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MALE & FEMALE

SOLVED PAPERS

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DSSSB POST GRADUATE TEACHER (PGT) 2014

BIOLOGY

SOLVED PAPER

[Exam Date : 30/11/2014, Tier-I]

1. Which of the following is the correct descending sequence of taxonomic categories?
निम्न में से कौनसी वर्गीकृत श्रेणी का सही अवरोही अनुक्रम है?

- Class-order-division-family-species-tribe
प्रकार-क्रम-विभाजन-कुल-जाति-समुदाय
- Family-order-genus-order-division-class
कुल-क्रम-गण-क्रम-विभाजन-प्रकार
- Division-class-order-family-tribe-genus
विभाजन-प्रकार-क्रम-कुल-समुदाय-गण
- Family-order-division-family-species-tribe
कुल-क्रम-विभाजन-कुल-जाति-समुदाय

Ans. (c) : The correct descending sequence of the taxonomic categories is :

Division-Class-Order-Family-Tribe-Genus

- The taxonomic category is also called **Linnaean hierarchy** because it was proposed by Linnaeus.
- The higher ranks give a more general description. The description of life forms becomes more specific as we descend down the hierarchy.

2. "Die naturlichen pflanzenfamilien" is written by

"Die naturlichen pflanzenfamilien" को इसने लिखा

- Bentham Hooker/बेंथम हुकर
- Engler and Prantl /एंग्लर और प्रेंटल
- Linnaeus/लिनियस
- Hutchinson /हचिन्सन

Ans. (b) : "Die naturlichen pflanzenfamilien" is written by Engler and Prantl. They proposed the first phylogenetic classification of plants. This book and the system of classification reflected the new post-Darwinian perspective. They organized the flowering plant life in line with the growing complexity in their floral morphology.

3. Differential staining of bacteria on Gram staining is due to / ग्राम अभिरंजन पर जीवाणुओं का अन्तरीय अभिरंजन इस कारण होता है

- Difference in the cell wall layer components of Gram positive and Gram negative bacteria
ग्राम पोजिटिव और ग्राम निगेटिव जीवाणुओं के कोशिका भित्ति के घटकों में अंतर
- Difference in the cell cell structure of Gram positive and Gram negative bacteria
ग्राम पोजिटिव और ग्राम निगेटिव जीवाणुओं के कोशिका के संरचना में अंतर

(c) Difference in the mode of the nutrition of Gram positive and Gram negative bacteria
ग्राम पोजिटिव और ग्राम निगेटिव जीवाणुओं के पोषण के तरीके में अंतर

(d) None of the above /इनमें से कोई नहीं

Ans. (a) : Differential staining of bacteria on Gram staining is due to difference in the cell wall layer components of Gram positive and Gram negative bacteria.

The basic principle of gram staining involves the ability of the bacterial cell wall to retain the crystal violet dye during solvent treatment. Gram positive micro organisms have higher peptidoglycan content, whereas gram-negative organisms have higher lipid content.

4. Ruminant Endosperm is present in which family?/किस कुल में जुगाली भ्रूणपोष होता है?

- Orchidaceae/ऑर्किडिंसी
- Rubiaceae/रूबींसी
- Annonaceae/एनोनेंसी
- Asclepiadaceae/एसक्लेपियेडेंसी

Ans. (c) : Ruminant Endosperm is present in Annonaceae family. It is developed when the seed coat grows into the endosperm and dissects it. It is observed in the areca nut or members of the family Annonaceae.

5. Which one is known as filamentous bacteria? तन्तुमय जीवाणु किसे कहा जाता है?

- Mycoplasmas/माइकोप्लाज्मा
- Spirochaetes /स्पाइरोकाइट्स
- Actinomycetes /एक्टिनोमाइसिटीज
- Vibrios/विब्रियोज

Ans. (c) : Actinomycetes is also known as the filamentous bacteria. They are a group of unicellular filamentous bacteria that form a branching network of filaments and produce spores.

6. Cork-screw shaped forms of bacteria are कॉर्क-पेंच के आकार के जीवाणु होते हैं

- Bacilli /दण्डाकार
- Stalked bacteria /संवृत जीवाणु
- Spirochaetes /स्पाइरोकाइट्स
- Actinomycetes /एक्टिनोमाइसिटीज

Ans. (c) : Cork-screw shaped forms of bacteria are Spirochaetes. They are spiral-shaped, slender and flexible. They are chemoheterotrophic in nature. They are either free living or host associated. They have endocellular flagella which helps it with the movement.

7. Outside of living cell, the virus particle is called/जीवित रहने वाली कोशिका के बाहर, वाइरस कण को कहते हैं

- (a) Virion /विरियन
- (b) Capsid/कैप्सिड
- (c) Obligate parasite /अनिवार्य परजीवी
- (d) None of these /इनमें से कोई नहीं

Ans. (a) : Outside of living cell, the virus particle is called **virion**, have a protein coat called **capsid**. The main function of the virion is to deliver its DNA or RNA genome into the host cell so that the genome can be expressed by the host cell.

8. "Eleterium" a dangerous drug is obtained from/"इलेटेरियम" यह हानिकारक दवा इससे पाई जाती है

- (a) Ecballium/एकबैलियम
- (b) Sechium/सेचियम
- (c) Trichosantes/ट्रिकोसेन्थीज
- (d) Echinocystis /इचिनोसिस्टिस

Ans. (a) : 'Eleterium' a dangerous drug is obtained from **Ecballium**. It is also known as the **wild or squirting cucumber**, is a hairy, perennial herbaceous vine of the Cucurbitaceae family. All parts of the plant are toxic particularly the green fruits.

9. Scientific name of "Indian Telegraph" plant is/"इंडियन टेलिग्राफ" पौधे का वैज्ञानिक नाम है

- (a) Canavalia ensiformis/कैनावलिया एनसिफार्मिस
- (b) Indigofera tinctoria/इंडिगोफेरा टिनक्टोरिया
- (c) Desmodium gyrans/डेस्मोडियम गाइरेन्स
- (d) Butea frondosa/ब्यूटिया फ्रॉडोसा

Ans. (c) : The scientific name of the "Indian Telegraph" plant is **Desmodium gyrans**, which belongs to the family Leguminosae, also known as family Fabaceae. It is commonly called **pea or legume family**.

The scientific name of **Desmodium gyrans** is **Codariocalyx motorius**. It is known as the telegraph plant, for its tiny lateral leaflet movement at rates that are swift enough to be experienced by the naked eye. This is a method for controlling the sun to optimize sunshine.

10. AIDS virus contains/एड्स के वाइरस में होते हैं

- (a) DNA only/केवल DNA
- (b) RNA only/केवल RNA
- (c) DNA + Protein / DNA + प्रोटीन
- (d) RNA + Protein / RNA + प्रोटीन

Ans. (d) : AIDS virus contains RNA + Protein. AIDS is also called as **acquired immune deficiency syndrome**, which is caused by HIV (Human Immuno deficiency Virus). It contains envelope, proteins and core. These proteins are located in between the core and the envelope. The core consists of two single stranded RNA.

11. Ginkgo biloba is not now an endangered species because of its/अब Ginkgo biloba संकटापन्न जाति नहीं है, इसका कारण है उसका

- (a) Ex-situ conservation /प्राकृतिक संरक्षण
- (b) Offsite conservation /ऑफसाइट संरक्षण
- (c) In-situ conservation /मूलस्थान संरक्षण
- (d) Cryopreservation /शीत परिरक्षण

Ans. (a) : **Ginkgo biloba** is not now an endangered species because of its Ex-situ conservation, which means conservation outside the habitats by perpetuating sample population in genetic resource centers. **Ginkgo biloba**, once in the list of endangered species is now flourishing in gardens.

12. Cryopreservation is useful for शीत परिरक्षण इसके लिए उपयोगी होता है

- (a) Preservation of semen /वीर्य का परिरक्षण
- (b) Living cells /जीवित कोशिका
- (c) Very young foetuses/बहुत अल्पवयस्क भ्रूण
- (d) All the above/ऊपरी सभी

Ans. (d) : Cryopreservation is useful for preservation of semen, living cells, very young foetuses. It is a process that preserves organelles, cells, tissues, or any other biological constructs by cooling the samples to very low temperature.

13. Who is known as the father of Phycology? फायकॉलॉजी (शैवाल शास्त्र) के पितामह किसे कहा जाता है?

- (a) De Bary/डी बेरी
- (b) Fritsch/फ्रिट्च
- (c) Aristotle/ऑरिस्टॉटल
- (d) Hodgkin /हॉजकिन

Ans. (b) : F.E. Fritsch is popularly known as the Father of Phycology, it is the study of algae.

He proposed the classification of algae that they should not be divided into phyta, i.e., divisions but only into classes. According to him, algae were classified into following II classes based on structure and reproduction of the algae.

14. "Ipecac" which is an excellent drug for Amoebic - dysentery is obtained from 'इपेकैक' (Ipecac) जो अमीबा-पेचिश की उत्कृष्ट दवा है, इससे प्राप्त की जाती है

- (a) Roots of Morinda /मोरिंडा की जड़
- (b) Wood of Morinda /मोरिंडा की लकड़ी
- (c) Roots of Cephaelis/सिफेलिस की जड़
- (d) Wood of Cephaelis/सिफेलिस की लकड़ी

Ans. (c) : "Ipecac" is an excellent drug for Amoebic dysentery which is obtained from roots of **Cephaelis**. It is made from alcohol extraction of the plants **Cephaelis**. It contains two active alkaloid agents : emetine and cephaeline.

15. On the top of the Ovary a nectar disc "stylopodium" is present in the family अण्डाशय के ऊपरी हिस्से में "स्टायलोपोडियम" नामक मकरन्द डिस्क इस कुल में पाई जाती है

- (a) Euphorbiaceae/यूफोर्बिएसी
(b) Apiaceae/ऐपियेसी
(c) Orchidaceae/ऑर्किडेसी
(d) Lamiaceae/लेमियेसी

Ans. (b) : On the top of the ovary a nectar disc "stylopodium" is present in the family Apiaceae. **Stylopodium** is a glandular disc-shaped or a conical swelling like expansion at the bottom of the style in plants of family Apiaceae. **For e.g :- Coriander.**

16. Flavouring agent "Vanilla" belongs to the family खुशबु कारक "वेनिला" इस कुल से सम्बंधित है

- (a) Lamiaceae/लेमियेसी
(b) Apiaceae/ऐपियेसी
(c) Orchidaceae/ऑर्किडेसी
(d) Asclepiadaceae/एसक्लेपियेडेसी

Ans. (c) : Flavouring agent "Vanilla" belongs to the family Orchidaceae. It is primarily obtained from pods of the flat-leaved vanilla. There are over 150 varieties of vanilla plants. Just like grapes that make wine, no two vanilla beans are the same in flavor, aroma or color.

17. Feathery stigmas are seen in पक्षमय वर्तिकाग्र इनमें देखे जाते हैं

- (a) Orchidaceae/ऑर्किडेसी
(b) Palmae/पामी
(c) Oleaceae/ओलीएसी
(d) Gramineae/ग्रेमिनी

Ans. (d) : Feathery stigma are seen in Gramineae. This family flowers are not very showy and do not have petals or sepals. Each female flower consists of an ovary from which two styles emerge, finished with two feathery sticky stigmas to catch pollen.

