BIOLOGY PAPER 1
(THEORY)

Maximum Marks: 70

Time Allowed: Three hours

*(Candidates are allowed **additional 15 minutes** for **only** reading the paper.*

*They must **NOT** start writing during this time).*

This paper is divided into four sections – A, B, C and D.

*Answer **all** questions.*

***Section – A** consists of **one** question **having sub-parts** of **one** mark each.*

***Section – B** consists of **seven** questions of **two** marks each.*

***Section – C** consists of **seven** questions of **three** marks each, and*

***Section – D** consists of **three** questions of **five** marks each.*

Internal choices have been provided in one question each in Section B, Section C and Section D.

The intended marks for questions or parts of questions are given in brackets [ ].

SECTION A – 20 MARKS

Question 1

Answer the following questions briefly.

(i) Name the type of bioreactor which provides greater surface area for oxygen transfer. **[1]**

(ii) Name the causative agent of genital warts. **[1]**

(iii) If a segment of double-stranded DNA has 18% thymine, calculate the percentage of cytosine in the DNA. **[1]**

(iv) A woman has normal vision, but her father is colourblind. If she marries a colourblind man, what is the probability of her son being colourblind? **[1]**

(v) What are Ramsar sites? **[1]**

(vi) Define *standing state* in an ecosystem. **[1]**

(vii) Name the toxin which is responsible for causing the symptoms of malaria. **[1]**

(viii) Name the bond which exists between chain-A and chain-B of human insulin. **[1]**

(ix) Which row is correct with respect to the features of Neutrophils and B-lymphocytes? **[1]**

	Neutrophils	**B-lymphocytes**
I	can change shape.	get activated by contact with antigens.
II	are found in organs rather than in blood.	kill virus-infected cells.
III	may be long-lived cells.	are always short-lived cells.
IV	their lysosomal enzymes digest bacteria.	secrete cytokines.

(a) I

(b) II

(c) III

(d) IV

(x) How many ova and sperms would be produced from 50 primary oocytes and 50 primary spermatocytes during gametogenesis? **[1]**

(a) 100 ova, 50 sperms

(b) 100 ova, 200 sperms

(c) 50 ova, 200 sperms

(d) 50 ova, 100 sperms

(xi) Which one of the following is a palindromic sequence? **[1]**

(a) 5'-CGTATG-3'
3'-CGAATG-5'

(b) 5'-CGAATG-3'
3'-GCATAC-5'

(c) 5'-GAATTC-3'
3'-CTTAAG-5'

(d) 5'-CGAATG-3'
3'-CTTAAG-5'

(xii) **Assertion**: Energy value of biogas is lower than that of organic matter. **[1]**
Reason: Biogas minimises the chances of spread of faecal pathogens.

(a) Both Assertion and Reason are true, and Reason is the correct explanation of Assertion.

(b) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.

(c) Assertion is true but Reason is false.

(d) Both Assertion and Reason are false.

(xiii) Give *one* significant contribution of each of the following scientists: **[2]**

(a) S. Cohen

(b) H. Boyer

(xiv) Give a term for the following: **[2]**

(a) The technique used to amplify a gene.

(b) The technique used for early diagnosis of HIV infection.

(xv) Expand the following abbreviations: **[2]**

(a) ICSI

(b) IUCD

(xvi) Give a reason for each of the following: **[2]**

(a) A person with cuts and bruises following an accident is administered tetanus anti-toxin.

(b) Origin of life is not possible under the present atmospheric conditions.

SECTION B – 14 MARKS

Question 2 **[2]**

(i) How does the Reproductive and Child Health Care Programme run by the government benefit the society?

OR

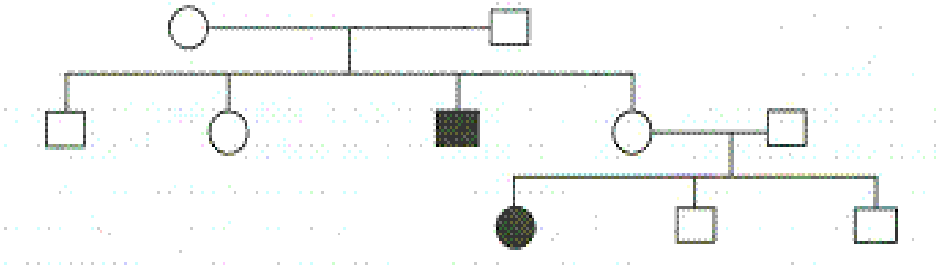
(ii) Write *any four* causes of infertility in males.

