

ENTRANCE EXAMINATION FOR ADMISSION, MAY 2011.

Ph.D. (ZOOGEOGRAPHY)

COURSE CODE : 133

Register Number :

*Signature of the Invigilator
(with date)*

COURSE CODE : 133

Time : 2 Hours

Max : 400 Marks

Instructions to Candidates :

1. Write your Register Number within the box provided on the top of this page and fill in the page 1 of the answer sheet using pen.
2. Do not write your name anywhere in this booklet or answer sheet. Violation of this entails disqualification.
3. Read each question carefully and shade the relevant answer (A) or (B) or (C) or (D) in the relevant box of the ANSWER SHEET using HB pencil.
4. Avoid blind guessing. A wrong answer will fetch you -1 mark and the correct answer will fetch 4 marks.
5. Do not write anything in the question paper. Use the white sheets attached at the end for rough works.
6. Do not open the question paper until the start signal is given.
7. Do not attempt to answer after stop signal is given. Any such attempt will disqualify your candidature.
8. On stop signal, keep the question paper and the answer sheet on your table and wait for the invigilator to collect them.
9. Use of Calculators, Tables, etc. are prohibited.

1. The hydrophobic tails of a phospholipid bilayer are oriented towards the
 - (A) Interior of the plasma membrane
 - (B) Extracellular fluid surrounding the cell
 - (C) Cytoplasm of the cell
 - (D) Nucleus of the cell

2. Which of the following is not the similarity of mitochondria and chloroplasts?
 - (A) Both make ATP
 - (B) Both possess their own DNA
 - (C) Both have an envelope of double unit membrane
 - (D) Both capture solar energy and convert it into chemical energy

3. Cell membrane is mainly constituted by lipids, proteins and carbohydrates. With respect to their proportion which statement is correct?
 - (A) All the three are in equal proportion
 - (B) Proteins are in least proportion
 - (C) Lipids are in equal proportion
 - (D) Carbohydrates are in least proportion

4. Who proposed the fluid-mosaic model of membrane structure?

(A) Davson and Danielli	(B) Roberston
(C) Seifriz	(D) Singer and Nicholson

5. Most hydrolytic enzymes of lysosomes function at

(A) Acidic (pH)	(B) Basic (pH)
(C) Neutral (pH)	(D) Any (pH)

6. In meiotic division four daughter cells are produced by two successive divisions in which
 - (A) First division is equational and second is reductional
 - (B) First division is reductional and second is equational
 - (C) Both divisions are reductional
 - (D) Both divisions are equational

7. Terminalization is a process related to

(A) Mitosis	(B) Cytokinesis
(C) Diakinesis	(D) Meiosis

8. The sex-determination in *Drosophila* is
- (A) Monogenic (B) Diagenic
(C) Determined by Y-Chromosome (D) Polygenic
9. Which of the following cells are most numerous
- (A) Helper T cells (B) Killer T cells
(C) Cytotoxic T cells (D) Memory cells
10. Which of the following cells guard against the over-production of antibodies
- (A) Helper T cells (B) Suppressor T cells
(C) Regulatory cells (D) Cytotoxic T cells
11. At a given temperature the energy of activation of two reactants are the same if
- (A) The specific rate constant of the two reactants are same
(B) The temperature coefficient of the specific rate constant for the two reactions are same
(C) ΔH for the two reactions are the same but not zero
(D) ΔH for the two reactions are zero
12. Which of the following reactions requires the removal of water to form a covalent bond
- (A) Glycogen \rightarrow Glucose subunits
(B) Glucose \rightarrow Glactose \rightarrow Lactose
(C) Trigceride \rightarrow 3 fatty acids \rightarrow and glycerol
(D) Dipeptide \rightarrow Two amino acids
13. What determines the specific functions of a protein
- (A) The exact sequence of its amino acids
(B) The length of the molecule
(C) Having fatty acids are monomers
(D) Having a hydrophobis head and a hydrophilic tail region
14. Substrate level phosphorylation occurs when
- (A) Succinic acid changes to fumaric acid
(B) Fumaric acid changes to malic acid
(C) Succinyl CoA changes to succinic acid
(D) Oxaloacetic acid changes to ketoglutaric acid

