SUMMATIVE ASSESSMENT – II

SCIENCE

निर्धारित समय : 3 घण्टे

Time allowed : 3 hours

अधिकतम अंक : 90

Maximum Marks : 90
Genera Instructions:

(i) The question paper comprises two Sections, A and B. You are to attempt both the sections.

(ii) All questions are compulsory.

(iii) There is no choice in any of the questions.

(iv) All questions of Section A and all questions of Section B are to be attempted separately.

(v) Question numbers 1 to 3 in Section A are one-mark questions. These are to be answered in one word or in one sentence.

(vi) Question numbers 4 to 6 in Section A are two-marks questions. These are to be answered in about 30 words each.

(vii) Question numbers 7 to 18 in Section A are three-marks questions. These are to be answered in about 50 words each.
(ix) Question numbers 25 to 33 in Section B are multiple choice questions based on practical skills. Each question is a one-mark question. You are to select one most appropriate response out of the four provided to you.

(x) Question numbers 34 to 36 in Section B are two-marks questions based on practical skills. These are to be answered in brief.

भाग अ

SECTION A

1. एथेन के अणु में सहसंयोजी आकर्षणों की संख्या लिखिए।
   Write the number of covalent bonds in the molecule of ethane.

2. किसी जीव के उस जैव-प्रक्रम का नाम लिखिए जो उसकी समस्ति की वृद्धि में सहायता करता है।
   Name the life process of an organism that helps in the growth of its population.

3. यदि किसी खाद्य शृंखला के प्रथम पोषी स्तर पर 10,000 जूल ऊर्जा उपलब्ध है, तो द्वितीय पोषी स्तर के जीवों को कितनी ऊर्जा उपलब्ध होगी?
   What will be the amount of energy available to the organisms of the 2nd trophic level of a food chain, if the energy available at the first trophic level is 10,000 joules?

4. काँच और जल के निर्पेक्ष अपवर्तनांक क्रमशः 4/3 और 3/2 हैं। यदि काँच में प्रकाश की चाल $2 \times 10^8$ m/s है, तो (i) निर्वंत, (ii) जल में प्रकाश की चाल परिकलित कीजिए।
   The absolute refractive indices of glass and water are 4/3 and 3/2 respectively. If the speed of light in glass is $2 \times 10^8$ m/s, calculate the speed of light in (i) vacuum, (ii) water.

5. गंगा नदी के जल के प्रदूषित होने के दो मुख्य कारणों की सूची बनाइए। उल्लेख कीजिए कि किसी नदी के जल का प्रदूषित और संरक्षित होना उसके आस-पास के क्षेत्रों में रहने वाले लोगों के स्वास्थ्य के लिए हानिकारक क्यों सिद्ध होता है।
   List two main causes of the pollution of water of the river Ganga. State how pollution and contamination of river water prove harmful for the health of the people of neighbouring areas.
What is biodiversity? What will happen if biodiversity of an area is not preserved? Mention one effect of it.

7. किसी ऐल्कोहॉल और कार्बोक्सिलिक अम्ल में भेद करने के दो प्रायोगिक परीक्षणों की सूची बनाइए और वर्णन कीजिए कि ये परीक्षण कैसे किए जाते हैं।
List two tests for experimentally distinguishing between an alcohol and a carboxylic acid and describe how these tests are performed.

8. एथाइन की इलेक्ट्रॉन-बिन्दु संरचना का चित्रण कीजिए। एथाइन और ऑक्सीजन के मिश्रण का दहन वेल्डिंग के लिए किया जाता है। अपने बिचार से इस कार्य के लिए एथाइन और वायु के मिश्रण का उपयोग क्यों नहीं किया जा सकता है?
Draw the electron-dot structure for ethyne. A mixture of ethyne and oxygen is burnt for welding. In your opinion, why cannot we use a mixture of ethyne and air for this purpose?

9. दो तत्व ‘P’ और ‘Q’ आधुनिक आवर्त सारणी के एक ही आवर्त के क्रमशः समूह-1 और समूह-2 के सदस्य हैं। इनके निम्नलिखित लक्षणों/पुण्यतंत्रों की तालिका के रूप में तुलना कीजिए:
Two elements ‘P’ and ‘Q’ belong to the same period of the modern periodic table and are in Group-1 and Group-2 respectively. Compare their following characteristics in tabular form:

(a) इनके परमाणुओं में इलेक्ट्रॉनों की संख्या
(b) इनके परमाणुओं का साइज़
(c) इनकी धातिक प्रवृत्ति
(d) इनकी इलेक्ट्रॉन त्यागने की प्रवृत्ति
(e) इनके ऑक्साइडों के सूत्र
(f) इनके क्लोराइडों के सूत्र

(a) The number of electrons in their atoms
(b) The sizes of their atoms
(c) Their metallic characters
(d) Their tendencies to lose electrons
(e) The formula of their oxides
(f) The formula of their chlorides
Taking the example of an element of atomic number 16, explain how the electronic configuration of the atom of an element relates to its position in the modern periodic table and how valency of an element is calculated on the basis of its atomic number.

