

Reg. No. :

Name :

Time : 2 Hours

Cool-off time : 20 Minutes

Preparatory Time : 5 Minutes

Second Year – March 2016

Part – III

BIOLOGY

Maximum : 60 Scores

General Instructions to Candidates :

- There is a 'cool-off time' of 10 minutes each for Botany and Zoology in addition to the writing time of 1 hour each. Further there is '5 minutes' 'Preparatory Time' at the end of the Botany Examination and before the commencement of Zoology Examination.
- You are not allowed to write your answers nor to discuss anything with others during the 'cool-off time' and 'Preparatory Time'.
- Use the 'cool-off time' to get familiar with questions and to plan your answers.
- Read questions carefully before answering.
- All questions are compulsory and only internal choice is allowed.
- When you select a question, all the sub-questions must be answered from the same question itself.
- Calculations, figures and graphs should be shown in the answer sheet itself.
- Malayalam version of the questions is also provided.
- Give equations wherever necessary.
- Electronic devices except non-programmable calculators are not allowed in the Examination Hall.

നിർദ്ദേശങ്ങൾ :

- നിർദ്ദിഷ്ട സമയത്തിന് പുറമെ ബോട്ടണിയിലും സുവോളജിക്കും 10 മിനിറ്റ് വീതം 'കൂൾ ഓഫ് ടൈം' ഉണ്ടായിരിക്കും. കൂടാതെ ബോട്ടണി പരീക്ഷയ്ക്കുശേഷം സുവോളജി പരീക്ഷ തുടങ്ങുന്നതിനുമുമ്പ് '5 മിനിറ്റ്' തയ്യാറെടുപ്പുകൾ നടത്തുന്നതിനായി നൽകുന്നതാണ്. ഈ വേളകളിൽ ചോദ്യങ്ങൾക്ക് ഉത്തരം എഴുതാനോ, മറ്റുള്ളവരുമായി ആശയവിനിമയം നടത്താനോ പാടില്ല.
- ഉത്തരങ്ങൾ എഴുതുന്നതിന് മുമ്പ് ചോദ്യങ്ങൾ ശ്രദ്ധാപൂർവ്വം വായിക്കണം.
- എല്ലാ ചോദ്യങ്ങൾക്കും ഉത്തരം എഴുതണം.
- ഒരു ചോദ്യനമ്പർ ഉത്തരമെഴുതാൻ തെരഞ്ഞെടുത്തു കഴിഞ്ഞാൽ ഉപചോദ്യങ്ങളും അതേ ചോദ്യനമ്പറിൽ നിന്ന് തന്നെ തെരഞ്ഞെടുക്കേണ്ടതാണ്.
- കണക്ക് കൂട്ടലുകൾ, ചിത്രങ്ങൾ, ഗ്രാഫുകൾ എന്നിവ ഉത്തരപേപ്പറിൽ തന്നെ ഉണ്ടായിരിക്കണം.
- ആവശ്യമുള്ള സ്ഥലത്ത് സമവാക്യങ്ങൾ കൊടുക്കണം.
- ചോദ്യങ്ങൾ മലയാളത്തിലും നൽകിയിട്ടുണ്ട്.
- പ്രോഗ്രാമുകൾ ചെയ്യാനാകാത്ത കാൽക്കുലേറ്ററുകൾ ഒഴികെയുള്ള ഒരു ഇലക്ട്രോണിക് ഉപകരണവും പരീക്ഷാഹാളിൽ ഉപയോഗിക്കുവാൻ പാടില്ല.

PART - A

BOTANY

(Maximum : 30 Scores)

Time : 1 Hour

Cool-off time : 10 Minutes

1. When a gamete without any fusion develop into a new organism the phenomenon is called
(a) Syngamy (b) External fertilization
(c) Parthenogenesis (d) Parthenocarpy **(Score : 1)**
 2. In some seeds the nucellus may be persistent. Such nucellus is called
(a) Endosperm (b) Scutellum
(c) Plumule (d) Perisperm **(Score : 1)**
 3. Nutrients are never lost from the ecosystems and are recycled. Write about
(a) gaseous cycle
(b) sedimentary cycle **(Scores : 1 + 1)**
 4. Increase in the concentration of toxicants at successive trophic level is called
(a) BOD (b) Biomagnification
(c) Eutrophication (d) Algal Bloom **(Score : 1)**
 5. The recombinant DNA technological process have made immense impact in the area of healthcare. How Eli Lilly produced Insulin ? **(Scores : 2)**
 6. (a) Resistance is the ability to prevent the pathogen from causing disease.
(1) Elucidate the steps in breeding for disease resistance.
(2) Cite two examples for virus resistant plants. **(Scores : 3)**
- OR**
- (b) Tissue culture is an achievement in plant breeding. What is a somaclone ?
Describe the production of somatic hybrid. **(Scores : 3)**
 7. What is a false fruit ? Cite an example. **(Scores : 2)**
 8. Many of the flowering plants have developed some devices for discouraging in breeding. Write any two of them. **(Scores : 2)**