15. Which of the following reaction occurs in shuttle mechanism of mitochondria
- (A) NADH.H is oxidized to NAD +
 - (B) Glucose is phosphorylated
 - (C) Ascorbic acid oxidized to dehydroascorbic acid
 - (D) Ferrous iron is oxidized to ferric iron
16. All the following correctly describe the active site of an enzyme except
- (A) It is small relative to the entire enzyme
 - (B) It is two-dimensional in structure
 - (C) It initially binds substrates by weak attractions
 - (D) Specificity is defined by arrangement of certain atom
17. The greater amount of DNA in a cell of an individual shows that it is a
- (A) Primitive organism
 - (B) Lower organism
 - (C) Highly evolved organism
 - (D) None of these
18. Wobble pairing take place
- (A) Under unusual condition between homologous chromosomes of a somatic cell causing somatic crossing over
 - (B) In some cases between the third base of a codon and that of an anticodon
 - (C) In those rare instances when unusual crossing over take place for the lack of segment-to-segment pairing
 - (D) In radiation-induced base deletion from one strand of DNA molecule so that the complementary counter part of the other strand exhibits mispairing
19. After initiation of transcription with core enzyme RNA polymerase the sigma factor is
- (A) Functionless
 - (B) Released to take part again
 - (C) Used during closing of chain
 - (D) Retained and it performs special functions
20. Protein synthesis in an animal cell takes place
- (A) Only on the ribosomes present in cytosol
 - (B) On ribosomes present in the nucleolus as well as in mitochondria
 - (C) On ribosomes present in cytosol as well as in cytosol
 - (D) Only on ribosomes attached to the nuclear envelope and endoplasmic reticulum

21. Apical dominance in higher plants is due to
- (A) Balance between auxins and cytokinins
 - (B) Enzyme activity
 - (C) Photoperiodism
 - (D) Carbohydrate and nitrogen ratio
22. Aldosterone helps in
- (A) Conservation of Sodium and water and elimination of Potassium
 - (B) Elimination of Sodium, Potassium and water
 - (C) Conservation of Sodium, Potassium and water
 - (D) Conservation of Potassium and water and elimination of Sodium
23. If pituitary is surgically removed, blood level of sodium falls and that of potassium rises because of
- (A) Atrophy of adrenal cortex
 - (B) Atrophy of adrenal medulla
 - (C) Fact that oxytocin from pituitary is no longer available
 - (D) Fact that LTH from pituitary is no longer available
24. If a person lives exclusively on a diet of milk, eggs and bread he is likely to suffer from
- (A) Scurvy
 - (B) Rickets
 - (C) Beri-beri
 - (D) Night blindness
25. Which one of the following is in correct in sequence?
- (A) Zygote, cleavage, blastula, gastrula
 - (B) Zygote, blastula, gastrula, cleavage
 - (C) Zygote, cleavage, gastrula, blastula
 - (D) Cleavage, zygote, blastula, gastrula
26. Entry of pollen tube through the micropyle is called
- (A) Misogamy
 - (B) Chalazogamy
 - (C) Pseudogamy
 - (D) Porogamy
27. Function of suspensor of embryo is
- (A) Absorbation of nourishment
 - (B) Formation of secondary embryos
 - (C) To push the embryo into the nutritive region
 - (D) All the above