11. List six specific characteristics of sexual reproduction.

12. What are chromosomes? Explain how in sexually reproducing organisms the number of chromosomes in the progeny is maintained.

13. List four points of significance of reproductive health in a society. Name any two areas related to reproductive health which have improved over the past 50 years in our country.

14. Explain with an example for each, how the following provides evidences in favour of evolution in organisms:
   (a) Homologous organs
   (b) Analogous organs
   (c) Fossils
16. If the image formed by a mirror for all positions of the object placed in front of it is always erect and diminished, what type of mirror is it? Draw a ray diagram to justify your answer. Where and why do we generally use this type of mirror?

17. What is meant by scattering of light? Use this phenomenon to explain why the clear sky appears blue or the sun appears reddish at sunrise.

18. Differentiate between biodegradable and non-biodegradable substances with the help of one example each. List two changes in habit that people must adopt to dispose non-biodegradable waste, for saving the environment.

19. Both soap and detergent are some type of salts. What is the difference between them? Describe in brief the cleansing action of soap. Why do soaps not form lather in hard water? List two problems that arise due to the use of detergents instead of soaps.
Name the human male reproductive organ that produces sperms and also secretes a hormone. Write the functions of the secreted hormone.

Name the parts of the human female reproductive system where

(i) fertilisation takes place,
(ii) implantation of the fertilised egg occurs.

Explain how the embryo gets nourishment inside the mother’s body.

How do Mendel’s experiments show that the

(a) traits may be dominant or recessive,
(b) traits are inherited independently?

What is meant by power of a lens? Define its S.I. unit.

You have two lenses A and B of focal lengths +10 cm and –10 cm respectively. State the nature and power of each lens. Which of the two lenses will form a virtual and magnified image of an object placed 8 cm from the lens? Draw a ray diagram to justify your answer.
One half of a convex lens of focal length 10 cm is covered with a black paper. Can such a lens produce an image of a complete object placed at a distance of 30 cm from the lens? Draw a ray diagram to justify your answer.

A 4 cm tall object is placed perpendicular to the principal axis of a convex lens of focal length 20 cm. The distance of the object from the lens is 15 cm. Find the nature, position and size of the image.
Write the importance of ciliary muscles in the human eye. Name the defect of vision that arises due to gradual weakening of the ciliary muscles in old age. What type of lenses are required by the persons suffering from this defect to see the objects clearly?

Akshay, sitting in the last row in his class, could not see clearly the words written on the blackboard. When the teacher noticed it, he announced if any student sitting in the front row could volunteer to exchange his seat with Akshay. Salman immediately agreed to exchange his seat with Akshay. He could now see the words written on the blackboard clearly. The teacher thought it fit to send the message to Akshay’s parents advising them to get his eyesight checked.

In the context of the above event, answer the following questions:

(a) Which defect of vision is Akshay suffering from? Which type of lens is used to correct this defect?

(b) State the values displayed by the teacher and Salman.

(c) In your opinion, in what way can Akshay express his gratitude towards the teacher and Salman?

**SECTION B**

25. जब आप ऐसीटिक अम्ल को लाल और नीले लिटमस पत्रों पर डालते हैं, तब क्या प्रक्षण करते हैं?

(A) लाल लिटमस लाल ही रहता है और नीला लिटमस लाल हो जाता है।
(B) लाल लिटमस नीला हो जाता है और नीला लिटमस नीला ही रहता है।
(C) लाल लिटमस नीला हो जाता है और नीला लिटमस लाल हो जाता है।
(D) लाल लिटमस रंगहीन हो जाता है और नीला लिटमस नीला ही रहता है।

What do we observe on pouring acetic acid on red and blue litmus papers?

(A) Red litmus remains red and blue litmus turns red.
(B) Red litmus turns blue and blue litmus remains blue.
(C) Red litmus turns blue and blue litmus turns red.
(D) Red litmus becomes colourless and blue litmus remains blue.
While preparing soap a small quantity of common salt is generally added to the reaction mixture of vegetable oil and sodium hydroxide. Which one of the following may be the purpose of adding common salt?