9. On earth, life exists even in extreme and harsh conditions. Mention any two major biomes in India. **(Score : 1)**

10. Ecological pyramids are usually upright. Meanwhile some, pyramid of biomass is inverted. Explain the reason. **(Scores : 2)**

11. (a) Population interactions may be beneficial or not. Write any three interactions in detail. **(Scores : 3)**

OR

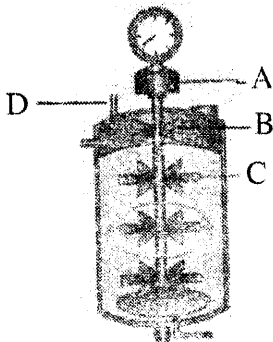
(b) Organism are influenced by biotic and abiotic factors. Write an account of any three abiotic environmental factors. **(Scores : 3)**

12. The major pollution in the environment is caused by automobiles. Expand the term CNG. Mention any two of its merits. **(Scores : 2)**

13. Some ethical standards are required to evaluate the morality of all human activities. Explain Biopiracy. **(Scores : 2)**

14. Temperature is generally increasing making the earth a hot plate. Mention any two measures to control global warming. **(Score : 1)**

15.



Observe the sketch of stirred-tank bioreactor and label the parts A, B, C and D. **(Scores : 2)**

16. Manipulating with nucleic acid is a trend in Biotechnology.

- (a) Name any one organism used as vector. **(Scores : 2)**
(b) What are DNA polymerase ?

17. A unisexual flower having no androecium is called

- (a) Dithecous (b) Dioecious **(Score : 1)**
(c) Monoecious (d) Pistillate

PART - B
ZOOLOGY

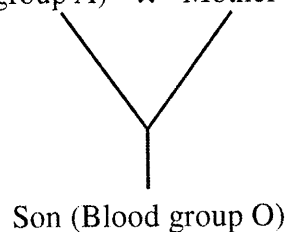
(Maximum : 30 Scores)

Time : 1 Hour

Cool-off time : 10 Minutes

1. Which of the following is not a Mendelian disorder ?
Colourblindness, Down's syndrome, Haemophilia, Thalassemia (Score : 1)

2. Study the following cross and answer the questions.
[Hint : ABO blood group in man is controlled by three alleles I^A , I^B and i .]
Father (Blood group A) × Mother (Blood group B)

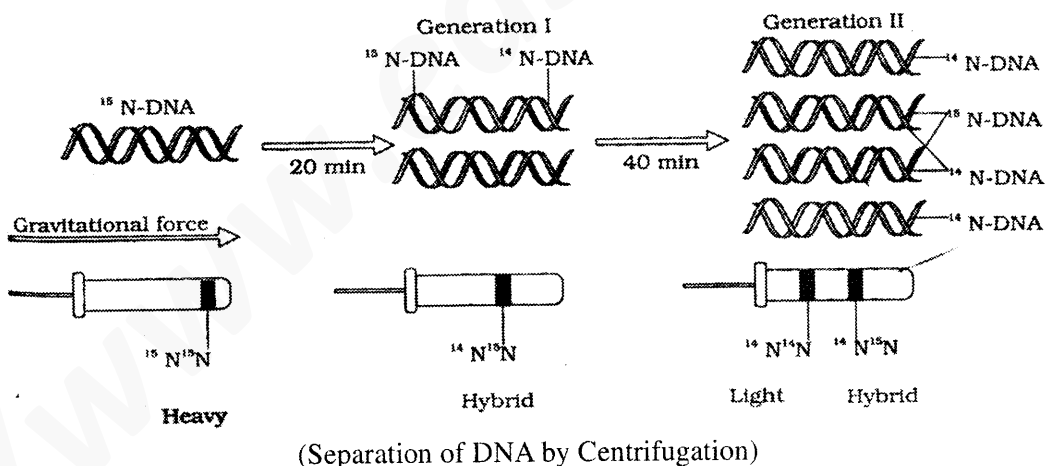


- (a) Write the genotypes of Father, Mother and Son.
(b) The type of dominance of human blood group inheritance is _____. (Scores : 2)
3. Categorise the given birth control methods into three groups with proper heads.