28. Migration and rearrangement of cells during embryo development occur in
(A) Gastrulation (B) Epiboly (C) Emboly (D) Involution
29. Which of the following ensures the effectiveness of reproduction in mammals?
(A) Formation of yolk sac (B) Formation of placenta
(C) Retention of embryo (D) Reduced number of eggs
30. The first step in activation of ovum during process of fertilization is
(A) Formation of fertilization cone
(B) Penetration of sperm in ovum
(C) Formation of fertilization membrane
(D) Fertilizin-antifertilizin reaction
31. Linkage is
(A) Stronger between genes located away from each other upon the chromosomes
(B) Stronger between genes located close together upon the chromosome
(C) Strength of linkage is not dependent upon the distance between the genes
(D) It depends upon the Nature of the concerned genes
32. In all of Mendel's experiments, the two alleles causing a trait were
(A) Dominant-recessive (B) Co-dominant
(C) Incompletely dominant (D) Co-recessive
33. Independent assortment of Mendel was proved by
(A) Monohybrid cross (B) Incomplete dominance
(C) Back-cross (D) Dihybrid cross
34. Which type of prokaryotic cell would be more successful as judged by the growth potential?
(A) One that is able to express all its genes all the time
(B) One that is unable to express any of its genes any of the time
(C) One that express some of its genes some of time
(D) One that divides only when all types of amino acids and sugars are present in the medium

35. In the 'Operon concept' the regulator gene regulates chemical reactions in the cell by
- (A) Inhibiting substrate in the reaction
 - (B) Inhibiting migration of mRNA into cytoplasm
 - (C) Inhibiting transcription of mRNA
 - (D) Inactivating enzymes in the reaction
36. The concept of split gene is that the
- (A) DNA in a gene can be split by deoxyribonuclease
 - (B) Secondary constrictions on the chromosomes give a split appearance to genes
 - (C) Coding sequences in many eukaryotic genes are often separated by non-coding sequences
 - (D) Adjacent genes are separated from each other by spacers
37. Errors during DNA replication, repair or recombination can lead to base-pair substitutions. Such changes are called
- (A) Conditional mutations
 - (B) Mutagens
 - (C) Saltatory changes
 - (D) Spontaneous mutations
38. Okazaki segments are
- (A) Segments of DNA capable of replication
 - (B) Segments of a chain of nucleotides
 - (C) Segments of a chain of nucleotides formed during replication of DNA
 - (D) Segments of gene which undergo recombination
39. An anti-codon of t-RNA can recognize more than one codon of m-RNA. It is
- (A) Wobble hypothesis
 - (B) Gene flow hypothesis
 - (C) Template hypothesis
 - (D) Richmond and Lang effect
40. A gene which affects the character of another gene, not located on the similar locus of the homologous chromosome is
- (A) Duplicate gene
 - (B) Complementary gene
 - (C) Epistatic gene
 - (D) Supplementary gene
41. In human beings, multiple genes are involved in the inheritance of
- (A) Sickle-cell anemia
 - (B) Colour blindness
 - (C) Phenylketonuria
 - (D) Skin colour

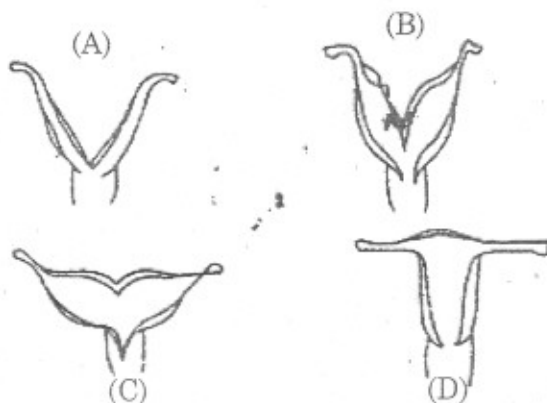
42. The ABO blood groups of humans are determined by three alleles. How many genotypes are possible for these phenotypes?
(A) 3 (B) 6 (C) 8 (D) 4
43. Which one of the following is not a characteristic of heterochromatin?
(A) Usually found in centromeric region
(B) Identifiable in atleast some interphase chromosomes
(C) Associated with active genes
(D) Located in the dark bands of polytene chromosomes
44. The latest view about the origin of virus is that
(A) They arose from nucleic acid and protein which were formed in primitive water
(B) They arose from bacteria as a result of loss of cell wall
(C) They arose from some primitive bacteria by loss of nucleus
(D) They are modified plasmids which are fragments of the nucleic acids of the host
45. Phenomenon of "Industrial Melanism" demonstrates
(A) Natural selection (B) Induced mutation
(C) Geographical isolation (D) Reproductive isolation
46. The most recent and direct prehistoric ancestor of present man was possibly
(A) Java Ape Man (B) Cro-Magnon
(C) Heidelbergensis (D) Peking Man
47. Supermale and superfemale type of determination of sex in *Drosophila* is based on
(A) Genic balance (B) Oxygen balance
(C) Biodiversity (D) Uniformity
48. Barr body in mammals represents
(A) All the heterochromatin in female cells
(B) One of the two X-chromosomes in the somatic cells of female
(C) All the heterochromatin in male and female cells
(D) The Y-chromosome in the somatic cells of male

