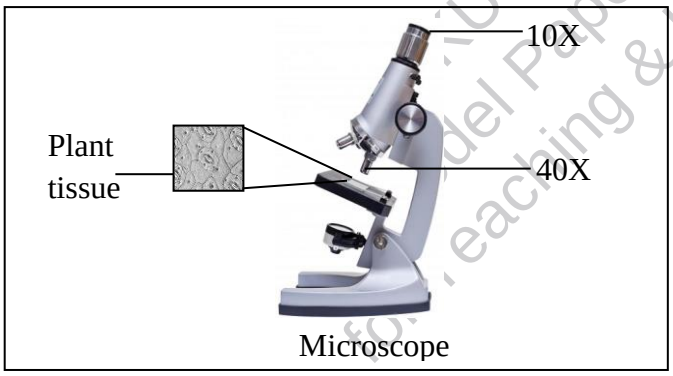
A. flexible.
B. inactive.
C. inorganic.
D. non-specific.

11. The given graph shows the effect of temperature on enzyme activity.

The point where the maximum kinetic energy has no effect on the structure of the enzyme is



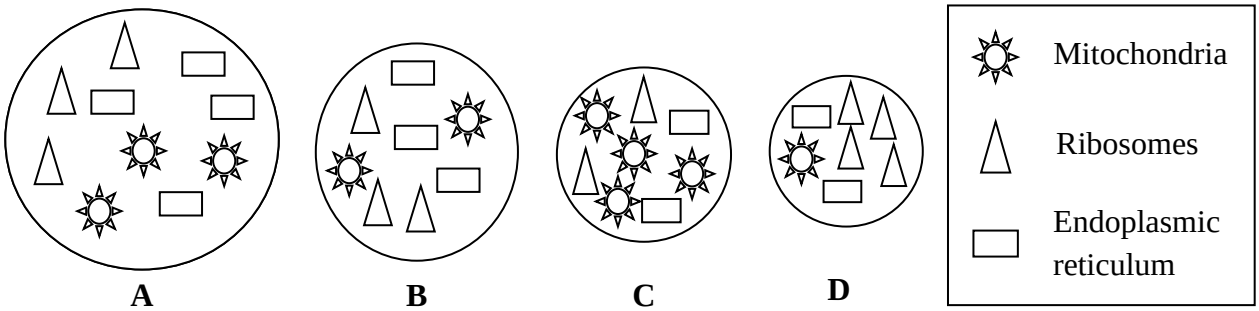

12. The magnification used to view a plant tissue under the microscope as shown in the given diagram is



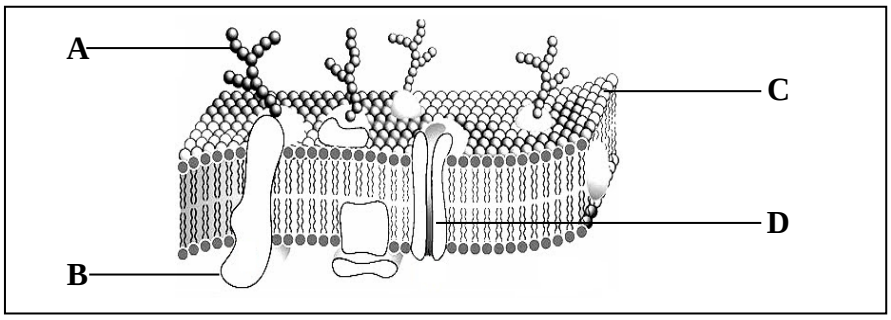

A. 10X.
B. 40X.
C. 50X.
D. 400X.

13. The following diagrams represent the relative quantity of three organelles in animal cells.

Which of the given cells would have the HIGHEST energy demand for metabolic activities?