18. "Stamens are the male organs" of the flower was first stated by फूलों के "पुंकेसर नर अंग है" यह पहले इसने कहा

- (a) Camerarius /कैमेरारियस
(b) Kolreuter /कोलरेयूटर
(c) Grew/ग्रीउ
(d) Amici/एमिसि

Ans. (c) : "Stamens are the male organs" of the flower was first stated by Grew, in 1682. Stamen consists of an anther and filament. The bulged part of stamen which produces pollen grain is known as **anther** which is borne on a slender stalk known as **filament**.

19. In which type of ovule the nucellar tissue remains single layered?/कौन-से प्रकार के बीजाण्ड में कोशिकारहित ऊतक एकल स्तरी रहता है?

- (a) Unitegmatic ovules /एकअन्तःकवचीय बीजाण्ड
(b) Bitegmatic ovules / द्विअन्तःकवचीय बीजाण्ड
(c) Tenuinucellate ovules/ टेन्यूनुसेलेट बीजाण्ड
(d) Crassinucellate ovules / क्रैसिन्यूसेलेट बीजाण्ड

Ans. (c) : In tenuinucellate ovules, the nucellar tissue remains single layered. The ovules with hypodermal sporogenous cell with unilayered nucellus tissue is called as **tenuinucellate**. They have very small nucleus.

20. Which of the following are the features that differentiates cilia from flagella?

निम्न में से कौन-सा लक्षण है जो पक्ष्माभिका और कशाभिका में भेद दिखाता है?

- (a) Cilia are short compared to flagella कशाभिका के मुकाबले पक्ष्माभिका छोटे होते हैं
(b) Flagella are less in number compared to cilia पक्ष्माभिका की तुलना में कशाभिका की संख्या कम होती है
(c) Cilia are distributed throughout the cell surface कोशिका की पूरी सतह पर पक्ष्माभिका फैली रहती है
(d) All of the above/ऊपरी सभी

Ans. (d) : The features that differentiates cilia from flagella are :

Cilia	Flagella
1. They are usually shorter in length	1. They are comparatively longer in length.
2. The number of cilia is comparatively more (typically ranges in the thousands).	2. The number of flagella is comparatively less (usually range from 1 to 8).
3. They are found in eukaryotic cell	3. They are found both in prokaryotic and eukaryotic cells.

21. Eukaryotic flagella is driven by यूकैरियोटिक पक्ष्माभिका को प्रेरित करता है

- (a) ATP/एटीपी
(b) Proton/प्रोटॉन
(c) Both (A) and (B)/(A) और (B) दोनों
(d) None of these /इनमें से कोई नहीं

Ans. (a) : Eukaryotic flagella is driven by ATP. The flagella is a structure that exists on both eukaryotic and prokaryotic cells, it serves the purpose of moving the cell.

Eukaryotic cells have flagella that is made of protein filament known as **microtubules** and uses ATP to create a bending-like motion that propels the cell forward.

22. Bioluminescence is a phenomenon associated with/जीवसंदिप्ति यह प्रतीभास इससे सम्बंधित है

- (a) Chrysophyta /क्राइसोफाइटा
(b) Phaeophyta /फियोफायटा
(c) Pyrrophyta / पायरोफायटा
(d) Chlorophyta /क्लोरोफायटा

Ans. (c) : Bioluminescence is a phenomenon associated with pyrophyta, which possess the ability to produce light through a complex biochemical reaction involving luciferase and luciferin. The function of bioluminescence in pyrophyta includes defense, attraction of prey, etc.

23. Which of the following algal divisions is characterized by possession of chlorophylls A and B, starch as the energy storage material, cellulosic cell walls and live in fresh water and marine habitats?

निम्न में कौनसे शैवाल विभाजन के क्लोरोफिल A और B का आधिपत्य, स्टार्च ऊर्जा संचयन द्रव्य, सेल्युलोजिक कोशिका भित्ति और ताजे पानी में रहना और समुद्री प्राकृतिक वास जैसे लक्षण हैं?

- (a) Chlorophyta / क्लोरोफायटा
- (b) Chrysophyta/ क्रायसोफायटा
- (c) Phaeophyta/ फियोफायटा
- (d) Pyrrophyta / पायरोफायटा

Ans. (a) : Chlorophyta, algal divisions is characterized by possession of chlorophylls A and B, starch as the energy storage material, cellulosic cell walls and live in freshwater and marine habitats.

Chlorophyta is commonly called as **green algae**. For e.g: *Spirogyra, Ulothrix*, etc.

24. Which algal division is divided up into three main groups consisting of the golden-brown algae, the yellow-green algae and the diatoms?

कौनसा शैवाल विभाजन तीन मुख्य समूहों में बँटा है और जिस में सुनहरा-भूरा शैवाल, पीला-हरा शैवाल और द्विपरमाणु शामिल हैं?

- (a) Chlorophyta /क्लोरोफायटा
- (b) Chrysophyta /क्रायसोफायटा
- (c) Phaeophyta / फियोफायटा
- (d) Pyrrophyta / पायरोफायटा

Ans. (b) : Chrysophyta, algal division is divided up into three main groups consisting of the golden-brown algae, the yellow-green algae and the diatoms.

For example : Desmids, etc.

25. Origin and evolution of sex in algae is best seen in शैवाल के लिंग का प्रारंभ और विकास इनमें बहुत अच्छी तरह से देखा जा सकता है

- (a) Blue-green algae /नीला-हरा शैवाल
- (b) Green algae / हरा शैवाल
- (c) Red algae / लाल शैवाल
- (d) Brown algae / भूरा शैवाल

Ans. (b) : Origin and evolution of sex in algae is best seen in green algae. For e.g; *Ulothrix* and *Chlamydomonas*. The first sexual reproduction was seen in them, in the form of isogamy that the gametes formed were of plus and minus strains.

26. Zygotic meiosis is a characteristic feature of जायगोटिक मियोसिस इसका विशिष्ट लक्षण है

- (a) Algae /शैवाल
- (b) Bryophytes /ब्रायोफाइट्स
- (c) Pteridophytes /टेरिडोफाइट्स
- (d) Gymnosperms /अनावृतबीजी

Ans. (a) : Zygotic meiosis is a characteristic feature of algae. In zygotic meiosis, the zygote divides meiotically or when the zygote undergoes reduction division, after the division of nucleus i.e. after karyogamy.

27. Sargasso sea is named after an algae Sargassum which is a/सरगासो सागर का नाम सरगासम शैवाल पर है, जो एक है

- (a) Green algae /हरा शैवाल
- (b) Brown algae /भूरा शैवाल
- (c) Red algae /लाल शैवाल
- (d) Blue-green algae /नीला-हरा शैवाल

Ans. (b) : Sargasso sea is named after an algae **Sargassum** which is a brown algae. It is commonly known as **Japanese wireweed** that belongs to the algal group containing chlorophyll a, chlorophyll c and fucoxanthin. The reserved form of food in these algae is laminarin.

28. How many Antipodal cells are there in Oenothera type of Embryo sac?/ओएनोथेरा प्रकार के भ्रूण कोश में कितनी विरोधी कोशिकाएँ होती हैं?

- (a) 4
- (b) 8
- (c) 3
- (d) Zero/शून्य

Ans. (d) : In Oenothera type of embryo sac, the antipodal cells are absent. The embryo sac of this type typically consists of a large central cell with two polar nuclei, synergids, and an egg cell but lacks antipodal cells. This unique arrangement is characteristic of the Oenothera genus in plant embryology.

29. Central Drug Research Institute is situated at केन्द्रीय औषध अनुसन्धान संस्थान कहाँ स्थित है?

- (a) Delhi/दिल्ली
- (b) Bombay/मुंबई
- (c) Chennai/चेन्नई
- (d) Lucknow/लखनऊ

Ans. (d) : The Central Drug Research Institute (CDRI) is situated at Lucknow, Uttar Pradesh. It is a multidisciplinary research laboratory, employing scientific personnel from various areas of biomedical sciences.

30. In some parasitic fungi a globular or hook like structure is formed at the point of contact with the host. This is known as/कुछ परजीवी कवकों में एक गोलाकार या काँटे जैसी संरचना परपोषी के साथ के सम्पर्क बिन्दु पर रूप लेती है। इसे कहते हैं

- (a) Haustoria /शोषक
- (b) Appresorium /एप्रेसोरियम
- (c) Hold fast /पकड़
- (d) Hook/आँकड़ा

Ans. (b) : In some parasitic fungi a globular or hook-like structure is formed at the point of contact with the host. This is known as **appressorium**.

31. "Perfect stage" of fungus means कवक की "परिपूर्ण अवस्था" का मतलब है

- (a) When the fungus is perfectly healthy जब कवक सम्पूर्णतः स्वस्थ होता है
- (b) When it produces asexually जब वह अलिंगी होकर उत्पन्न करता है
- (c) When it forms perfectly sexual spores जब वह सम्पूर्ण लैंगिक बीजाणु बनता है
- (d) None of these/इनमें से कोई नहीं

Ans. (c) : "Perfect stage" of fungus means when it forms perfectly sexual spores.

"Perfect stage" is a phase in the life cycle of certain fungi in which sexual spores are formed, as the asci in the sexual stage of the ascomycetes.

32. Enzyme code of Glucose-6-Phosphotransferase is/ "ग्लूकोज-6- Phosphotransferase का एन्जाइम कोड है

- (a) 2-7-1-2
- (b) 2-1-7-2
- (c) 2-7-2-2
- (d) 2-7-2-1

Ans. (a) : Enzyme code of Glucose-6-phosphotransferase is 2-7-1-2.

- The first digit of code indicates major class of enzyme.
- The second digit of code indicates subclass of enzyme.
- The third digit of code indicates sub-class of enzyme.
- The fourth digit of code indicates serial number of particular subclass.

33. Assume that four molecules of an enzyme and 60000 molecules of substrate are taken into a test tube, containing water. All the substrate molecules are converted into products in five minutes. Considering this data, calculate the TON of that enzyme./कल्पना कीजिए कि, एक एन्जाइम के चार अणु एक पानी वाली परीक्षण नली में 60000 सबस्ट्रेट के अणुओं के साथ लिए गये हैं। पाँच मिनट में सबस्ट्रेट के सभी अणु को उत्पाद में परिवर्तित किया जाता है। यह सामग्री ध्यान में रखते हुए उस एन्जाइम का टीओएन का हिसाब लगाइये।

- (a) 2500
- (b) 3000
- (c) 3500
- (d) 4000

Ans. (b) : The **Turnover Number (TON)** of an enzyme is the number of substrate molecules converted into product per molecule of enzyme per unit of time.

$$\text{TON} = \frac{\text{(Number of Substrate molecules)}}{\text{(Number of Enzyme molecules)}(\text{Time})}$$

$$\text{TON} = \frac{(60000)}{(4) \times (5)} = 3000$$

34. Plant hormone used as antitranspirant is पादप हार्मोन जिसे प्रस्वेदक रोधी के रूप में उपयोग में लाते हैं

- (a) IAA/आईए
- (b) GA/जीए
- (c) Ethylene/इथिलिन
- (d) ABA/एबीए

Ans. (d) : Plant hormone used as anti-transpirant is ABA. It is a naturally occurring plant hormone. It stimulates the closure of stomata in the epidermis during water stress conditions. Therefore, the water loss through the stomata by transpiration is reduced and it is therefore, known as **antitranspirant hormone**. ABA increases the tolerance of plants to various kind of stresses in the environment. Therefore, it is also known as **stress hormone**.