Cervical caps, Vasectomy, Cu T, Tubectomy,
Diaphragms, Condoms, Lippes Loop

(Scores : 3)

4. Results of a famous experiment is given in the figure. Answer the questions.

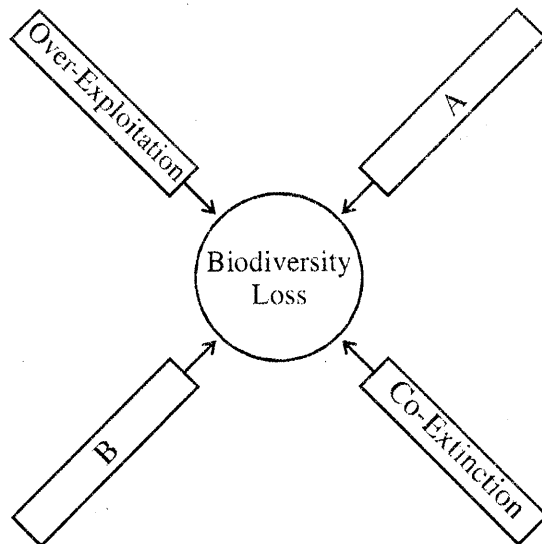


(Separation of DNA by Centrifugation)

- (a) Identify the experiment.
(b) Which property of the DNA is proved by this experiment ?

(Scores : 2)

5. Observe the concept diagram of the Evil Quartet of biodiversity loss.



- (a) Write A and B.
- (b) What is Co-Extinction ?

(Scores : 2)

6. Match the columns A and B :

A	B
Corpus Luteum	Embryo
Leydig cells	Implantation
Blastocyst	Progesterone
Inner cell mass	Androgens
	Prolactin

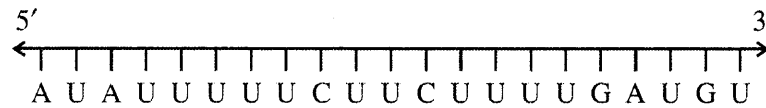
(Scores : 2)

7. Read the statements and choose the correct option :

- A : Sacred grooves are examples of *in situ* conservation
 - B : Biodiversity hotspots have low degree of endemism.
 - C : Biodiversity increases when number of organisms in a particular species increases.
- (a) Statement 'A' alone is correct.
 - (b) Statements 'A' and 'B' are correct.
 - (c) Statements 'A' and 'C' are correct.
 - (d) Statement 'C' alone is correct.

(Score : 1)

8. Read carefully the sequence of codons in the mRNA unit and answer the questions.



- (a) What change is needed in the first codon to start the translation process ?
(b) If translation starts by that change, till which codon it can continuous ? Why ?

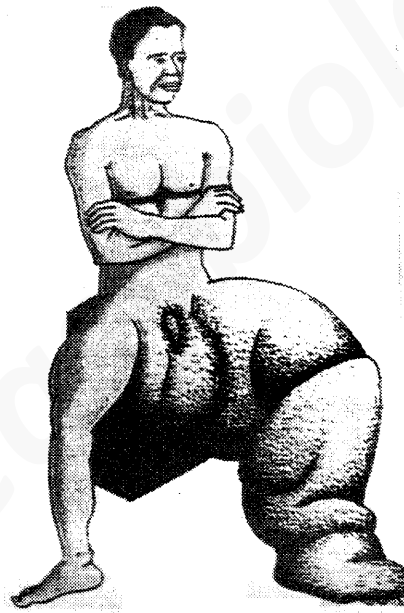
(Scores : 2)

9. "BOD is commonly calculated as an index of water pollution."

- (a) Do you agree with this statement ? Why ?
(b) Expand BOD.