14. The component of the given plasma membrane that distinguishes one type of cell from the other type of cell in the human body is

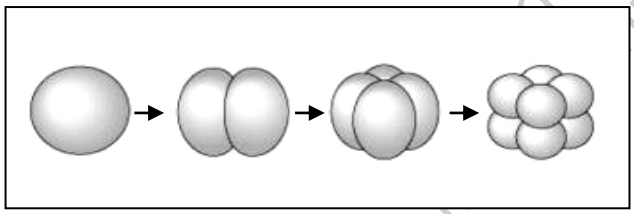



15. Human ovaries and testes produce steroid hormones.

The organelle that would be abundant in human ovaries and testes to facilitate the production of steroid hormones is

A. lysosomes.
B. Golgi bodies.
C. rough endoplasmic reticulum.
D. smooth endoplasmic reticulum.

16. The diagram represents a pattern of cleavage in animals.



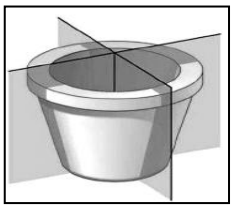
The organisms that follow the given pattern of cleavage belong to the phylum

A. annelida.
B. mollusca.
C. nematoda.
D. echinodermata.

17. Cephalochordates are different from urochordates because in cephalochordates, the notochord

A. is enclosed in a covering called tunic.
B. develops into vertebral column in adults.
C. and nerve chord persist throughout their life.
D. and nerve chord are found in larval stage only.

18. The given diagram represents a type of body symmetry.



The animal which has the type of body symmetry as shown in the given diagram is

| | | | |
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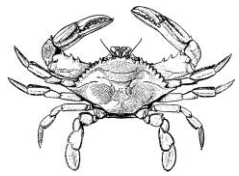
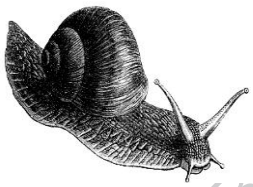
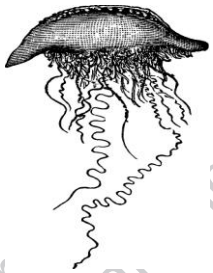
|  |  |  |  |
| A | B | C | D |

19. Cnidarians are also called polyp due to their body

A. size.
B. wall.
C. form.
D. symmetry.

20. Lion, tiger and cat belong to the family Felidae. The scientific name of lion, tiger and cat are *Panthera leo*, *Panthera tigris* and *Felis catus* respectively.

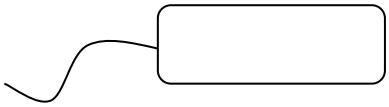
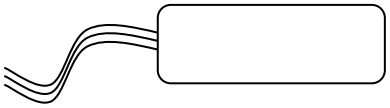
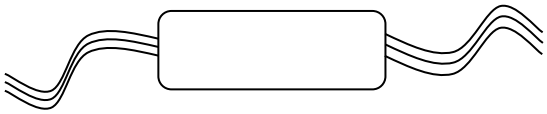
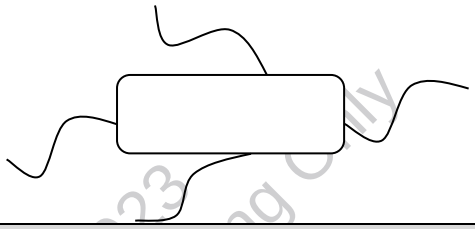
The scientific names of lion, tiger and cat show that the cat, in contrast to lion and tiger, belongs to a different

A. class.
B. order.
C. genus.
D. phylum.

21. During the lytic cycle, the function of lysozymes released by bacteriophage is to

A. synthesise viral genome.
B. dissolve bacterial cell wall.
C. break down bacterial DNA.
D. speed up the formation of proteins.

22. The diagram that represents the amphitrichous condition of bacteria is

| | |
|---|---|
|  |  |
| A | B |
|  |  |
| C | D |

23. In the cell wall of Gram-positive bacteria, the outer membrane and peptidoglycan layer are

| | **Outer Membrane** | **Peptidoglycan Layer** |
|---|---|---|
| A | absent | present |
| B | present | absent |
| C | absent | absent |
| D | present | present |

24. Hydrogen peroxide inhibits the growth of microorganisms on non-living matter.

Hydrogen peroxide acts as a/ an

A. vaccine.
B. antibiotic.
C. antiseptic.
D. disinfectant.

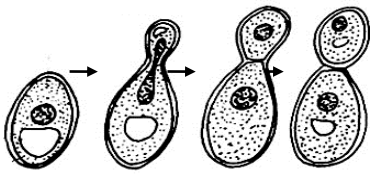
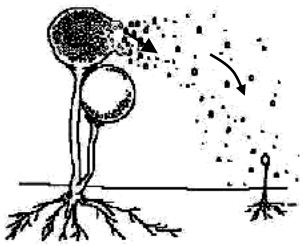
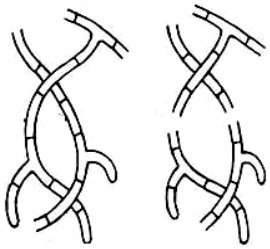
25. An example of pathogenic apicomplexans is

A. entamoeba.
B. plasmodium.
C. trypanosoma.
D. trichonympha.

26. Many of the fungi-like protists are NOT true fungi because they

A. are made up of hyphae.
B. are non-photosynthetic.
C. lack centrioles for division.
D. contain cellulose in their cell walls.