35. Organisation of stem apex into corpus and tunica is determined mainly by/स्कंध शीर्ष का पिण्ड और कंचुक में संगठन होना निर्धारित करता है

- (a) Planes of cell division /कोशिका विभाजन का स्तर
- (b) Regions of meristematic activity विभज्योतिकी हलचल का प्रदेश
- (c) Rate of cell growth /कोशिका वृद्धि दर
- (d) Rate of shoot lip growth /प्ररोह अग्र का वृद्धि दर

Ans. (a) : Organisation of stem apex into corpus and tunica is determined mainly by planes of cell division.

The outer zone of shoot apex, i.e. tunica forms protoderm which through anticlinal divisions gives rise to epidermis of stem and leaves. Corpus is inner mass of meristem where cells undergo divisions in different planes to form procambium and ground meristem.

36. Exanthema in citrus is due to

निम्बू-वंश में स्फोटक इस कारण होता है

- (a) Deficiency of Manganese/मैंगनीज की कमी
- (b) Deficiency of Copper/तांबे का कमी
- (c) Deficiency of Iron /लोह की कमी
- (d) Deficiency of Aluminium/एल्युमिनियम की कमी

Ans. (b) : **Exanthema** in citrus is due to deficiency of copper. It is produced by soil factors, brought about by soil microorganisms, which causes the yield of gums on the bark and affects the fruit-bearing capacity of the tree. Dying of the leaves is a major characteristic symptom of exanthema.

37. The pahala blight of sugarcane is due to the deficiency of/गन्ने में पायी जानेवाली पहाला चिन्ती इसके अभाव के कारण होती है

- (a) Copper/तांबा
- (b) Manganese/मैंगनीज
- (c) Iron/लोहा
- (d) None of the above /इनमें से कोई नहीं

Ans. (b) : The pahala blight of sugarcane is due to the deficiency of manganese. The white spots on chlorotic leaf areas become necrotic and turn red, reddish-brown or brown.

38. Which rust of crucifers caused *Albugo candida* belongs to class/ *Albugo candida* जो कूसीफेरी के सफेद जंग से होता है, वह इस वर्ग से सम्बन्धित है

- (a) Oomycetes /ऊमाइसिटीज
 (b) Plasmophora /प्लाज्मोफोरा
 (c) Phytophthora /फायटोफथोरा
 (d) All of the above /उपर्युक्त सभी

Ans. (a) : White rust of Crucifers caused *Albugo candida* belongs to class Oomycetes. The plant members of the Brassica family are generally susceptible to this disease. White rust has been known to cause agricultural losses in fields cultivating members of this family including cauliflower, broccoli, Indian mustard etc.

39. Cleavage polyembryony is found in बहुगर्भत्व दरार इसमें दिखाई देती है

- (a) Pinus/चिड़
 (b) Cycas/ताड़
 (c) Cycas and Pinus both /ताड़ और चिड़ दोनों
 (d) None of these /इनमें से कोई नहीं

Ans. (a) : Cleavage polyembryony is found in Pinus. It commonly occurs in gymnosperms. In case of the coniferous plants, all the four cells of the young embryo develop into 4 embryos. The three wither off and the one completely develops into a new plant.

40. Tunica Corpus theory was proposed by कंचुक कार्पस सिद्धान्त इन्होंने प्रस्तावित किया था

- (a) Hanstein/हैनस्टेन
 (b) Schmidt/स्मिड्ट
 (c) Haberlandt/हेबरलैंड
 (d) Robert Hook/रॉबर्ट हुक

Ans. (b) : The Tunica-Corpus theory was proposed by Schmidt. It focused on the pattern of growth of tissues present at the apex. This theory describes the planes of cell division in the shoot apex of plants. It was proposed on the basis of observation and studies conducted over plant shoot apex. It is not applicable to roots or any other plant parts.

41. Mucilaginous canals in Cycas are found in ताड़ में श्लेष्मीय नलियाँ यहाँ पाई जाती हैं

- (a) Pith only/केवल मज्जा
 (b) Cortex and pith/प्रान्तस्था और मज्जा
 (c) Vascular bundle/संवहनी बण्डल
 (d) All of these /इनमें सभी

Ans. (b) : Mucilaginous canals in Cycas are found in cortex and pith. Both centrally located pith and the cortex are large and well developed and contain mucilage canals.

42. The fruits are not formed in gymnosperms because/अनावृतबीजी में फल उत्पन्न होते हैं क्योंकि

- (a) They are seedless plants /वे बीजरहित वनस्पति हैं
 (b) They are not pollinated /वे परागणित नहीं होते
 (c) They have no ovary/उनके अण्डाशय नहीं होते
 (d) The process of fertilization does not take place in them /निषेचन की प्रक्रिया उनमें नहीं होती

Ans. (c) : The fruits are not formed in gymnosperms because they have no ovary. Gymnosperms are vascular seed-producing plants which have naked or unenclosed seeds, that are borne in cones and do not have an ovary. Here, double fertilisation does not takes place.

43. Stomata are absent in/इनमें रंध नहीं होते

- (a) Submerged plants/जलमग्न वनस्पति
 (b) Xerophytes/मरुद्भिद्
 (c) Free floating plants/मुक्त प्लवमान वनस्पति
 (d) All of the above /ऊपरी सभी

Ans. (a) : The stomatas are absent in submerged plants, in this plant exchange of nutrients, gases, etc. and water uptake occurs directly through the general surface. These plants do not have stomata and do not show phenomenon of transpiration.

44. Enrichment of water bodies through human activity is

जल कार्यो का मानव क्रियाकलाप से संवर्धन है

- (a) Denudation/निराकरण
 (b) Eutrophication /युट्रोफिकेशन
 (c) Naturosis/नैचुरोसिस
 (d) Leaching /विक्षालन

Ans. (b) : The enrichment of water bodies through human activity is **eutrophication**. It occurs when a body of water becomes overly enriched with nutrients.

Phosphorus and nitrates present in domestic sewage act as nutrients and promote the growth of algae which form a cover on the water surface.

45. Plants growing on snow are known as

हिम पर विकसित होनवाली वनस्पति को कहते हैं

- (a) Cryptophytes /क्रिप्टोफाइट्स
 (b) Cryophytes/क्रायोफाइट्स
 (c) Therophytes/थेरोफाइट्स
 (d) Oxylophytes /ऑक्सिलोफाइट्स

Ans. (b) : Plants growing on snow are known as **cryophytes**, these forms of algae causes red snow, green snow, yellow snow, etc. The term 'Cryo' refers to cold and 'phytes' refers to plants or organisms. Cryophytes are also known as **cryovegetation or cryoflora**.

46. Carpogonial filament of polysiphonia consist of following number of cells

बहुनलिकों की कार्पोगोनियल केशर में निम्न संख्या की कोशिकाएँ होती हैं

- (a) 3 – 4 (b) 4 – 5
 (c) 5 – 6 (d) 6 – 7

Ans. (b) : Carpogonial filament of polysiphonia consist of 4-5 number of cells. The carpogonial filament is situated at the tip and is also known as **carpogonium**. It is a flask-shaped structure with a swollen base and a long tubular neck called the **trichogyne**.

47. Which of the following is not concerned with cyanophyceae?

निम्न में से क्या सायनाफाइसी से सम्बन्धित नहीं है?

- (a) Absence of sex organs and motile reproductive bodies
लिंग इन्द्रिय का ना होना और गतिशील प्रजनक कार्य
- (b) Simple protoplasts with plastids
प्राकल कण के साथ साधारण जीवद्रव्यक
- (c) The low state of the thallus organization and extremely simple cell structure /कायक संगठन की निम्न अवस्था और बहुत ही सीधी कोशिका संरचना
- (d) Absence or well organized nuclei
अच्छी तरह से संगठित केन्द्रकों का ना होना

Ans. (b) : The cells of Cyanophyceae or blue-green algae (BGA) have less developed nucleus, and they do not show sexual reproduction. They are unicellular or filamentous. The name blue-green algae is given because of the presence of a dominant pigment c-phyococyanin, the bluegreen pigment.

48. Phytochrome is involved in पादपवर्ण (फायटोक्रोम) इससे सम्बन्धित है

- (a) Phototropism/फोटोट्रोपिज्म
- (b) Photoperiodism/फोटोपेरिओडिज्म
- (c) Photorespiration /प्रकाशश्वसन
- (d) Photophosphorylation /प्रकाशभास्वरलन

Ans. (b) : Phytochrome is involved in photoperiodism. Phytochrome is a light-sensitive pigment found in plants that plays a crucial role in regulating various aspects of plant growth and development in response to light.

Photoperiodism refers to the physiological response of plants to the relative lengths of day and night. Phytochrome is a key component in this process, as it helps plants sense the duration of light and darkness. It is particularly involved in triggering events such as flowering, dormancy and other developmental processes based on the changing lengths of day and night.

49. The branch of ecology that deals with the biological relationship between an individual organism or an individual species and its environment

परिस्थिति विज्ञान की शाखा जो अलग-अलग जीव का या अलग-अलग जाति का और उनके वातावरण के बीच का जैव सम्बन्ध पर विचार करती है

- (a) Autecology/आटइकोलॉजी
- (b) Synecology/सिनइकोलॉजी
- (c) Phytogeography /पादपभूगोल
- (d) None of the above /इनमें से कोई नहीं

Ans. (a) : The branch of ecology that deals with the biological relationship between an individual organism or an individual species and its environment is called as **autecology**.

50. Cancer's are apart of every culture and have been around as long as people. The study of cancers is known as

कर्कटाबुद (कैंसर) हर जीवाणु-समूह का एक भाग है और जब से आदमी है, तब से वह मौजूद है। कर्कटाबुद के अध्ययन को कहते हैं

- (a) Physiology/शरीरविज्ञान
- (b) Pathology/रोगविज्ञान
- (c) Oncology/अर्बुदविज्ञान
- (d) Neurology /तन्त्रिका विज्ञान

Ans. (c) : Cancer's are a part of every culture and have been around as long as people. The study of cancer's is known as **oncology**. It is a branch of medicine that deals with the study, treatment, diagnosis and prevention of cancer.

51. Which one of the following was the cause of the "baby boom" in the last century?/पिछली सदी में "बेबी बूम" का निम्न में से क्या कारण था?

- (a) Immigration/आप्रवासन
- (b) Ending of the war/युद्ध की समाप्ति
- (c) Development of birth control/संतति नियंत्रण
- (d) Mortality/मर्त्यता

Ans. (b) : The ending of the war was the cause of the "baby boom" in the last century.

Baby boom is a period marked by a significant increase of births. People born during these periods are often called **baby boomers**. The best known baby boom occurred in the mid-twentieth century, sometimes considered to have started after the end of the Second World War, sometimes from the late 1940s, and ending in the 1960s.

