Practical Paper in Botany

Exam. Time: Three Hours

Practical Paper

Practical exam is conducted in the language of the examination. The paper consists of 10 questions, and candidates are required to answer any five of them.

Practical Questions

Please read each of the following instructions carefully before attempting questions.

There are EIGHT questions divided into two SECTIONS and printed both in HINDI and in ENGLISH. Candidate has to attempt FIVE questions in all.

Question No. 1 and 5 are compulsory and out of the remaining, THREE are to be attempted choosing at least ONE from each section.

The number of marks carried by a question/part is indicated against it.

Answers must be written in the medium authorized in the Admission certificate which must be stated clearly on the cover of this Question-cum-Answer (QCA) booklet in the space provided. No marks will be given for answers written in medium other than the authorized one.

Word limit in questions, wherever specified, should be adhered to.

Illustrate your answers with suitable sketches and diagrams, wherever considered necessary.

Attempts of questions shall be counted in chronological order. Unless struck off, attempt of a question shall be counted even if attempted partly. Any page or portion of the page left blank in the answer book must be clearly struck off.
खण्ड ‘A’  SECTION ‘A’

1.(a) आत्मविश्वासक कूट की मिन विशेषताओं को उपयुक्त उदाहरणों द्वारा अभिलक्षित करें:
(i) अप्हास (डोकेनेसी) (ii) आत्मविश्वासक कूट की सर्वमात्रिकता
डोकेन (डोका) परिकल्पना पर एक उपाय जोड़ें।
Characterize with suitable examples, the following features of genetic code:
(i) Degeneracy (ii) Universality of genetic code
and add a note on Wobble hypothesis.

1.(b) सूक्ष्मकीय के $F_1 - F_0$ कक्षाओं की संरचना का सत्यापन करें। वे किस प्रकार सूक्ष्मकीय की हिल्टी के पार प्रभावन के संबंध में सह्य है; जिसमें एटि.पी. का उपयोग होता है?
Illustrate and narrate structure of $F_1 - F_0$ particles of mitochondria. How do they facilitate
movement of protons across the mitochondrial membrane leading to ATP generation?

1.(c) $E. coli$ के लैँक आपस्रोत (लैँक प्रतलक) का सत्यापन करें।
Give an illustrated account of Lac Operon in E. Coli.

1.(d) संक्षेप (क्रियापत्तिक) तथा प्रोटोटिपिक को परिभाषित और उनके बीच विशेषता करें। इसके जैव-मौकीजी उपयोग पर एक
रिपोर्ट जोड़ें।
Define and differentiate between Genomics and Proteomics. Add a note on their biomedical
applications.

1.(e) मिन संरचनाओं में मिछिलों में $0, 1, \frac{1}{2} \text{ या } 4$ को भरते; जिससे प्रत्येक स्तर के जीन प्रतिक को उसके मैथिस विभाग की संभावना
से जोड़ा जा सके। कारण लिखें।
Complete the table given below by inserting $0, 1, \frac{1}{2} \text{ or } \frac{1}{4}$ for the probability of each genotype of
progeny for each type of mating. Give reasons.

<table>
<thead>
<tr>
<th>स्तर का जीन प्रतिक</th>
<th>Genotype of progeny</th>
</tr>
</thead>
<tbody>
<tr>
<td>मैथिस Mating</td>
<td>A A</td>
</tr>
<tr>
<td>A A x A A</td>
<td></td>
</tr>
<tr>
<td>A A x A</td>
<td></td>
</tr>
<tr>
<td>A A x A A</td>
<td></td>
</tr>
<tr>
<td>A a x a</td>
<td></td>
</tr>
</tbody>
</table>

2.(a) मिन चंसात्तल रोगों तथा उनके मानव में प्रकटता के आधि आधार का वर्णन करें:
(i) पूरीत लंगुरता (ii) नींद (हिस्र) कोशिका अर्धस्थ (iii) हंटिंग कोरा
Describe the molecular basis of the following inherited diseases and their manifestations in
humans:
(i) Cystic fibrosis (ii) Sickle cell anemia (iii) Hunting chorea

2.(b) आधुनिक होमो सेप्टिका के पांच मूल विकासीक परिकल्पना को विविधता करें जो उनके पुर्यो के बंध में विविध मूलभारत विभाजन
कार्यों तथा उपयोग में पट्टे थे।
Identify the five important evolutionary changes led to evolution of modern Homo sapiens from
the ancestral stock during various Geological era and epochs.