49. A cross between white-eyed female and red-eyed male *Drosophila* give red-eyed females and white eyed males. Rarely the cross gives rise to white eyed females and red-eyed males. This is due to
- (A) Mutation in male
 - (B) Loss of sex chromosome
 - (C) Mutation in female fly
 - (D) Nondisjunction of two X-chromosomes in female
50. Which of these is a true statement?
- (A) Eukaryotes evolved before prokaryotes
 - (B) Prokaryotes evolved before eukaryotes
 - (C) The true cell evolved before the protocell
 - (D) Prokaryotes didn't evolve until 1.5 billion years ago
51. The evolution of one population in response to the evolution of another population and vice versa, is called
- (A) Coevolution
 - (B) Convergent evolution
 - (C) Divergent evolution
 - (D) Parallel evolution
52. An isolated population of humans, with approximately equal numbers of blue-eyed and brown-eyed individuals was decimated by an earthquake. Only a few brown-eyed people remained to form the next generation. This kind of change in the gene pool is called a
- (A) Blocked gene flow
 - (B) Hardy-Weinberg equilibrium
 - (C) Bottleneck effect
 - (D) Founder effect
53. In some birds, such as peacock and pheasant, the males are more colourful than the females. The selective agent producing the evolution of such conspicuous features is
- (A) Females
 - (B) Predators
 - (C) Climate
 - (D) Humans
54. Different species of dragonflies do not mate with each other because the males of each species have appendages that can clasp and hold foe copulation only females of their own species. This is an example of
- (A) Ecological isolation
 - (B) Temporal isolation
 - (C) Mechanical isolation
 - (D) Behavioural isolation
55. A potential danger to a population that has been greatly reduced in number is the
- (A) Loss of genetic variability
 - (B) Tendency towards assertive mating
 - (C) Hardy-Weinberg equilibrium
 - (D) Reduced gene flow

56. The formation of a new species through change in a single lineage is known as
(A) Convergent evolution (B) Anagenesis, or phyletic evolution
(C) Cladogenesis or divergent evolution (D) Allopatry
57. Which of the following is not an anatomic change from ape to Homosapiens?
(A) From a long thin pelvis to a bowl-like pelvis
(B) From opposable to nonopposable big toes
(C) From flat to arched feet
(D) From locking to nonlocking knee joints
58. Intraspecific competition is strongest when the
(A) Species overlap in their distribution
(B) Populations overlap in their ranges
(C) Population is at its carrying capacity
(D) Reproductive rate is at its maximum
59. Similar environments on different continents produce similar ecological communities. Ecologically similar species in some non adjacent communities are known as
(A) Sibling species (B) Ecological equivalents
(C) Parallel species (D) Geographic competitors
60. The rate at which new tissues are formed in producers is the ecosystem's
(A) Net primary productivity (B) Gross primary productivity
(C) Net secondary productivity (D) Gross secondary productivity
61. Which of the following atoms typically cycles within the most localized area?
(A) Carbon (B) Water (C) Nitrogen (D) Phosphorous
62. Flow of energy gradually decreases when it passes from lower to higher trophic levels. This is explained by
(A) First law of thermodynamics (B) Second law of thermodynamics
(C) Newton's law (D) None of these
63. From which part of *Atropa belladonna* is the drug belladonna obtained?
(A) Stems (B) Flowers
(C) Leaves (D) Leaves and roots