52. Which one of the following molecules is not a component of the 30s initiation complex?

निम्नलिखित में से कौनसा अणु 30s संकीर्ण नीजारोपण का अंगभूत नहीं है?

- (a) GTP/जीटीपी
- (b) mRNA/एमआरएनए
- (c) Initiation factor 2/नीजारोपण कारक 2
- (d) ATP/एटीपी

Ans. (d) : The 30s initiation complex in bacterial translation involves several components, including mRNA, initiator tRNA (charged with formyl-methionine), and initiation factors. GTP is also used during the initiation process. However, ATP is not typically considered a direct component of the 30s initiation complex. Instead, ATP is generally involved in various cellular processes, including energy transfer, but it is not a central component in the initiation of protein synthesis.

53. Animals get nitrogen directly through जानवरों को नाइट्रोजन सीधे इसके द्वारा मिलता है

- (a) Nitrogen fixation /नाइट्रोजन निर्धारण
- (b) Plants /वनस्पति
- (c) Bacteria /जीवाणु
- (d) Habitat /प्राकृतिक वास

Ans. (b) : Animals get nitrogen directly through plants. Atmospheric nitrogen is fixed by nitrogen - fixing bacteria and makes available to the plants. Animals, like herbivores feed on plants absorbs nitrogen in the form of protein.

54. **The king of Indian spices**
भारतीय मसालों का राजा है
- Foeniculum vulgare/फीनिक्कुलम वल्वारे
 - Piper nigrum/पाइपर निग्रम
 - Curcuma longa/करकुमा लोंगा
 - Zingiber officinale/जिजिबर ऑफिसिनेल

Ans. (b) : The King of Indian spices is *Piper nigrum*. The hundreds of years ago, traders considered black pepper as the King of Spices and called it as a "**black gold**", it was one of the very first items of commerce between India and Europe. It is one of the world's most traded spices in the world. It belongs to the family Piperaceae.

55. **Selaginella differs from Funaria in having**
सेलाजिनेला यह फ्यूनेरिया से इस तरह अलग है
- Motile sperms /गतिशील शुक्राणु
 - Well developed vascular system
अच्छा विकसित संवहन तंत्र
 - An independent gametophyte/स्वतंत्र गंतुकधारी
 - Antheridia /रेतुकाशय

Ans. (b) : *Selaginella* differs from *Funaria* in having well developed vascular system, are specialized tissues for the transport of water, nutrients, and organic compounds within a plant. *Selaginella* is a vascular plant that has xylem and phloem tissues, allowing it to transport water and nutrients more efficiently than non-vascular plants.

On the other hand, *Funaria* is a moss which lack a well defined vascular system.

56. **Protonema occurs in the life cycle of/शंवालक**
(प्रोटोनीमा) इसके जीवन चक्र में घटित होता है
- Riccia/रिक्सिया
 - Funaria /फ्यूनेरिया
 - Dryopteris /ड्रायोप्टेरिस
 - Spirogyra /स्पाइरोगाइरा

Ans. (b) : Protonema occurs in the life cycle of *Funaria*. The protonema is a thread-like chain of cells that forms the earliest stage (the haploid phase) of a bryophyte, like *Funaria* life cycle. When a moss first grows from the spore, it grows as a protonema, which develops into a leafy gametophore.

57. **Formation of gametophyte directly from sporophytic tissue without spores is**
बीजाणु के बगैर सीधे बीजाणुजन ऊतक से गंतुकधारी का संगठन करने को कहते हैं
- Apogamy/अपयुग्मन
 - Apospory/अबीजुक जनन
 - Apocarpny /एपोकार्पी
 - Parthenogenesis /अनिषेक जनन

Ans. (b) : The formation of gametophyte directly from sporophytic tissue without spores is apospory. It is a type of asexual reproduction process in plants.

58. **Fern gametophyte is/पर्णांग गंतुकधारी है**
- Multicellular cordate prothallus
बहुकोशिकीय हृदयाकारवाला पूर्वकायक
 - Liver shaped thallus/गुर्दे के आकार का कायक
 - Unicellular colourless /एककोशिक रंगहीन
 - Filamentous, multicellular and green
तन्तुमय, बहुकोशिकीय और हरा

Ans. (a) : Fern gametophyte is multicellular cordate prothallus. "**Multicellular**" means it consists of multiple cells, and "**cordate**" refers to its heart-shaped appearance. This prothallus is the haploid phase in the fern life cycle, producing male and female gametes that eventually fuse to form a diploid sporophyte, which is the more familiar fern plant that we typically see.

59. **The enzyme responsible for continuing DNA replication in prokaryotes, once it is initiated is/प्रोकैरियोट्स में एक बार प्रारंभ होने से निरंतर DNA प्रतिकृति के लिए यह एंजाइम जिम्मेदार है**
- DNA polymerase I/DNA पोलिमिरेज I
 - DNA polymerase III/DNA पोलिमिरेज II
 - Polymerase beta/ पोलिमिरेज बीटा
 - Polymerase delta/ पोलिमिरेज डेल्टा

Ans. (b) : The enzyme responsible for continuing DNA replication in prokaryotes, once it is initiated is DNA polymerase III. It is the major replicative polymerase, functioning in the synthesis both of the leading and lagging strand of DNA and Okazaki fragments by the extension of RNA primers.

60. **In Pyrimidine Synthesis, Eukaryotes can use uracil to feedback inhibit which of the following enzymes?**
पिरिमिडीन संश्लेषण में यूकेरियोट्स यूरासिल का उपयोग कर निम्न में से कौनसे एंजाइम को रोकने का पुनर्निवेशन कर सकता है?
- Carbamoyl phosphate synthase
कार्बामॉइल फॉस्फेट सिंथेज
 - Asparatate Transcarbamoylase
एस्पार्टेट ट्रांसकार्बामोयलेज
 - Dihydroorotase/डाइहाइड्रोरोटेज
 - Thymidylate synthase / थाइमिडिलेट सिंथेज

Ans. (d) : In pyrimidine synthesis, eukaryotes can use Uracil to feedback inhibit thymidylate synthase. It is a crucial enzyme in the pyrimidine synthesis pathway, specifically involved in the conversion of deoxyuridine monophosphate (dUMP) to deoxythymidine monophosphate (dTMP). The process requires the addition of a methyl group to dUMP, and this methyl donor is provided by tetrahydrofolate (THF), producing dTMP.

61. **Cytogenetic mapping**
कोशिकाआनुवंशिकी मानचित्र
- Requires that the gene have been cloned if in-situ hybridization is to be used
यदि स्वस्थानी संकरण का उपयोग किया जाना है तो आवश्यक है कि जीन को क्लोन किया गया हो।

- (b) Is a high resolution method of gene localization /यह जीनों के स्थानीयकरण की एक उच्च वियोजन पद्धति है
- (c) Can be used to determine relative order of genes located very close to each other
आपस में बहुत निकट आये हुए जीनों का सापेक्ष क्रम निर्धारित करने के लिए उपयोग में लाया जा सकता है
- (d) All of the above /ऊपरी सभी

Ans. (d) : Cytogenetic mapping can involve in-situ hybridization, which requires gene cloning. It is a high resolution method for gene localization and can be used to determine the relative order of genes located very close to each other.

62. Which of the following questions could be easily answered by FISH?/निम्न में से कौनसा प्रश्न का उत्तर मछली द्वारा आसानी से दिया जा सकता है?

- (a) How often does recombination occur between the ebony and sepia loci in *Drosophila*?
ड्रोसोफिला में इबोनी और सीपिया लोकी का पुन संयोग प्रायः कब होता है?
- (b) In a particular family affected with Becker muscular dystrophy, is the mutation due to a deletion of the entire gene?
बेकर पेशीय डिस्ट्रॉफी से प्रभावित एक विशेष वंश में, उत्परिवर्तन सम्पूर्ण जीनों के विलोप से है?
- (c) How large a piece of DNA you need to clone in order to clone the group of human globin genes from chromosome 11?/क्रोमोसोम 11 से मिले मानव ग्लोबिन जीनों के समूह को क्लोन करने के लिए कितने बड़े डीएनए के खण्ड की जरूरत है?
- (d) None of the above/इनमें से कोई नहीं

Ans. (b) : FISH (Fluorescence In Situ Hybridization) is ideal for detecting specific DNA sequences in chromosomes. For the question about Becker muscular dystrophy, FISH can reveal if the mutation involves a complete gene deletion by utilizing fluorescent probes that bind to the target gene. This technique allows visualization of genetic abnormalities, such as deletions, making it a powerful tool for diagnosing conditions associated with structural changes in genes. However, FISH is less suitable for addressing questions on recombination frequency or determining DNA cloning requirements, as these involve different aspects of genetic analysis that are better addressed by alternative methods.

Direction (Qs. 163 and 164):

You have set up the following experiment to linkage map two RFLPs in pigs. For RFLP A, you can detect either a 5,000 bp band or a 3,350 bp band; for RFLP B, you can detect either a 4,300 bp band or a pair of bands of 2,300 and 2,000 bp. Beginning with strains homozygous for different forms of each RFLP, you generate compound heterozygotes, which you then cross to pigs that are homozygous for the smaller forms of each RFLP. By analysis of several litters you get the following results: 52

individuals with 5,000 bp and 4,300 bp bands; 48 individuals with 5,000 bp, 4,300 bp, 3,350 bp, 2,300 bp and 2,000 bp bands; 11 individuals with 5,000 bp, 4,300 bp, 2,300 bp and 2,000 bp bands; and 9 individuals with 5,000 bp, 4,300 bp and 3,350 bp bands.

निर्देश (Qs. 163 और 164):

सुअरों में स्थित दो RFLP को दो मानचित्रों की सहलम्नता का प्रयोग आपको प्रारंभ करना है। RFLP A के लिए आप या तो 5,000 bp का बैंड या 3,350 bp का बैंड पता लगा सकते हैं। RFLP B के लिए आप या तो 4,300 bp का बैंड या तो 2,300 bp और 2,000 bp वाली बैंड की जोड़ी का पता लगा सकते हैं। प्रारंभ में विभिन्न प्रकार के हर RFLP के लिए समयुग्मज उपभेद के लिए, आप विषमयुग्मज संयुग उत्पन्न करें और उसे सुअरों में जो प्रत्येक RFLP के छोटे टाँचे के लिए समयुग्मज हैं। बहुत सारा कुडा-कचरे के परीक्षण के बाद आपको निम्न नतीजा मिलता है : 52 व्यष्टि जिनके 5,000 bp और 4,300 bp बैंड हैं; 48 व्यष्टि जिनके 5,000 bp, 4,300 bp, 3,350 bp, 2,300 bp, और 2,000 bp बैंड हैं; 11 व्यष्टि जिनके 5,000 bp, 4,300 bp, 2,300 bp, और 2,000 bp बैंड हैं; और 9 व्यष्टि जिनके 5,000 4,300 और 3,350 बैंड हैं।

63. What was the arrangement of the markers in the original parental strains?

मूल पैतृक उपभेदों के चिह्नक के लिए क्या क्रम था?