27. The diagram which shows asexual reproduction in fungi through conidia is

| | |
|---|---|
|  |  |
| A | B |
|  |  |
| C | D |

28. In the sexual reproduction of fungal life cycle, the resultant hyphae of plasmogamy contains

A. two nuclei of same genetic type.
B. two nuclei of different genetic types.
C. one nucleus with diploid number of chromosomes.
D. one nucleus with haploid number of chromosomes.

29. The given statements represent different stages of sexual reproduction in Zygomycetes.

I. Development of aerial hyphae with sporangium
II. Formation of gametangia
III. Mating of two different hyphae
IV. Formation of haploid spores
V. Development of zygospore

The CORRECT sequence of stages involved in the reproduction is

A. III, IV, V, II, I
B. III, IV, II, V, I
C. III, II, V, I, IV
D. III, II, IV, V, I

30. The given characteristics are present in a sporophyte of bryophytes.

- Waxy cuticle
- Meristematic tissues
- Stomata and chloroplast

The subdivision of bryophyte that exhibits the given characteristics is

A. bryopsida.
B. psilopsida.
C. hepaticopsida.
D. anthoceropsida.

31. Megaphylls are leaves present in advanced groups of plants that

A. lack floral structures.
B. lack veins and veinlets.
C. are found in dicots only.
D. have an expanded lamina.

32. In the life cycle of a sunflower, which of the following structures are included in gametophyte generation with haploid number of chromosomes?

I. Endosperm
II. Embryo
III. Egg cells
IV. Pollen grain

A. I and II
B. I and IV
C. II and III
D. III and IV

33. The characteristic feature of a sessile flower is that it is

A. devoid of sepals.
B. enclosed in a bud.
C. attached to the pedicel.
D. borne directly on the stem.

34. Based on the fact that a watermelon contains many seeds, it can be inferred about a normal flower of a watermelon plant that it contains

A. many sepals and petals.
B. large-sized anthers.
C. numerous ovules.
D. many stamens.

35. Which of the following options is CORRECT about glycolysis?

(**Note:** ATP = Adenosine Triphosphate and NADH = Nicotinamide Adenine Dinucleotide)

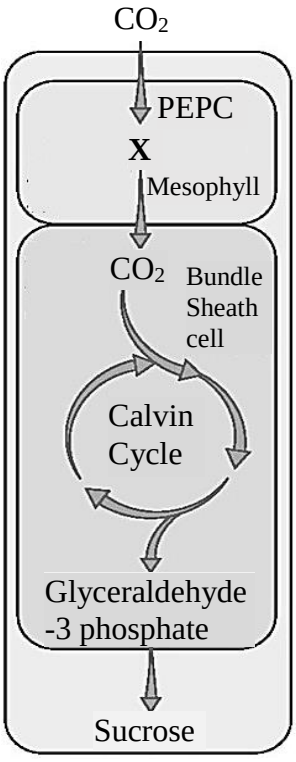
| | **Utilisation of ATP** | **Production of NADH** |
|---|---|---|
| A | Yes | Yes |
| B | No | Yes |
| C | Yes | No |
| D | No | No |

36. When one molecule of acetyl CoA completes the Krebs cycle, it yields

A. 1 NADH, 2 $FADH_2$ and 1 ATP.
B. 2 NADH, 1 $FADH_2$ and 2 ATP.
C. 3 NADH, 1 $FADH_2$ and 1 ATP.
D. 6 NADH, 2 $FADH_2$ and 2 ATP.

