Series ONS **SET-3**

Roll No. | | | | | | | |

Candiates must write code on the title page of the answer – book

- Please check that this question paper contains 11 printed pages.
- Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please check that this question paper contains 26 questions.
- Please write down the Serial Number of the question before attempting it.
- 15 minute time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the students will read the question paper only and will not write any answer on the answer-book during this period.

BIOLOGY (Theory)

Time allowed : 3 hours **Maximum Marks :** 70

General Instructions :

(i) *There are a total of 26 questions and five sections in the question paper. **All** questions are **compulsory.***

(ii) *Section A contains questions number 1 to 5, very short-answer type questions of 1 mark each.*

(iii) *Section B contains questions number 6 to 10, short-answer type I questions of 2 marks each.*

(iv) *Section C contains questions number 11 to 22, short-answer type II questions of 3 marks each.*

(v) *Section D contains question number 23, value based question of 4 marks.*

(vi) *Section E contains questions number 24 to 26, long-answer type questions of 5 marks each.*

(vii) *There is no overall choice in the question paper, however, an internal choice is provided in one question of 2 marks, one question of 3 marks and all the three questions of 5 marks. In these questions, an examinee is to attempt any one of the two given alternatives.*

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JEE (Advanced)

Selections (from 2002-2015)	Students in TOP 100 AIR (from 2002-2015)
23182	**153**
(YCCP: 14864 | DLP+eLP: 8318)	(YCCP: 101 | DLP+eLP: 52)

Highest selections in JEE (Adv) 2015 in India from any single institute of Kota

JEE (Main)

Selections (from 2009-2015)	Students in TOP 100 AIR (from 2009-2015)
93915	**65**
(YCCP: 66288 | DLP+eLP: 27627)	(YCCP: 25 | DLP+eLP: 40)

Highest selections in JEE (Main) 2015 in India from any single institute of Kota

PRE-MEDICAL

Selections in AIIMS (from 2012-2015)	Selections in AIPMT (from 2012-2015)
66	**1559**
(YCCP: 51 | DLP+eLP: 15)	(YCCP: 1128 | DLP+eLP: 431)

Selection of every 3rd student from classroom coaching program in AIPMT 2015

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SECTION -A

1. Mention two advantages for preferring CNG over diesel as an automobile fuel. [1]

2. What are transgenic animals. Given an example. [1]

3. Write the probable differences in eating habits of Homo habilis and Homo erectus. [1]

4. Mention the role of 'genetic mother' in MOET. [1]

5. A male honeybee has 16 chromosomes whereas its female has 32 chromosomes. Give one reason. [1]

SECTION -B

6. Name a free-living and a symbiotic bacterium that serve as bio-fertilizer. Why are they so called ? [2]

7. Name the calls HIV (Human Immunodeficiency Virus) gains entry into after infecting the human body. Explain the events that occur in these cells. [2]

8. Explain the relationship between CFC's and Ozone in the stratosphere. [2]

OR

Why are sacred groves highly protected ?

9. Following are the features of genetic codes. What does each one indicate ? [2]
Stop codon; Unambiguous codon; Degenerate codon; Universal codon.

10. Out of many papaya plants growing in your garden, only a few bear fruits. Give reason. [2]

SECTION - C

11. (a) Write the two limitations of traditional breeding technique that led to promotion of micro propagation.

(b) Mention two advantages of micro propagation.

(c) Give two examples where it is commercially adopted. [3]

12. (a) It is generally observed that the children who had suffered from chicken - pox in their childhood may not contract the same disease in their adulthood. Explain giving reasons the basis of such an immunity in an individual. Name this kind of immunity.

(b) What are interferons ? Mention their role. [3]

13. How do homologous organs represent divergent evolution ? Explain with the help of a suitable example. [3]

14. Name two hormones that are constituents of contraceptive pills. Why do they have high and effective contraceptive value ? Name a commonly prescribed non-steroidal oral pill.

OR

(a) How are Parthenocarpic fruits produced by some plants and apomictic seeds by some others ? Explain.

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(b) When do farmers prefer using apomictic seeds ? [3]

15. (a) What do 'Y' and 'B' stand for in 'YAC' and 'BAC' used in Human Genome Project (HGP). Mention their role in the project.

(b) Write the percentage of the total human genome that codes for proteins and the percentage of discovered genes whose functions are known as observed during HGP.

(c) Expand 'SNPs' identified by scientists in HGP. [3]

16. Explain enzyme-replacement therapy to treat adenosine deaminase deficiency. [3]
Mention two disadvantages of this procedure.

17. What is a test cross ? How can it decipher the heterozygosity of a plant ? [3]

18. (a) How do organic farmers control pests ? Give two examples.

(b) State the difference in their approach from that of conventional pest control methods. [3]

19. (a) Name the selectable markers in the cloning vector pBR322 ? Mention the role they play.

(b) Why is the coding sequence of an enzyme β-galactosidase a preferred selectable marker in comparison to the ones named above ? [3]

20. Differentiate between primary and secondary succession. Provide one example of each. [3]

21. (a) Why must a cell be made 'competent' in biotechnology experiments ? How does calcium ion help in doing so ?

(b) State the role of 'biolistic gun' in biotechnology experiments. [3]

22. Explain Parasitism and co. evolution with the help of one example of each. [3]

SECTION-D

23. A large number of married couples the world over are childless. It is shocking to know that in India the female partner is often blamed for the couple being childless.

(a) Why in your opinion the female partner is often blamed for such situations in India ? Mention any two values that you as a biology student can promote to check this social evil.

(b) State any two reasons responsible for the cause of infertility.

(c) Suggest a technique that can help the couple to have a child where the problem is with the male partner. [4]

SECTION-E

24. (a) What is polygenic inheritance ? Explain with the help of a suitable example.

(b) How are pleiotropy and Mendelian pattern of inheritance different from polygenic pattern of inheritance ?

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OR

(a) Name the stage in the cell cycle where DNA replication occurs.

(b) Explain the mechanism of DNA replication. Highlight the role of enzymes in the process.

(c) Why is DNA replication said to be semiconservative ? [5]

25. (a) Name the two growth models that represent populations growth and draw the respective growth curves they represent.

(b) State the basis for the difference in the shape of these curves.

(c) Which one of the curves represent the human population growth at present ? Do you think such a curve is sustainable ? Give reason in support of your answer.

OR

(a) Taking an example of a small pond explain how the four components of an ecosystem function as a unit.

(b) Name the type of food chain that exists in a pond. [5]

26. (a) Explain the menstrual phase in a human female. State the levels of ovarian and pituitary hormones during this phase.

(b) Why is follicular phase in the menstrual cycle also referred as proliferative phase ? Explain.

(c) Explain the events that occur in a graafian follicle at the time of ovulation and there after.

(d) Draw a graafian follicle and label antrum and secondary oocyte.

OR

(a) As a senior biology student you have been asked to demonstrate to the students of secondary level in your school, the procedure(s) that shall ensure cross-pollination in a hermaphrodite flower. List the different steps that you would suggest and provide reasons for each one of them.

(b) Draw a diagram of a section of a megasporangium of an angiosperm and label funiculus, micropyle, embryosac and nucellus. [5]

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