- (a) A : 5,000 bp, B : 4,300 bp and A : 3,350 bp, B : 2,300/2,000 bp/ A : 5,000 bp, B : 4,300 bp और A : 3,350 bp, B : 2,300/2,000 bp
- (b) A : 5,000 bp, B : 2,300 / 2,000 bp and A : 3,350 bp, B : 4,300 bp
A : 5,000 bp, B : 2,300 / 2,000 bp और A : 3,350 bp, B : 4,300 bp
- (c) A : 3,350 bp, B : 4,300 bp and A : 5,000 bp, B : 4,300 bp/ A : 3,350 bp, B : 4,300 bp और A : 5,000 bp, B : 4,300 bp
- (d) A : 3,350 bp, B : 2,300/2,000 bp and A : 3,350 bp, B : 2,300/2,000 bp/ A : 3,350 bp, B : 2,300/2,000 bp और A : 3,350 bp, B : 2,300/2,000 bp

Ans. (b) : The correct arrangement of the markers in the original parental strains is :

A : 5,000 bp, B : 2,300 / 2,000 bp and A : 3,350 bp, B : 4,300 bp

The answer given above suggests the initial genotype of the parental strains based on the observed bands in the compound heterozygotes. Here's the breakdown :

- **A : 5,000 bp, B : 2,300/2000 bp** : This represents one of the parental strains. It has RFLP A with a 5,000 bp band and RFLP B with a pair of bands at 2,300 bp and 2,000 bp.
- **A : 3,350 bp, B : 4,300 bp** : This represent the other parental strain. It has RFLP A with a 3,350 bp band and RFLP B with a single band at 4,300 bp.

The compound heterozygotes from the cross between these parental strains show the observed bands in the experiments result's, confirming the arrangement.

64. Which of these genetic markers is most likely to be highly polymorphic (have many different alleles)?/इनमें से कौन-सा आनुवंशिक चिह्नक अत्यंत बहुरूपी होने की अधिकतम संभावना है?

- (a) An RFLP/एक RFLP
- (b) A microsatellite /एक सूक्ष्म उपग्रह
- (c) An SNP /एक SNP
- (d) All of these are equally polymorphic
यह सभी समान रूप से बहुरूपी है

Ans. (b) : Microsatellites, also known as **short tandem repeats (STRs)**, are highly polymorphic genetic markers. They consist of short, repetitive DNA sequence, and the number of repeats can vary widely between individuals. This variability makes microsatellites valuable for genetic mapping and forensic applications. While RFLPs can be polymorphic, microsatellites are often more variable due to the variability in the number of repeats. SNPs can also be polymorphic, but they involve single base pair changes and may have less variability than microsatellites.

65. Mendel's hybridization strategy was use of two plants/मेंडल के संकरण योजना दो पौधों का उपयोग करने की थी, जो होते है

- (a) Differing in a pair of contrasting character
एक जोड़ी में विरोधी वैशिष्ट्य में भिन्न
- (b) Differing in two of contrasting character
एक जोड़ियों में विरोधी वैशिष्ट्य में भिन्न
- (c) Differing in many pair of contrasting character /अनेक जोड़ियों में विरोधी वैशिष्ट्य में भिन्न
- (d) Differing in three pair of contrasting character
तीन जोड़ियों में विरोधी वैशिष्ट्य में भिन्न

Ans. (a) : Mendel's hybridization strategy involved plants that differed in a pair of contrasting characters. This was central to his groundbreaking work on inheritance. By focusing on a single pairs of traits, such as tallness versus shortness in pea plants, Mendel could isolate and study the inheritance patterns of individual characteristics. This simplification allowed him to establish the principles of segregation and independent assortment, forming the basis for his laws of inheritance and contributing significantly to the foundation of modern genetics.

66. Gene transfer in bacteria by transformation has the following characteristics/कायान्तरण के द्वारा जीवाणु में जीन स्थानांतरण का यह लक्षण है

- (a) A majority of the donor genes are transferred /अधिकांश दाता जीन स्थानांतरित किये जाते हैं
- (b) It involves a plasmid /उसमें जीवद्रव्यी शामिल है
- (c) It depends on phage infection of the recipient cell /पानेवाली कोशिका के फेज संक्रमण पर निर्भर है
- (d) It can be carried out using free DNA extracted from the donor/दाता से निकाले गये सहज DNA से वह किया जा सकता है

Ans. (b) : Gene transfer in bacteria by transformation involves a plasmid.

The plasmid carriers are used for gene transfer in bacteria, in which circular DNA is found which is fast in duplication of a gene. The gene transfer in bacteria can be achieved through conjugation, transformation and viral transduction.

67. Any process that results in integration of new combinations of genes together in a single cell is/एक प्रक्रिया जिसका नतिजा है जीन के नये संयोगों का एकल कोशिका में समाकलन और वह है

- (a) Genetic recombination/आनुवंशिक पुनर्संयोग
- (b) Fusion /सायुज्य
- (c) Genetic fission/आनुवंशिक विखण्डन
- (d) Allelotyping /अलीलोटायपिंग

Ans. (a) : Any process that results in the integration of new combinations of genes together in a single cell is genetic recombination.

It involves the exchange of genetic material between homologous chromosomes during meiosis or through mechanisms like crossing over. The outcome is the creation of unique genetic arrangements, contributing to genetic diversity and the inheritance of varied traits in offspring.

68. Common lymphomas in pediatric age बच्चों की उमर में सामान्य लसिका मांसारुद है

- (a) Anaplastic large cell lymphoma
एनाप्लास्टिक बृहत कोशिका लसिका मांसारुद
- (b) Burkitt's lymphoma /बरकित का लसिका मांसारुद
- (c) Follicular lymphoma /रोमकूपी लसिका मांसारुद
- (d) Diffuse large β -cell lymphoma
विसृत बृहत् β -कोशिका लसिका मांसारुद

Ans. (b) : Common lymphomas in pediatric age is Burkitt's lymphoma. It is a common pediatric lymphoma characterized by rapid cell division. It often present as a jaw or facial tumor. This high-grade malignancy is associated with Epstein-Barr virus and involves the abnormal growth of B-cells. Early detection and aggressive treatment are crucial for favourable outcome in pediatric patients.

69. Myoepithelial carcinoma is immune reactive for/मायोएपिथेलियल कर्कट-रोग यह इसके लिए प्रतिरक्षित प्रतिक्रियाशील है

- (a) S-100, CD1a and p53/ S-100, CD1a और p53
- (b) EMA, desmin and fibrin
EMA, डेसमिन और फायब्रिन
- (c) Cytokeratin, S-100 and calponin
सायटोकेरेटिन, S-100 और काल्पोनिन
- (d) CD20, CD3 and vimentin
CD20, CD3 और विमेन्टिन

Ans. (c) : Myoepithelial carcinoma is immune reactive for cytokeratin, S-100 and calponin. Myoepithelial carcinoma exhibits immunoreactivity for cytokeratin, indicating epithelial origin. S-100 expressions highlights its myoepithelial differentiation. Calponin confirms the myoepithelial nature, indicating a contractile phenotype. This immunoprofile aids in the accurate diagnosis and classification of myoepithelial carcinoma.

70. Which of the following is associated with Burkitt's lymphoma ?/निम्न में किसका बुरकिट के लसिका मांसारुद से सम्बन्ध है?

- (a) EBV/इबीवी
(b) Arbo virus/अरबो वाइरस
(c) Picorna virus /पिकोर्ना वाइरस
(d) Pox virus /पॉक्स वाइरस

Ans. (a) : Burkitt's lymphoma, especially the endemic variant, is strongly linked to Epstein-Barr virus (EBV) infection. The virus plays a crucial role in the development of this aggressive B-cell lymphoma, contributing to genetic alterations that drive uncontrolled cell growth and malignancy.

71. Link the following cancer with their corresponding viruses:

1. Cervical cancer	A. Epstein Barr virus
2. Burkitt's lymphoma	B. Human papilloma virus
3. Nasopharyngeal cancer	C. Hepatitis B
4. Hepatocellular carcinoma	D. RNA retro virus
5. T-cell leukaemia	

निम्न में कैंसर और उसके अनुरूप वाइरस की जोड़ी बनाईए:

1. ग्रीवा कैंसर	A. एपस्टीन बार वाइरस
2. बुरकिट का लसिका मांसारुद	B. मानव अंकुरारुद वाइरस
3. नासाग्रसनीय कैंसर	C. हिपेटाइटिस B
4. याकृतकोशिकीय कैंसर	D. आरएनए रेट्रो वाइरस
5. T-कोशिका श्वेतरक्तता	

- (a) 1A, 2A, 3B, 4C, 5D
(b) 1D, 2A, 3A, 4C, 5D
(c) 1B, 2A, 3A, 4C, 5D
(d) 1C, 2A, 3B, 4C, 5D

Ans. (c) :

List-I	List-II
1. Cervical cancer	B. Human Papilloma virus
2. Burkitt's lymphoma	A. Epstein Barr virus
3. Nasopharyngeal cancer	A. Epstein Barr virus
4. Hepatocellular carcinoma	C. Hepatitis B virus
5. T-cell leukaemia	D. RNA retro virus

72. The transfer of oncogenes from one cell to another is called/अर्बुद जीन का एक कोशिका से दूसरे कोशिका में स्थानांतरण करने को कहते हैं

- (a) Infection /संक्रमण
(b) Transduction /ट्रान्सडक्शन
(c) Transfection /ट्रान्सफेक्शन
(d) Inductance /प्रेरकत्व

Ans. (b) : Transduction refers to the transfer of genetic material, such as oncogenes, from one cell to another via a viral vector. It involves the incorporation of foreign genes into the recipient cell's genome, potentially leading to cellular transformation. This process plays a crucial role in cancer development and genetic research.

73. Organisms, which damage man's property, including plants and agricultural produce causing damage of significant economic importance are called/जो जीव मनुष्य की सम्पत्ती जैसे की वनस्पति और कृषि उत्पाद का वृहत् और महत्वपूर्ण आर्थिक नुकसान करते हैं उन्हें कहते हैं

- (a) Pests/नाशी जीव (b) Pathogens /रोगजनक
(c) Parasites/परजीवी (d) Aliens/विदेशी

Ans. (a) : Organisms that damage man's property, including plants and agricultural produce causing significant economic harm, are called **pests**. They include insects, rodents, and other unwanted species that interfere with human activities, requiring management strategies for pest control and mitigation of damages.

74. What do the following insects have in common? sod webworm, bagworm, black cutworm and monarch/निम्न कीटों में क्या समानता है? तृणभूमि जालकीट, थैलीकीट, काला काटकीट और मोनार्क

- (a) They all belong to the order Lepidoptera शल्किपक्ष गण से वह सभी सम्बन्धित हैं
(b) They all feed on trees वे सभी पेड़ों पर ही अपना पोषण करते हैं
(c) They all migrate /वे सभी स्थान बदलते हैं
(d) They are all butterflies /वे सभी तितलियाँ हैं

Ans. (a) : Sod webworm, bagworm, black cutworm and monarch, they all belong to the order Lepidoptera, encompassing butterflies and moths. This shared taxonomic classification highlights their evolutionary and biological similarities as winged insects with distinctive life cycles.