(Scores : 2)

10. Identify the disease shown in the following figure and write the causative organism of the disease.



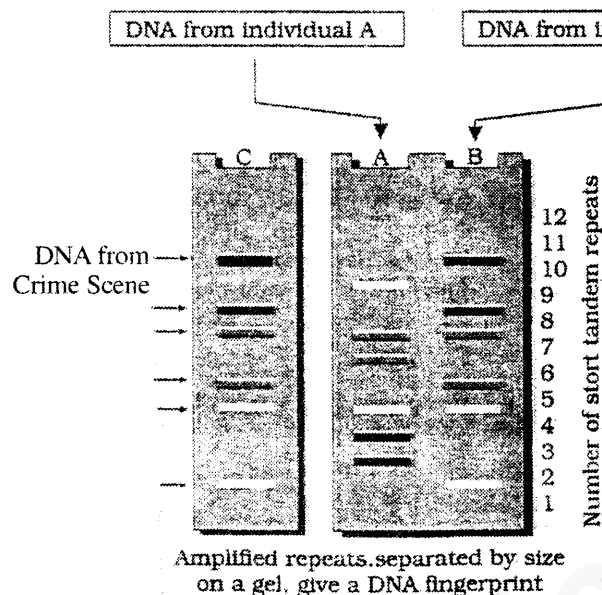
(Score : 1)

11. "Blood of a man is tested positive for cannabinoid."

- (a) What are these ?
(b) From where these are extracted naturally ?
(c) Which part of the body is affected by these ?

(Scores : 3)

12. Schematic representation of DNA fingerprints are shown below :
 [Hints : C is a sample taken from a crime scene, A and B from two suspected individuals]

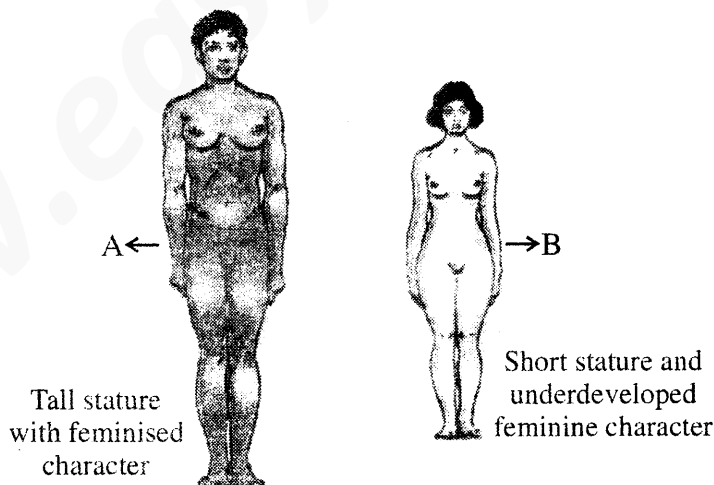


- (a) Which one of the suspected individual may involved in the crime ?
 (b) Write any other use of DNA fingerprinting.

(Scores : 2)

13. Breast feeding during initial period of infant growth is necessary to develop immunity of new born babies. Why ? (Score : 1)

14. Observe the figures and answer the questions.



- (a) Identify the syndromes A and B.
 (b) What is the chromosome numbers in A and B ?

(Scores : 2)

16. Read the principle and answer the questions :

“Allele frequencies in a population are stable and constant from generation to generation called genetic equilibrium.”

- (a) Name the principle mentioned here.
- (b) Mention any two factors affecting the equilibrium.
- (c) What is the significance of disturbances occur in the genetic equilibrium?(Scores : 3)

OR

‘Natural selection can lead to stabilisation, directional change and disruptive changes.’

Explain the terms stabilization, directional change and disruptive change mentioned above. (Scores : 3)

FINALIZED SCHEME OF VALUATION

Subject - Biology - Part A Botany

Code No. 1017

Qn.No	SUB QTN	SUB QTN	Scoring Indicators	Split Score	Total Score
1			c) Parthenogenesis	1	1
2			d) Perisperm	1	1
3	a		Cycles of gaseous matter are called gaseous cycle. The reservoir of gaseous type of nutrient cycle exists in the atmosphere. These cycles occur at faster rate. (Any one relevant point or example or schematic representation about gaseous cycle give 1 score)	1	2
	b		Cycles of mineral matter are called sedimentary cycle. These cycles are slow. The reservoir for mineral matter is located in earth's crust. (Any one relevant point or example or schematic representation about sedimentary cycle give 1 score)	1	
4			b) Biomagnification	1	1
5			<ul style="list-style-type: none"> • Eli lily prepared two DNA sequences corresponding to A and B, chains of human insulin by using r DNA techniques. • Introduced them in plasmids of E.coli to produce insulin chains. • Chains A and B were produced separately. • These separately prepared chains were extracted and combined by creating disulfide bonds to form human insulin. (Any two points from above or summerised explanation about it or diagrammatic representation of preparation of human insulin by rDNA technology give 2 score)	1+1	2
6	a	1	<ul style="list-style-type: none"> • Screening germ plasm for resistance sources. • Hybridisation of selected parents. • Selection and evaluation of hybrids. • Testing and release of new varieties. Or any four steps of plant breeding give 2 scores.	1/2 1/2 1/2 1/2	3
		2	Pusa Sadabahar, Parbhani kranti, Chilly and Mung bean. (any two example for virus resistant plants give 1 score)	1	
			OR	OR	OR