Question 3 **[2]**

What is meant by *lactational amenorrhoea*? Discuss the physiological mechanism which makes lactational amenorrhoea a natural contraceptive method.

Question 4 **[2]**

Study the pedigree chart given below and answer the questions that follow.



(i) Is the trait recessive or dominant? Give a reason for your answer.

(ii) Is the trait sex-linked or autosomal? Give a reason for your answer.

Question 5 **[2]**

The NPP of a terrestrial ecosystem is 1500 Kg per meter square per year and the respiratory loss of the ecosystem is 1200 Kg per meter square per year. Calculate the GPP of the given ecosystem.

Question 6 **[2]**

Give *any two* differences between normal body cells and cancer cells.

Question 7 **[2]**

(i) Name the first human-like hominid ancestor. What was its cranial capacity?

(ii) Name the hominid ancestor that existed about 1·5 mya. What was its cranial capacity?

Question 8 **[2]**

A person in good health visited a garden where flowers were in full bloom. While returning from the garden he suddenly started sneezing and wheezing.

(i) Name and define the response of the person's immune system in the above-mentioned case.

(ii) Name the cell of the immune system and the type of antibody involved in this kind of response.

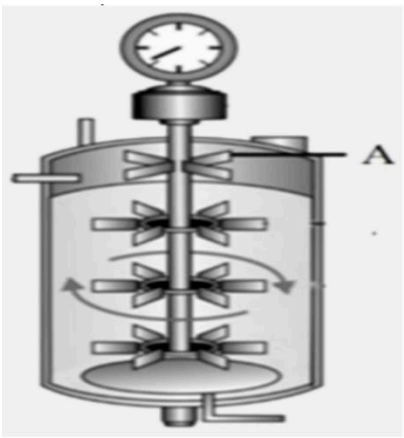
SECTION C – 21 MARKS

Question 9 **[3]**

Draw a neatly labelled diagram of a microspore.

Question 10 **[3]**

(i)



(a) Identify the diagram given above. **[½]**

(b) What is the role of the part labelled 'A'? **[½]**

(c) Redraw the diagram and label *any three* parts. **[2]**

OR

(ii) A bacterial culture was grown on a specific culture medium containing a chromogenic substrate. After sometime, it was observed that some colonies developed a blue-coloured appearance while some remained colourless. Briefly explain the phenomenon responsible for this observation.

Question 11 **[3]**

What is meant by 'biocontrol'? Explain how *Trichoderma* and Baculovirus act as biocontrol agents.

Question 12 **[3]**

What are *linked genes*? Give a schematic representation of a test cross between a white-eyed female *Drosophila* and a red-eyed male *Drosophila*.

Question 13 **[3]**

Alcoholic drinks are produced by fermentation, but some beverages are produced through an additional process of distillation. How do the distilled and undistilled alcoholic beverages differ in their quality and composition? Explain by giving *one* example each for a distilled alcoholic beverage and an undistilled alcoholic beverage.

Question 14 **[3]**

Consider the situation, where a variety of birds depend upon a big tree for their survival. The birds in turn are hosts for the different parasites surviving on them. Draw a pyramid of number to represent the above situation.

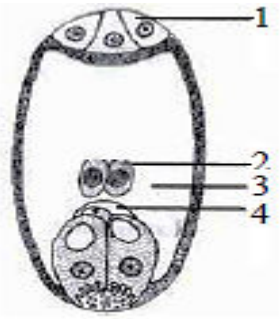
Question 15 **[3]**

Explain any three *ex situ* methods of conservation of biodiversity.

SECTION D – 15 MARKS

Question 16

(i)



Observe the given diagram of a typical embryo sac in angiosperm and answer the following questions.

(a) Identify the parts labelled 1, 2, 3 and 4. **[2]**

(b) Define *Syngamy* and *Triple fusion*. **[1]**

(c) How many nuclei and cells constitute an embryo sac? **[1]**

(d) Give *one* point on the significance of double fertilization. **[1]**

OR

(ii) A couple was expecting their child and visited a doctor for routine check-up. They came to know that the foetus was suffering from an incurable disorder. The doctor advised them to go for MTP.

(a) What is the full form of MTP? **[1]**

(b) In what way has the technique of MTP been misused? **[1]**

(c) Which diagnostic technique helped the doctor to detect the disorder in the embryo? **[1]**

(d) Give *one* similarity and *one* difference between Cu7 and LNG-20. **[2]**

Question 17 **[5]**

(i) Explain the 'Species-Area Relationship' with the help of a graph. Give its mathematical expression also.

(ii) Explain 'Rivet Popper Hypothesis'.

Question 18 **[5]**

Describe the process of transcription in prokaryotes.