75. What is the major alfalfa insect pest insect in this region?/इस प्रदेश में कौनसा प्रमुख गरारी कीट, नाशी जीव कीट है?

- (a) Alfalfa weevil /गरारी टोका (वील)
(b) Alfalfa looper/गरारी लूपर
(c) Blister beetle /छाला भृंग
(d) Alfalfa butterfly /गरारी तितली

Ans. (a) : The predominant alfalfa insect pest in the region is the **Alfalfa weevil**. This destructive insects feeds on alfalfa foliage, causing significant damage to crops. Effective management strategies are crucial to mitigate the economic of **Alfalfa weevil** infestations.

76. Carpenter ants belong to which of the following the orders?

बढ़ई चींटी निम्न में से किस गण से सम्बन्धित है?

- (a) Neuropteran /न्यूरोप्टेरन
- (b) Lepidoptera /लिपिडोप्टेरा
- (c) Plecoptera /प्लिकोप्टेरा
- (d) Hymenoptera /हाममेनोप्टेरा

Ans. (d) : Carpenter ants belongs to the order Hymenoptera, characterized by membranous wings and a complex social structure. This order includes various ant species, bees, wasps and sawflies. Carpenter ants, known for nesting in wood, play essential roles in ecosystems, contributing to decomposition and serving as pollinators in their foraging activities.

77. What do the following insects have in common? mayfly, caddisfly, mosquito, dobsonfly

निम्न में से कीटों में क्या समानता है? पाँखी, केडीस प्लाइ, मच्छर, डॉबसन प्लाइ

- (a) They all belong to the order Lepidoptera
वे सभी शल्किपक्ष गण से सम्बन्धित हैं
- (b) They all feed on trees
वे सभी पेड़ों पर ही अपना पोषण करते हैं
- (c) They all live in the water/वे सभी जलवासी है
- (d) They are all in the order dipteral
वे सभी द्विपक्षी (डिप्टेरल) गण से हैं

Ans. (c) : Mayfly, Caddisfly, mosquito and dobsonflies, all live in the water, they all undergo aquatic life stages. Mayflies and Caddisflies are aquatic nymphs, mosquitoes have aquatic larvae, and dobsonflies have aquatic larvae called **hellgrammites**, emphasizing their dependency on water for various life cycle phases.

78. Which of the following is a function of air bladder?

वायु-आशय का निम्न में से कौन-सा कार्य है?

- (a) Respiration /श्वसन
- (b) Sound production/ध्वनि उत्पादन
- (c) Buoyant float/तरणशील प्लव
- (d) All of the above /ऊपरी सभी

Ans. (c) : The air bladder primarily functions as a buoyant float in fish, aiding in controlling their depth in water. While respiration and sound production are important processes in some fish, they are not the main functions of the air bladder.

79. Which of the following structure of a fish is homologous with lung of frog?/निम्न में से मछली की कौनसी संरचना मेंढक के फेफड़े से समजात है?

- (a) Gill pouch/गिल थैली
- (b) Swim bladder/वायुशय
- (c) Stomach/उदर
- (d) Book lung /बुक लंग्स

Ans. (b) : The swim bladder in fish is homologous to the lung in frogs, as both structures are involved in buoyancy control. While lungs facilitate air-breathing in amphibians like frogs, swim bladders aid fish in adjusting their buoyancy by controlling gas volume. This homology reflects an evolutionary connection between aquatic and terrestrial vertebrates in adapting to their respective environments.

80. What is the scientific name of pinworm of man?

आदमी के पिन कृमी का वैज्ञानिक नाम क्या है?

- (a) Enterobius vermicularis/एंटरोबियस वर्मिक्यूलेरिस
- (b) Trichinella spiralis/ट्राइसीनेला स्पाइरेलिस
- (c) Trichuris trichiura/ट्राइचुरिस ट्राइचिउरा
- (d) Dracunculus medinensis/ड्रैकुनकुलस मेडिनेंसिस

Ans. (a) : The scientific name of the human pinworm is **Enterobius vermicularis**. They are also known as **threadworm or seatworm**, is a parasitic worm. It is a nematode (roundworm) and a common intestinal parasite or helminth, especially in humans.

81. Which structure is called tongue of cockroach?

कौन-सी संरचना को तिलचट्टा की जीभ कहते हैं?

- (a) Labium/अधरोष्ठ
- (b) Labrum/ओष्ठ
- (c) Hypopharynx/जिह्वा
- (d) Mandible /जबड़ा

Ans. (c) : The structure called the "tongue" of a cockroach is the **hypo-pharynx**. It is a part of the mouth parts and assists in manipulating food during ingestion. Unlike the labium, labrum and mandible, the hypo-pharynx specifically functions in facilitating the movement and ingestion of food, contributing to the cockroach's feeding process.

82. The skull of frog and rabbit are

मेंढक और खरगोश की खोपड़ी है

- (a) Dicondylic /द्विस्थूलक
- (b) Monocondylic /एकस्थूलक
- (c) Tricondylic /त्रिस्थूलक
- (d) Tetracondylic /चतुःस्थूलक

Ans. (a) : The skulls of frogs and rabbits are dicondylic, featuring two occipital condyles that articulate with the atlas vertebra. This characteristic allows for greater mobility in the neck region. The dicondylic skulls are common in amphibians and some mammals, providing stability and flexibility in movement, facilitating diverse behaviors and adaptations to different environmental niches.

83. Which of the following is used as emulsifier?/निम्न में से किसे पायसीकारक कहते हैं?

- (a) Algin/एल्जिन
- (b) Agar/अगर
- (c) Carragenan/कैरेजेन
- (d) Funoran/फ्यूनोरॉन

Ans. (c) : Carrageenan is a polysaccharide extracted from red seaweed, and it is used as an emulsifier in various food and industrial applications. As an emulsifier, it helps to stabilize and enhance the texture of emulsions, preventing separation of immiscible components, such as oil and water. This property makes carrageenan valuable in the food industry for improving the consistency and shelf life of products like sauces, dairy and desserts.

84. **Recurrence of floods in the plains of North India is due to excessive/उत्तर भारतीय पठारों पर बार-बार बाढ़ का कारण है, अधिक**

- (a) Siltation of dams /गाद भरे बाँध
- (b) Rainfall/वर्षा
- (c) Agriculture/कृषि
- (d) Deforestation in catchment area
आवाह-क्षेत्र में वननाशन

Ans. (d) : The recurrence of floods in the plains of North India is due to excessive deforestation in catchment area. The deforestation reduces the natural vegetation cover, leading to increased surface runoff and decreased absorption of rainwater by tree roots. This alteration in the landscape can amplify the intensity and frequency of floods as water flows more rapidly over the bare ground. Forests play a crucial role in regulating water flow, and their removal can disrupt this balance, contributing to flood events.

85. **Genome comparison have suggested that mouse DNA has mutated about twice as fast as human DNA. What is a possible explanation for this discrepancy?/जीनोम तुलना में यह सुझाव दिया गया है कि आदमी के डीएनए से चूहे के डीएनए का उत्परिवर्तन करीब दुगुनी गति से हुआ है। इस असंगति का संभावित कारण क्या है?**

- (a) Mice are much smaller than humans
आदमी से चूहे बहुत छोटे होते हैं
- (b) Mice live in much less sanitary conditions than humans and are therefore exposed to a wider range of mutation-causing substances
चूहे आदमियों से कम स्वास्थ्यकर परिस्थितियों में रहते हैं और इसीलिए उन्हें उत्परिवर्तन के कारणों का सामना करना पड़ता है
- (c) Mice have a smaller genome size
चूहों के जीनोम का आकार छोटा होता है
- (d) Mice have a much shorter generation time
चूहों का प्रजनन समय बहुत छोटा होता है

Ans. (d) : The faster mutation rate in mouse DNA is likely due to their much shorter generation time compared to humans. The mutation rate is often expressed per generation, and because mice reproduce more quickly, there are more generations over a given period. This increased frequency of reproduction allows for more opportunities for mutations to occur and accumulate in the mouse population, resulting in a faster overall mutation rate compared to humans who have a longer generation time.

86. **Why was the genome of the protist *P. falciparum* difficult to sequence?**

प्रोटिस्ट *P. falciparum* जीनोम को क्रमित करने में क्यों कठिनाई हुई?

- (a) This protist has a large genome
इस प्रोटिस्ट का जीनोम बृहत् था
- (b) This organism hides inside red blood cells, making it difficult to obtain enough DNA for the sequencing project/यह जीव लाल रक्त कोशिकाओं में छिप जाता है और इसीलिए क्रम प्रक्रिया में पर्याप्त डीएनए मिलने में कठिनाई पैदा करता है

- (c) The apicoplast structures in this protist inhibit sequencing reactions /इस प्रोटिस्ट में स्थित एपिकोप्लास्ट संरचना क्रम प्रतिक्रिया का निरोध करती है
- (d) The genome contains a high proportion of adenine and thymine /जीनोम में बड़ी मात्रा में एडेनाइन और थाइमाइन होते हैं

Ans. (b) : The difficulty in sequencing the genome of the protist *P. falciparum* lies in its intracellular location within red blood cells. Isolating sufficient DNA for sequencing is challenging due to this hidden habitat, hindering the sequencing project by limiting access to the organism's genetic material.

87. **Which of the following best describes pseudogenes?/निम्न में से किस छद्मजीन का उत्तर वर्णन कहा जा सकता है?**

- (a) Two functional genes within an organism that arose from the duplication of one gene
एक जीन के द्विगुणीकरण से उठे हुए जीव में दो कार्यशील जीन
- (b) Genes that share the same ancestral sequence, but are found in different organisms
जो जीन एक जैसे पैतृक क्रम के साझेदार हैं लेकिन भिन्न जीवों में पाए जाते हैं
- (c) Sequences of DNA that are very similar to functional genes, but do not produce a functional product
डीएनए के क्रम कार्यशील जीन के समान ही होते हैं, परन्तु कार्यशील उत्पाद उत्पन्न नहीं करते
- (d) Sequences of DNA that are very similar to inactive genes, but do produce a functional product/डीएनए के क्रम निष्क्रिय जीन के समान ही होते हैं, परन्तु कार्यशील उत्पाद उत्पन्न नहीं करते हैं

Ans. (c) : Pseudogenes are DNA sequences closely resembling functional genes but lack the ability to products. They often result from mutations rendering them non-functional. Unlike active genes, **pseudo genes** do not contribute to the synthesis of proteins or other functional elements. Their similarity to functional genes reflects evolutionary remnants, highlighting the molecular traces of genetic processes.

88. **The *Tbx5* gene is known to play a role in which process?/ *Tbx5* जीन किस प्रक्रिया में भूमिका निभाने के लिए जाना जाता है?**

- (a) Notochord development/आद्यपुच्छवंश का विकास
- (b) Limb formation /अवयक का निर्माण
- (c) Eye formation/आँख का निर्माण
- (d) Sexual reproduction/लैंगिक पुरुत्पादन

Ans. (b) : The *Tbx5* gene is associated with limb formation. It plays a crucial role in embryonic development, specifically in the patterning and growth of limbs. Mutations in *Tbx5* can lead to limb abnormalities, emphasizing its significance in orchestrating the proper development of limbs during early stages of vertebrate embryogenesis.

89. How many pairs of chromosomes do chimpanzees carry?

चिपांजी में कितने जोड़ी गुणसूत्र होते हैं?