	b	<p>Plants obtained by tissue culture are genetically identical are known as somaclones.</p> <ul style="list-style-type: none"> • Isolation of somatic cells from two different varieties of plants. • Digestion of cell walls by enzymes. • Fusion of protoplasts of two selected varieties forming somatic hybrid protoplast. • Somatic hybrid protoplast is then grown in suitable culture medium and produce desired somatic hybrid or the diagrammatic representation of somatic hybridisation give 2 scores 	<p>1</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p>	<p>3</p>
7		<p>Fruit is developed from (thalamus) parts of the flower other than ovary. Such fruits are called false fruits.</p> <p>Eg:-Apple, Strawberry, Cashew (any one relevant example give 1 score)</p>	<p>1</p> <p>1</p>	2
8		<ul style="list-style-type: none"> • Pollen release and stigma receptivity are not synchronised. • Anther and stigma are placed at different positions. • Self- incompatibility. • Unisexual flowers on monoecious • Dioecious plants (any two out breeding devices give 2 scores) 	<p>1</p> <p>1</p>	2
9		<ul style="list-style-type: none"> • Deciduous forest • Tropical rain forest • Forest • Desert • Sea coast (Any two these give 1 score) 	<p>1/2</p> <p>1/2</p>	1
10		<p>Pyramid of biomass in sea / lake is generally inverted because the biomass of fishes (top carnivores) far exceeds that of phytoplankton (primary producers) or diagrammatic representation of inverted pyramid of biomass with correct labelling give 2 scores</p>	2	2

11	a	<p>1. Mutualism/symbiosis The interaction between two organisms both are mutually benefited or Species A + Species B + or Explanation with example</p> <p>2. Commensalism:- The interaction between two organisms, one is benefited and other is neither benefited nor harmed or Species A + Species B 0 or Explanation with example.</p> <p>3. Parasitism :- The interaction between host and parasite, in this parasite is benefited and host is harmed or + - or Explanation with example</p> <p>4. Predation-. - + Explanation with example</p> <p>5. Competition. - - Explanation with example</p> <p>6. Ammensalism - 0 Explanation with example (Name of any three of the above interactions with example give 3 scores)</p>	<p>1/2 1/2 1/2 1/2 1/2</p>	3
		OR	OR	OR
	b	<p>Temperature Water Light Soil (Any three above mentioned environmental factors with explanation in single sentence give full score 3)</p>	1/2 x 6=3	3
12		<p>Compressed natural gas.</p> <ul style="list-style-type: none"> • CNG burns most efficiently and very little unburnt gas is left. • It is cheaper than diesel and petrol. • It can not be adulterated like petrol or diesel. • It cannot be siphoned off • Eco friendly (any two of the above responses give 1 score) 	<p>1 1/2 1/2</p>	2
13		<p>The use of bio-resources by multinational companies and other organizations without proper authorisation from the countries and the people concerned without compensatory payment. (Any relevant explanation of biopiracy give 2 scores)</p>	2	2
14		<ul style="list-style-type: none"> • Cutting down use of fossil fuel. • Improving efficiency of energy usage. • Reducing deforestation. • Planting trees. • Slowing down the growth of human population. • Reduce the emission of greenhouse gases into the atmosphere etc (any two correct responses give 1 score) 	<p>1/2 1/2</p>	1

15		A Motor B Foam braker C Flat bladed impeller D Acid / Base for pH control Or any two labelling or brief account on bioreactor give full score 2	1/2 1/2 1/2 1/2	2
16	a	Bacteria, E.coli, Agrobacterium tumifaciens, Retrovirus, Plasmid, Ti plasmid, p BR322, Bacteriophage, Yeast (any one organism or components used as vector give 1 score)	1	2
	b	DNA polymerase is the enzyme which catalyses the polymerisation of deoxyribonucleotides into new DNA strand or extension of primer in PCR or DNA polymerase a commonly used tool in rDNA technology. (Any one function give 1 score	1	
17		d) Pistillate	1	1
		TOTAL SCORE	30	30