37. The given diagram shows carbon fixation in the leaves of C4 plants.

(**Note**: PEPC stands for Phosphoenolpyruvate Carboxylase)




The molecule labelled as '**X**' in the given diagram is

A. malic acid.
B. oxaloacetate.
C. pyruvic acid.
D. phosphoenolpyruvate.

38. Given below is one of the steps of light independent reaction (Calvin cycle).

1,3-bisphosphoglycerate ⟶ glyceraldehyde 3-phosphate

The conversion of the given reactant into product involves

A. formation of ATP.
B. reduction of carbon.
C. utilisation of phosphate.
D. fixation of carbon dioxide.

39. Plants showing stunted growth and strong chlorosis should be MAINLY supplied with

A. iron.
B. calcium.
C. nitrogen.
D. magnesium.

40. The part present in the gastrointestinal tract that prevents the entry of stomach's content back into the oesophagus when contracted is

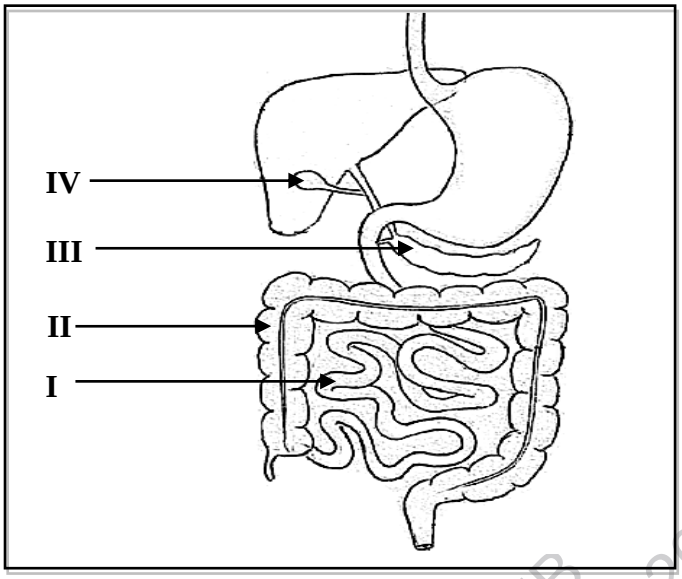
A. mucosal layer.
B. pyloric sphincter.
C. cardiac sphincter.
D. longitudinal muscle layer.

41. Hina is very conscious about her body shape. She overeats and then forces herself to vomit in order to avoid gaining weight.

What disorder does Hina have?

A. Botulism
B. Dyspepsia
C. Bulimia nervosa
D. Anorexia nervosa

42. The given diagram shows the human digestive system.




Which labelled parts do NOT secrete digestive enzymes?

A. I and II
B. I and III
C. II and IV
D. III and IV

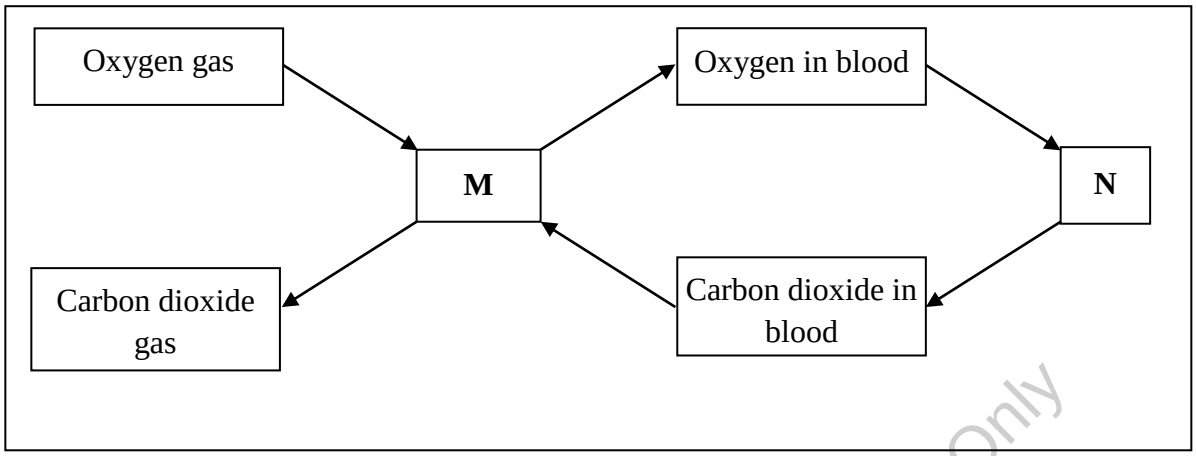
43. The end products formed in the process of photorespiration is

A. oxygen gas and glycolate.
B. carbon dioxide gas and serine.
C. adenosine triphosphate (ATP) and ribulose biphosphate.
D. nicotinamide adenine dinucleotide phosphate (NADPH) and glycine.