(A) To reduce the basic nature of the soap
(B) To make the soap neutral
(C) To enhance the cleansing power of the soap
(D) To favour the precipitation of the soap

A student takes about 4 mL of distilled water in four test tubes marked P, Q, R and S. He then dissolves in each test tube an equal amount of one salt in one test tube, namely sodium sulphate in P, potassium sulphate in Q, calcium sulphate in R and magnesium sulphate in S. After that he adds an equal amount of soap solution in each test tube. On shaking each of these test tubes well, he observes a good amount of lather (foam) in the test tubes marked

(A) P and Q
(B) Q and R
(C) P, Q and S
(D) P, R and S
A student was asked to observe and identify the various parts of an embryo of a red kidney bean seed. He identified the parts and listed them as under:

I. Tegmen
II. Testa
III. Cotyledon
IV. Radicle
V. Plumule

The correctly identified parts among these are

(A) I, II and III
(B) II, III and IV
(C) III, IV and V
(D) I, III, IV and V
Given below is the list of vegetables available in the market. Select from these the two vegetables having homologous structures:

Potato, sweet potato, ginger, radish, tomato, carrot, okra (Lady’s finger)

(A) Potato and sweet potato
(B) Radish and carrot
(C) Okra and sweet potato
(D) Potato and tomato

30. कोई छात्र अपने विद्यालय की प्रयोगशाला में दिए गए अवतल दर्पण की फोकस दूरी ज्ञात करते समय दर्पण (M) द्वारा प्रयोगशाला की दृष्टि खिड़की (W) का स्पष्ट प्रतिविम्ब पद्ध (S) पर प्राप्त करता है। दर्पण की फोकस दूरी ज्ञात करने के लिए उसे कौन-सी दूरी मापनी चाहिए?

(A) MW
(B) MS
(C) SW
(D) MW – MS
is a sharp image of the distant window (W) of the school laboratory on the screen (S) using the given concave mirror (M) to determine its focal length. Which of the following distances should he measure to get the focal length of the mirror?

(A) MW
(B) MS
(C) SW
(D) MW – MS

31. किसी छात्र ने नीचे दिए गए आरंभ में दर्शाए अनुसार एक भली-भोली प्रदीप दूरस्थ भवन का प्रतिबिम्ब पर्दा (S) पर फोकसित करने के लिए किसी युक्ति (X) का उपयोग किया। इस युक्ति (X) के विषय में सही कथन चुनिए।

(A) यह युक्ति 8 cm फोक्स दूरी का अवतल लेंस है।
(B) यह युक्ति 8 cm फोक्स दूरी का उत्तर दर्पण है।
(C) यह युक्ति 4 cm फोक्स दूरी का उत्तर लेंस है।
(D) यह युक्ति 8 cm फोक्स दूरी का उत्तर लेंस है।
A student used a device (X) to obtain/focus the image of a well-illuminated distant building on a screen (S) as shown below in the diagram. Select the correct statement about the device (X).

(A) This device is a concave lens of focal length 8 cm.
(B) This device is a convex mirror of focal length 8 cm.
(C) This device is a convex lens of focal length 4 cm.
(D) This device is a convex lens of focal length 8 cm.

32. कोई छात्र काँच की आयताकार सिंहार से होकर गुजरने वाली प्रकाश किरण का पथ आपतन कोणों के विभिन्न मानों के लिए आरेखित करता है । वह प्रयोग के प्रत्येक चरण को करते समय यथासम्भव सावधानियाँ बरतता है । प्रयोग के अन्त में, मापों का विश्लेषण करने पर, निम्नलिखित में से उसका सम्भावित निष्कर्ष क्या होना चाहिए?

(A) \( \angle i = \angle e < \angle r \)
(B) \( \angle i < \angle e < \angle r \)
(C) \( \angle i > \angle e > \angle r \)
(D) \( \angle i = \angle e > \angle r \)

A student traces the path of a ray of light through a rectangular glass slab for the different values of angle of incidence. He observes all possible precautions at each step of the experiment. At the end of the experiment, on analysing the measurements, which of the following conclusions is he likely to draw?

(A) \( \angle i = \angle e < \angle r \)
(B) \( \angle i < \angle e < \angle r \)
(C) \( \angle i > \angle e > \angle r \)
(D) \( \angle i = \angle e > \angle r \)
A student traces the path of a ray of light through a triangular glass prism for different values of angle of incidence. On analysing the ray diagrams, which one of the following conclusions is he likely to draw?

(A) The emergent ray is parallel to the incident ray.
(B) The emergent ray bends at an angle to the direction of the incident ray.
(C) The emergent ray and the refracted ray are at right angles to each other.
(D) The emergent ray is perpendicular to the incident ray.

When you add sodium hydrogen carbonate to acetic acid in a test tube, a gas liberates immediately with a brisk effervescence. Name this gas. Describe the method of testing this gas.

Students were asked to observe the permanent slides showing different stages of budding in yeast under high power of a microscope.

(a) Which adjustment screw (coarse/fine) were you asked to move to focus the slides?
(b) Draw three diagrams in correct sequence showing budding in yeast.
A 4 cm tall object is placed on the principal axis of a convex lens. The distance of the object from the optical centre of the lens is 12 cm and its sharp image is formed at a distance of 24 cm from it on a screen on the other side of the lens. If the object is now moved a little away from the lens, in which way (towards the lens or away from the lens) will he have to move the screen to get a sharp image of the object on it again? How will the magnification of the image be affected?