64. One of the major difficulties in the biological control of insect pests is?
(A) The predator develops a preference to other diets and may itself become a pest
(B) The method is less effective as compared with the use of insecticides
(C) The predators does not always survive when transferred to a new environment
(D) The practical difficulty of introducing the predator to specific areas
65. If producer is a large tree that supports a number of herbivorous animals is further attacked by still more ectoparasites the pyramid of number shall be
(A) Inverted (B) Upright
(C) Irregular (D) Spindle shaped
66. Radiations from outer space do not constitute health hazard because
(A) They are harmless
(B) Only 0.1% radiations reach the earth annually
(C) They are useful as they provide energy and heat
(D) None of these
67. Which of the following habitats from the highest diversity of living species?
(A) Tropical forests (B) Grassland
(C) Desert (D) Tropical rainforest
68. Carolus Linnaeus system is an artificial system because:
(A) It is based on evolutionary trends
(B) It is based on number of characters
(C) It is based on a few characters of superficial similarities in morphology
(D) It is phylogenetic
69. Who has introduced five kingdom system of biological classification?
(A) Linnaeus (B) Copeland
(C) Ernst Mayr (D) Robert N. Whittaker
70. Taxonomy based on identification of evolutionary units within species by determining units within species by determining their genetical interrelationship is called
(A) Numerical taxonomy (B) Biochemical taxonomy
(C) Experimental taxonomy (D) Chemotaxonomy

71. Egg of eutherian mammals is
 (A) centrolecithal (B) telolecithal
 (C) macrolecithal (D) microlecithal
72. In which type of cleavage do the cleavage furrows divide a small amount of active cytoplasm at the animal pole?
 (A) Meroblastic (B) Holoblastic
 (C) Determinate (D) Unequal holoblastic
73. The amnion in mammals consists of extra-embryonic
 (A) endoderm and somatic mesoderm
 (B) ectoderm and somatic mesoderm
 (C) ectoderm and splanchnic mesoderm
 (D) endoderm and splanchnic mesoderm
74. The egg of a frog is
 (A) telolecithal (B) microlecithal
 (C) centrolecithal (D) alecithal
75. The correct sequence in the formation of spermatozoa is
 (A) spermatogonia? spermatids? spermatocytes? spermatozoa
 (B) spermatids? spermatogonia? spermatocytes? spermatozoa
 (C) spermatids? spermatogonia? primary spermatocytes? secondary spermatocytes? spermatozoa
 (D) spermatogonia? primary spermatocytes? secondary spermatocytes? spermatids? spermatozoa
76. Which one of the following types of uteri is simplex?



77. Which of the following pairs 'regarding the source and protective coverings formed from such source in lien's egg are correctly matched?

- I. Vitelline Primary envelope secreted by the egg itself
- II. Albumen (egg white) Secondary envelope secreted by the follicle cells
- III. Outer calcareous shell Tertiary envelope secreted by the oviduct

Select the correct answer using the codes given below:

Codes:

- (A) I and II (B) II and III (C) I and III (D) I, II and III

78. Which of the following represent (s) the permanently neotenic form?

In some Amphibia

- I. If there is deficiency of iodine in the surrounding water, the larval stage is prolonged
- II. Larva may become sexually mature even when its body retains gills, gill slits and several other larval characters. But the larva can metamorphose under certain natural and experimental conditions
- III. Adults always have well-developed gills, lidless eye, cartilaginous skull etc. In no conditions do they shed these characters