44. In fish, the surface area of the gills for gaseous exchange is increased due to the presence of

A. alveoli.
B. gill arch.
C. lamellae.
D. opercula.

45. The given schematic diagram shows gaseous exchange in human respiratory system.




What is represented by **M** and **N** in the given diagram?

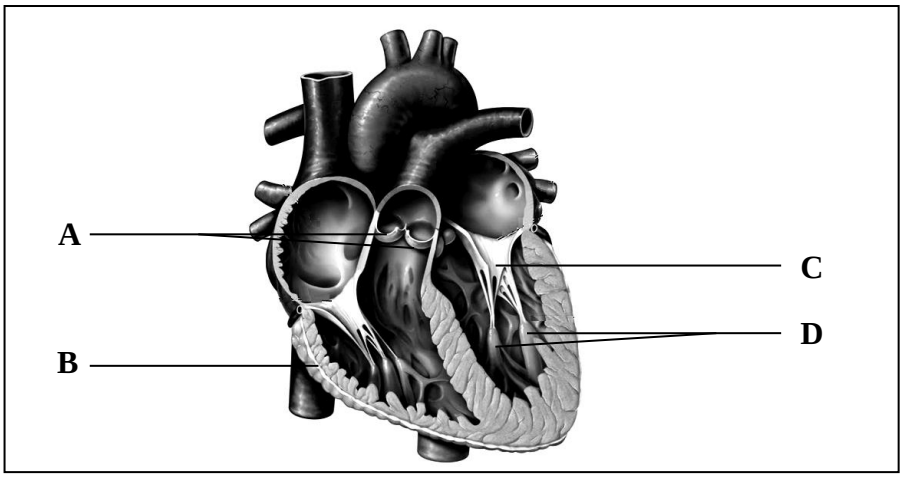
| | **M** | **N** |
|---|---|---|
| A | Alveoli | Atmosphere |
| B | Alveoli | Body cells |
| C | Body cells | Atmosphere |
| D | Body cells | Alveoli |



46. A plasmolysed cell will change into a deplasmolysed cell when it is kept in the solution with

A. same solute potential as that of plasmolysed cell.
B. lower water potential than that of plasmolysed cell.
C. higher water potential than that of plasmolysed cell.
D. higher solute potential than that of plasmolysed cell.

47. In the given diagram of human heart, papillary muscles are labelled as



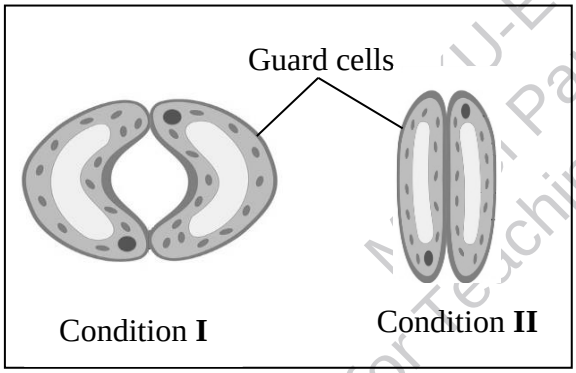
48. A newborn baby is diagnosed with a condition in which ductus arteriosus fails to close which results in blueness of his/ her skin. The skin of the baby appears blue because of the mixing of blood between

A. pulmonary artery and aorta.
B. left atrium and left ventricle.
C. right atrium and right ventricle.
D. pulmonary artery and pulmonary vein.

49. If the systolic pressure of an individual is 110 mm Hg and diastolic pressure is 70 mm Hg, then his/ her pulse pressure would be

A. 40 mm Hg.
B. 70 mm Hg.
C. 110 mm Hg.
D. 180 mm Hg.

50. The given diagram represents guard cells of stomata in two different conditions.






Which of the following options is TRUE about conditions **I** and **II** in guard cells?

| | **Condition I** | | **Condition II** | |
|---|---|---|---|---|
| | **Concentration of $K^+$ ions** | **Concentration of Water** | **Concentration of $K^+$ ions** | **Concentration of Water** |
| A | High | High | Low | Low |
| B | Low | Low | High | High |
| C | Low | High | High | Low |
| D | High | Low | Low | High |

END OF PAPER

# Please use this page for rough work