- (a) 23 (b) 46
(c) 24 (d) 48

Ans. (c) : Chimpanzees carry 24 pairs of chromosomes. This chromosome count is significant in understanding their genetic makeup, as it reflects their close evolutionary kinship with humans. Each parent contributes 24 unique chromosomes, and the shared chromosomes number emphasizes the genetic similarities between humans and chimpanzees, highlighting a common ancestry in the evolutionary timeline.

90. Which of the following is the study of a collection of genetic material (genomes) from a mixed community of organisms. It is usually refers to the study of microbial communities?

निम्न में से कौनसी जीवों के मिश्र समूह से ली गई आनुवंशिक सामग्री (जीनोम) के संग्रहण का अध्ययन है और उसे मोटे तौर पर जीवाणुई समूहों का अध्ययन कहा जाता है?

- (a) Metagenomics /मेटाजिनोमिक्स
(b) Genomics/जीनोमिक्स
(c) Epigenetic /एपिजेनेटिक
(d) None of the above /ऊपरी कोई नहीं

Ans. (a) : The metagenomics involves studying the collective genetic material (genomes) from a diverse community of organisms, particularly microbial communities. Unlike genomics, which focuses on individual organisms, metagenomics explores the genetic content of entire microbial populations, providing insights into the biodiversity and functional potential of these communities without the need for isolating and culturing individual species.

91. In females, one of the X-chromosomes is inactive by/मादाओं में X-गुणसूत्रों में एक निष्क्रिय होता है, इसके कारण

- (a) The number of dominant genes on each X-chromosomes
प्रत्येक X-गुणसूत्रों पर प्रभल जीनों की संख्या
(b) Epigenetic markers /अनुजातीय चिह्नक
(c) Environmental factors /वातावरणीय घटक
(d) Enzymes coded for by mitochondrial DNA
कलकणुकीय डीएनए के लिए कोड किये गये एंजाइम

Ans. (b) : In females, one of the X-chromosomes is inactivated through epigenetic markers. This process, known as **X-inactivation**, ensures gene dosage compensation between males and females. Epigenetic modifications, such as DNA methylation and histone changes, leads to the transcriptional silencing of one X-chromosome in each female cell, preventing the over expression of X-linked genes and maintaining cellular balance.

92. The only methylated base in mammals is स्तनधारियों में पाया जानेवाला एकमात्र मिथाइलेटेड क्षारक होता है

- (a) 7-methyl guanine /7-मिथाइल ग्वानिन
(b) Thymine /थाइमिन
(c) Methyl adenine/मिथाइल एडेनिन
(d) 5-methyl cytosine/मिथाइल साइटोसिन

Ans. (d) : In mammals, 5-methyl cytosine is the only methylated base. This epigenetic modification involves the addition of a methyl group to the 5th carbon of cytosine in DNA. It plays a crucial role in gene regulation, chromatin structure, and cellular differentiation, contributing to the modulation of gene expression patterns in various biological processes.

93. Which of these is not secreted from Anterior Hypophysis?/निम्न में से किसके अग्र मूलजनक से स्रावण नहीं होता?

- (a) Thyroid Stimulating Hormone
अवटुग्रन्थि उद्दीपक हार्मोन
(b) Adrenocorticotrophin Hormone/एड्रेनोकोर्टिकोट्रोपिन हार्मोन
(c) Oxytocin/ऑक्सिटोसिन
(d) Follicular Stimulating Hormone
/फुटकीय उद्दीपक हार्मोन

Ans. (c) : Oxytocin is not secreted from the Anterior Hypophysis. Instead, it is produced by the Posterior Hypophysis. The Anterior Hypophysis secretes hormones such as Thyroid Stimulating Hormone (TSH), Adreno cortico trophin Hormone (ACTH), and Follicular Stimulating Hormone (FSH), which regulate various endocrine glands and physiological processes. Oxytocin, associated with uterine contractions and lactation, is released from the Posterior Hypophysis.

94. Long term management of hypercalcemia does not include/हायपरकैलसेमिया के दीर्घ अवधि प्रबंध में यह शामिल नहीं है

- (a) Bisphosphates/बिसफॉस्फेट
(b) Hydration /जलयोजन
(c) Calcitonin /कैल्सीटोनिन
(d) Loop diuretics /लूप डाययूरेटिक्स

Ans. (c) : Calcitonin is not typically used in the long-term management of hypercalcemia. While it can provide a rapid but short-lived reduction in blood calcium levels, its effectiveness diminishes over time. Long-term strategies often involve medications like bisphosphonates, which inhibit bone resorption, and hydration to help flush out excess calcium through the urine.

95. The "master gland" of the endocrine system, located at the base of the brain, is the अतःस्रावो तन्त्र की "प्रधान ग्रन्थि", जो मस्तिष्क के तल में बसी होती है, वह है

- (a) Apical gland/अग्रस्थ ग्रन्थि
- (b) Bartholin gland/बारथोलिन ग्रन्थि
- (c) Pituitary gland/पीयूष ग्रन्थि
- (d) Thyroid gland/अवटुग्रन्थि

Ans. (c) : The pituitary gland, situated at the base of the brain, is often referred to as the "**master gland**" of the endocrine system. It regulates various hormonal functions, influencing growth, reproduction, metabolism, and stress response. Unlike the apical and Bartholin glands, it plays a central role in coordinating the body's hormonal balance.

96. Which type of gland secretes hormones directly into the bloodstream rather than into ducts leading to the exterior of the body?

किस प्रकार की ग्रन्थि हार्मोन का स्राव सीधे रक्तप्रवाह में करती है ना कि शरीर के बहिर्भाग को ले जानेवाली नलिकाओं के द्वारा?

- (a) Endocrine gland/अंतःस्रावी ग्रन्थि
- (b) Exocrine gland/बाह्यस्रावी ग्रन्थि
- (c) Serous gland/सीरमी ग्रन्थि
- (d) Target gland/लक्ष्य ग्रन्थि

Ans. (a) : Endocrine glands release hormones directly into the bloodstream, influencing distant target organs. This differs from exocrine glands, which secrete substances through ducts to external surfaces. Serous glands produce watery secretions and target glands are affected by hormones but do not directly release them into the bloodstream.

97. In *Drosophila*, the pattern is established ड्रोसोफिला में पैटर्न दृढ़ होता है

- (a) During production of the oocyte डिम्बाणुजनकोशिका के उत्पादन के समय
- (b) As a result of environmental interactions with the oocyte/ डिम्बाणुजनकोशिका के साथ परिसरीय अन्योन्यक्रिया के नतिजे से
- (c) During gastrulation/गैस्ट्रलेशन के समय
- (d) After embryogenesis has completed भ्रूणउत्पत्ति ग्रन्थ पूर्ण होने के बाद

Ans. (a) : In *Drosophila*, embryonic patterning occurs during oocyte production. Maternal factors deposited in the oocyte influence the spatial organization of the embryo, establishing the initial body plan. This process, occurring before fertilization, shapes subsequent development, highlighting the significance of maternal contributions to early embryogenesis in ***Drosophila***.

98. Morphogen/संरचनाजनन

- (a) Conveys positional information to cells within the embryo
भ्रूण के अंदर के कोशिकाओं को स्थितीय सूचना देता है

- (b) Is typically present in similar amounts in all cells/सभी कोशिकाओं में समान मात्रा में विशेष तरह से मौजूद रहता है
- (c) Functions only at very low concentration
केवल बहुत ही निम्न सान्द्रता से कार्य करता है
- (d) All of these/यह सभी

Ans. (a) : Morphogen conveys positional information to cells within the embryo. Morphogen is a signaling molecule that provides spatial cues to cells during embryonic development, helping to establish specific cell fates and patterns based on their positional information.

99. In *Drosophila* development, an embryonic segment?/ ड्रोसोफिला विकास में भ्रूणखण्ड

- (a) Is the same thing as a parasegment
वह परखण्ड ही है
- (b) Will contribute to two different segments in the adult fly
बालिग मक्खी दो विभिन्न खण्डों से सहयोग करता है
- (c) Is a region of spatial control of gene expression
जीन अभिव्यंजना के नियंत्रण का स्थानिक प्रदेश है
- (d) None of the above /ऊपरी कोई नहीं

Ans. (d) : In *Drosophila* development, an embryonic segment and a parasegment are related but not identical. An embryonic segment corresponds to the overall body unit, while a parasegment is more refined segmental boundary.

Thus the correct answer is (d) as it accurately reflects this distinction.

Note - The correct answer is (a) is the same thing as a parasegment because, in *Drosophila* development, an embryonic segment corresponds to a parasegment.

100. Which of these would be an example of a homeotic phenotype?/निम्न में से कौनसा होमियोटिक फेनोटाइप का उदाहरण होगा?

- (a) The wings are shrunken and useless
पंख सिकुड़े और बेकार होते हैं
- (b) The eyes of the fly are brown instead of normal red
मक्खी की आँखें सामान्य लाल की बदले भूरी रहती हैं
- (c) The first abdominal segment has legs
पहले उदरीय खण्ड में पैर होते हैं
- (d) None of the above /ऊपरी कोई नहीं

Ans. (c) : An example of a homeotic phenotype is the transformation of one body part into another. In this case, having legs on the first abdominal segment represents a homeotic transformation. It is observed in ***Drosophila*** and other organisms, result from genetic mutations affecting the normal development and specification of body segments, causing parts to assume the identity of others.

DSSSB POST GRADUATE TEACHER (PGT) 2015

BIOLOGY

SOLVED PAPER

[Exam Date : 28/06/2015, Tier-II]

1. **The subcellular organelle not bound by a single membrane is**

एक एकल झिल्ली से जो आनद्ध नहीं है, वह उपकोशिका ऑर्गनल है

- (a) Golgi apparatus/गॉल्जीकाय
 (b) Endoplasmic Reticulum/अंतप्रदव्यी जालिका
 (c) Mitochondria/माइटोकॉन्ड्रिया
 (d) Lysosomes/लाइसोसोम्स

Ans. (c) : The single membrane organelles present in eukaryotic cell include Endoplasmic Reticulum, Vacuole, Lysosome, Golgi Apparatus and Peroxisome. Single membrane bound cell organelles are those which have only one membrane around the structures. But mitochondria is double membrane bound organelle not a single membrane bound. Ribosome and centrosome have no membrane.

2. **Blood proteins of following are similar- इनमें से रूधिन प्रोटीन में समान _____ हैं।**

- (a) Man and Gorilla/मानव और गोरिल्ला
 (b) Man and Macaca/मानव और मकाका
 (c) Man and Ape/मानव और वानर (Ape)
 (d) Man and Monkey/मानव और बन्दर

Ans. (c) : The base sequence in nucleic acids and amino acids sequence in proteins of related organism. The protein present in the blood of man and ape are similar. These similarities provide biochemical evidence of evolution. The biochemical studies of human and ape showed that they share 98.8 percent of their DNA which indicates that they are closely related.

3. **All the animals living in a particular area are collectively called**

एक निर्धारित क्षेत्र में रहने वाले सभी प्राणी सामूहिक रूप में _____ कहलाते हैं।

- (a) Vegetations/ वेजिटेशन्स
 (b) Flora/फ्लोरा
 (c) Fauna/ फॉना
 (d) Both (a) and (b)/ (a) और (b) दोनों

Ans. (c) : All the animals having in a particular area are collectively called **fauna**. The term fauna refers to all of the animals species that are indigenous to a region. Fauna produces CO₂ when they respire. The study of animals of a particular region is called **faunistic**. On the basis of the habitats, size and the environments in which

the animals are found, The animals are classified into various different types of fauna as mega fauna, cry fauna, micro fauna etc.