2.(c) संस्कृति तथा आधुनिक कोशिका चक्रों की उदाहरण करें। इन चक्रों के प्रवासह विभिन्न उन्नामों तथा ऐतिहासिक की मूलभारत
के मूलभारत पर एक उपाय जोड़ें।
Compare the events during mitotic and meiotic cell cycles. Add a note on role of stage-specific
macromolecules and enzymes in such cycles.

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3.(a) Describe the process of DNA finger printing and indicate which of the following is used in DNA finger printing:

(i) Palindromic sequences of DNA
(ii) V.N.T.R
(iii) Shine-Dalgarno sequences
(iv) TATA boxes

3.(b) Give an illustrated account of evolution of horse, mentioning the relevant geological time periods.

3.(c) State and explain Hardy Weinberg's law of genetic equilibrium. What are its limitations? Calculate the allele frequencies of $L^M$ and $L^N$ genes from the following blood group data of a population on the basis of this law.

<table>
<thead>
<tr>
<th>Blood type</th>
<th>Genotype</th>
<th>Number of individuals</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$M$</td>
<td>$L^M L^M$</td>
</tr>
<tr>
<td>2</td>
<td>$MN$</td>
<td>$L^M L^N$</td>
</tr>
<tr>
<td>3</td>
<td>$N$</td>
<td>$L^N L^N$</td>
</tr>
</tbody>
</table>

4.(a) Give an illustrated account of protein synthesis in eukaryotic cell. Compare this with similar events in a prokaryotic cell. Add a note on the mechanisms that lead to migration of such proteins in the lumen of endoplasmic reticulum.

4.(b) What are the various vectors used in genetic engineering? Write and compare the protocol for each.

4.(c) Define continental drift. Explain the processes by which this has impacted upon the geographical distribution of fauna restricting it to certain regions only.

**SECTION 'B'**

5.(a) What are nucleic acids? Describe the structure and functions of various types of RNAs.

5.(b) Name the enzymes and hormones released by liver and pancreas. Discuss their functions in digestion of food and maintenance of blood glucose balance.
5. (c) What is I.V.F.? Make a flow chart of steps in I.V.F. Add a note on its applications.

5. (d) Give evidence in favour of mitochondrial theory of aging. What are its limitations?

5. (e) What are vitamins? Name and give the functions of water soluble vitamins. Tabulate the diseases that occur in humans due to hypo and hypervitaminosis.

6. (a) What do you mean by neurotransmitters? Describe adrenergic, cholinergic and peptidergic neurotransmitters and write an illustrated account of their functions in synaptic transmission.

6. (b) Describe the process of formation of three germinal layers. Draw sequential diagrams and narrate to show formation of eye in frog or chick.

6. (c) What is haematopoeisis? Indicate the site and the stages by which erythrocytes, various types of leucocytes and platelets are formed. Which chemical factor(s) coordinate and control these events?

7. (a) What is paedomorphosis? How does it differ from Neoteny? Add a note on its significance in evolution of Homo sapiens.

7. (b) What are immunoglobulins? Describe the structure of IgG and add a note on its diversity.

7. (c) What do you mean by anticoagulant? Describe the structure and functions of natural and synthetic anticoagulants.

8. (a) Haeckel propounded the concept (law), "Ontogeny recapitulates phylogeny." Give evidence and examples that negates it or favours it.

8. (b) What is apoptosis? What are its stages? Write about the molecular mechanism of apoptosis.

8. (c) What is cladistics? Discuss its applications in understanding the evolution of different life forms and phylogeny.