Note–The answer given in the official Answer Key is "option (b)" which is incorrect.

4. **When biological names are written in a paragraph?**

जैविक नामों को कब एक परिच्छेद में लिखा जाता है?

- (a) It is written in Italics
 यह इटालिक में लिखा गया हो
 (b) It is underlined /यह रेखांकित हुआ हो
 (c) It is not underlined /यह रेखांकित न हो
 (d) (a) + (b)

Ans. (d) : Scientific names are written in Italics or underlined to indicate that they are in Latin or Latinized form. This convention helps to distinguish scientific names from common names and emphasizes their status as standardized, internationally recognized names for their organisms. This rule is followed in binomial nomenclature given by Linnaeus.

Hence, underline and Italic both are correct option.

Note–The answer given in the official Answer Key is "option (c)" which is incorrect.

5. **The term 'taxon' for the first time was used by 'टैक्सॉन' शब्द का प्रयोग पहली बार _____ के लिए किया गया था-**

- (a) ICBN (b) ICZN
 (c) Mayr (d) de Candolle

Ans. (c) : A taxon is defined as a collection of one or more populations of organisms. The term "taxon" for the first time was used by Ernst Mayr. The organisms which are characterized by similar characteristics or traits. The term taxonomy was coined by A.P.de Candolle.

6. **Phylogenetic system brings out**

वंशावली प्रणाली _____ को बाहर लाती है।

- (a) Reproductive similarities/प्रजनन समानताएँ
 (b) Grouping according morphological characters
 रूपात्मक गुणों के अनुसार सामूहीकरण
 (c) Grouping on the basis increasing complexities
 जटिलताओं की वृद्धि के आधार पर सामूहीकरण
 (d) Grouping according to evolutionary trends
 विकासवादी प्रवृत्ति के अनुसार सामूहीकरण

Ans. (d) : In Phylogenetic System of Classification, organisms are classified according to the evolutionary trends and genetic affinities. Phylogenetic system brings out grouping according to evolutionary trends and genetic relationship. This system is also called **cladistics**.

7. **The single group of organisms which contains over 0.75 million species is**
जीवियों का एकल समूह जिसमें 0.75 मिलियन से अधिक होती वह है
- (a) Insects/कीड़े (b) Animal/प्राणी
(c) Monkeys/बंदर (d) Fungi/कवक

Ans. (a) : In terms of number of species, insects certainly represent the largest percentage of the world's organisms. The largest variety of species can be found in insects. It contains more than 7,00,000 species.

8. **Silent valley is a place in**
साइलेंट वैली _____ में एक जगह है।
- (a) Himalayas/हिमालय (b) Karnataka/कर्नाटक
(c) Kerala/केरल (d) Tamilnadu/तमिलनाडु

Ans. (c) : The Silent valley, located in Kerala. It is known for many highly endangered species. It has been preserved as natural forest and because of the presence of rare plants and animals with a total area of 237.5 sq. km. and a core area of 89.54 sq. km. The Silent Valley National Park located in Palakkad district of Kerala.

9. **Slime moulds resemble**
स्लाइम मोल्ड _____ के सदृश्य होते हैं।
- (a) Fungi/कवक
(b) Animals and fungi/प्राणी और कवक
(c) Plants/पौधे
(d) Animals/प्राणी

Ans. (b) : Slime moulds resemble with both the characteristics of animal and fungi. Slime moulds are organisms, that use spores to reproduce.

- Animal-like character - Cell wall absent in vegetative phase, Amoeba like structure, holozoic type of nutrition.
- Fungi like character - Absorptive type of nutrition, and sporangia formation. Slime moulds are also known as **false fungi**.

10. **Which is absent in archaebacteria?**
आर्किबैक्टीरिया में _____ अनुपस्थित है।
- (a) Polysaccharides/पॉलीसेकराइड
(b) Peptidoglycan/पेप्टाइडोग्लाइकेन
(c) Lipids/लिपिड्स
(d) Proteins/प्रोटीन

Ans. (b) : Archaebacteria have physiological functions different from bacteria. Archaebacteria cell walls do not comprise peptidoglycon. They additionally have an exceptional membrane lipid bond as compared to the bacteria and eukarya. Bacterial cell-walls contain peptidoglycan, but archean cell walls do not have peptidoglycan.

11. **Which of the following bacteria is a parasite on other bacteria?**
इनमें से कौनसा जीवाणु दूसरे जीवाणु के उपजीवी है?
- (a) Bdellovibrio/ब्डेलोविब्रियो
(b) Beggiatoa/बेगियाटोआ
(c) Virbio/वर्बियो
(d) Bacilli/बेसिली

Ans. (a) : **Bdellovibrio** is a predatory bacterium that parasitizes other bacteria. It invades and consumes them, playing a crucial role in controlling bacterial populations. Unlike most bacteria, **Bdellovibrio** acts as a predatory organism, preying on other bacteria for nutrients, making it a unique example of bacterial parasitism in microbial ecosystem.

12. **In bacteria, the respiratory enzymes are located in**
जीवाणु में श्वसन किण्व _____ में स्थित है।
- (a) Plasmid/प्लाज्मिड (b) Episome/एपिसोम
(c) Mesosome/मीसोसोम (d) Nucleoid/न्यूक्लियोइड

Ans. (c) : In bacteria, the respiratory enzymes are located in mesosomes. Cellular respiration is an energy generating process that happens within the cell membrane of bacteria. The mesosome was thought to increase the surface area of the cell, aiding the cell in cellular respiration. They are also known as **chondroid**. Mesosomes are folded invaginations in the cell membrane of bacteria.

13. **Ultimate source of genetic variability is**
आनुवंशिक परिवर्तनशीलता का परम स्रोत है
- (a) Mutation/परिवर्तन
(b) Genetic drift/आनुवंशिक बहाव
(c) Gene flow/जीन बहाव
(d) Gene exchange/जीन का आदान-प्रदान

Ans. (a) : Mutation is the ultimate source of all genetic variation. Changes in composition of a genome due to recombination alone are not considered mutations since recombination alone just changes which genes are united in the same genome but not altered the sequence of those genes.

Mutation is important as the first step of evolution because it creates a new DNA sequence for a particular gene, creating a new allele.

14. **Natural selection means**
प्राकृतिक चयन का मतलब है
- (a) Better adaptability/बेहतर अनुकूलनशीलता
(b) Better survival/बेहतर अस्तित्व
(c) Elimination of less adapted
कम अनुकूलित का उन्मूलन
(d) All of the above/उपरोक्त सभी

Ans. (d) : Natural selection encompasses better adaptability, better survival and the elimination of less adapted individuals, leading to the propagation of traits favoring survival and reproduction in a given environment.

Note - But, according to final answer key option (a) is the correct answer because, natural selection is the process through which populations of living organisms adapt and change over the time. A better adaptation is a feature that arose and was favored by natural selection for its current functions. Adaptations helps an organism survive and reproduce in current environment.

15. Co-discoverer of Darwinism was डार्विनवाद का सह खोजी था

- (a) Malthus/माल्थस (b) Wallace/वैलेस
(c) Ruskin/रस्किन (d) Robert/रोबर्ट

Ans. (b) : Co-discoverer of Darwinism was Alfred Russel Wallace. Charles Darwin and Wallace independently discovered the mechanism of natural selection for evolutionary change. Darwin selection was always focused on the benefit for the individual. Wallace greatly admired on the origin of species. Darwin regarded Wallace as the one man who truly understood the idea of evolution by natural selection.

16. The first life forms which developed on Early Earth are called धरती के आरंभ में जो पहला जीवन रूप विकसित हुआ था, वह कहलाता है

- (a) Mycobiont /माइकोबायोट
(b) Phycobiont/फाइकोबायोट
(c) Protobiont/प्रोटोबायोट
(d) None of the above/उपरोक्त कोई भी नहीं

Ans. (c) : The first life forms which developed on early earth are called **protobiont**. The protobiont are considered as the precursor of the prokaryotic cell. These are proteinoid based protocells in which the genetic material RNA was present. It's a simple cluster of organic molecules which is capable of reproduction and carries out certain physiological processes like the living cells. The first primitive organism is said to be evolved around 3.5-2 billion years ago.

17. The number of nerve cells present in human brain is मानव मस्तिष्क में मौजूद कोशिकाओं की संख्या है

- (a) 10 billion/10 बिलियन
(b) 1 billion/1 बिलियन
(c) 100 billion/100 बिलियन
(d) 200 billion /200 बिलियन

Ans. (c) : There are approximately 100 billion neurons in mature human brain. The naturally occurring neuronal cell death occurs prenatally, and elimination of about 50% of unwarranted connections among neurons occurs postnatally.

Hence, the brain consist of approximately 100 billion nerve cells called **neurons**.

Note—The answer given in the official Answer Key is "option (a)" which is incorrect.

18. Circular single strand DNA occurs in bacteriophage

जीवाणुभोजी में होने वाले एक अकेला वृत्तिय DNA है

- (a) T₂, T₄ (b) ϕ X174, M₁₃
(c) ϕ , T₅ (d) T₄ ϕ ₆

Ans. (b) : Circular single stranded DNA occurs in bacteriophage ϕ X174 M₁₃ is a bacteriophage which is composed of circular single stranded DNA molecule enclosed in a thin flexible tube, made up of about 2,700 copies of single protein, P8 (major coat protein) . ϕ X174 bacteriophage is a small icosahedral virus which contains a single stranded, closed circular DNA molecule with 5,386 nucleotide bases.

Hence, circular single stranded DNA occurs in ϕ X174 and M13 bacteriophages.

19. Study of shells, especially those on mollusks is known as

'सीप का अध्ययन, विशेष रूप से उन घोंघों का अध्ययन _____ कहलाता है

- (a) Malacology/मोलस्क विज्ञान (मेलकोलॉजी)
(b) Conchology /कान्कोलॉजी
(c) Entomology/एन्टोमोलॉजी
(d) Ophiology/ओफियोलॉजी

Ans. (b) : The study of molluscs is known as **Malacology**. Malacology is the branch of zoology and study of molluscs as whole organism. But the study of molluscs shell is called **conchology**. Conchology confirmed to study of their shells.

According to Dance, 1986, conchology may be defined as the study of terrestrial and aquatic molluscan shells. and their associated hard parts, including the operculum and radula.

20. Process absent in viruses is

वायरस की प्रक्रिया में _____ अनुपस्थित है

- (a) Replication/प्रतिकृति
(b) Protein synthesis /प्रोटीन संश्लेषण
(c) Mutation/परिवर्तन
(d) Energy liberation/ऊर्जा मुक्ति

Ans. (d) : Energy production and liberation process is absent in viruses, as this process is not required by virus. As we know that virus have no ribosome's, mitochondria, or other organelles, they are completely dependent on their cellular hosts for energy production and protein synthesis. A virus is small infectious agent, that replicates only inside the living cells of other organism. Viral proteins can be synthesized in host cells by using host machinery.