Select the correct answer using the codes given below :

Codes :

- (A) I and II (B) II and III (C) III alone (D) II alone

79. In chordates, fertilization occurs.

- (A) when the egg is in the metaphase of the first meiotic division
- (B) when the egg is in the metaphase of the second meiotic division
- (C) after the completion of both the meiotic divisions
- (D) before the meiotic divisions

80. The blastocoel ultimately

- (A) forms optic vesicle
- (B) vanishes
- (C) forms gut cavity
- (D) forms archenteron

81. Match list-I (pattern of cleavage) with list-II (group of animals) and select the correct answer using the codes given below the lists :

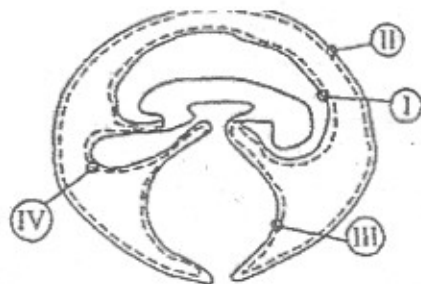
List-I	List-II
A. Radial	1. Echinodermata
B. Spiral	2. Mollusca
C. Bilateral	3. Ascidia
D. Irregular	4. Coelenterate

Codes :

A B C D

- (A) 1 2 3 4
 (B) 1 3 2 4
 (C) 4 3 2 1
 (D) 4 2 3 1
82. The term "grey crescent" is associated with the egg of:
 (A) Branchiostoma and frog (B) Frog
 (C) Chick (D) Frog and chick
83. Epiboly involves
 (A) inward movement of macromeres
 (B) overgrowth of micromeres over macromeres
 (C) rapid proliferation of cells at the rim of the blastopore
 (D) invagination of cells at the blastopore

84. Extra embryonic membranes in chick are shown in the given figure. Amnion, allantois, chorion and yolk sac are labelled in the figure respectively as



- (A) IV, I, II and III (B) IV, I, III and II
 (C) I, IV, III and II (D) I, IV, II and III

85. Evolution of sex has been necessary for the sake of
- (A) continuance of species
 - (B) variety of characters it will result in
 - (C) consistency of traits that will appear generation after generation
 - (D) keeping the proliferation of young ones, in check
86. Which one of the following sets of structures occurs in ascidian larva but not in adult?
- (A) Gills and gill slits
 - (B) Pharynx and endostyle
 - (C) Gill slits and tail
 - (D) Notochord and tubular nerve cord
87. In Amphioxus, the large cavity that surrounds the pharynx and in which the gill slits open is called
- (A) metapleural fold
 - (B) coelom
 - (C) psuedocoelom
 - (D) atrium
88. Match list-I (structures) with list-II (arising from) and select the correct answer using the codes given below the lists :

List-I

List-II

- | | |
|-----------------|----------------|
| A. Zygosphere | 1. Neural arch |
| B. Zygantra | 2. Centrum |
| C. Prapophysis | |
| D. Basapophysis | |

Codes :

A B C D

- (A) 1 1 2 2
- (B) 2 2 1 1
- (C) 1 1 1 2
- (D) 2 1 2 1

89. Who introduced the term 'Nucleic acid'?
- (A) Meischer (B) Altmann
(C) Robert Brown (D) Feulgen and Rossenbeck
90. Neoteny in axolotl larva is the phenomenon where a larva
- (A) gains new tone in its body muscles
(B) metamorphosis in a normal manner
(C) becomes sexually mature and can reproduce but remains other systems in their larval state
(D) permanently retains all its systems in their larval state without any exception
91. Which of the following pairs of germinal layers and organs is/are correctly matched?
- (i) Ectoderm-eye
(ii) Endoderm-heart
(iii) Mesoderm-brain

Select the correct answer using the codes given below :

- (A) (i), (ii) and (iii) (B) (i) alone
(C) (i) and (ii) (D) (ii) and (iii)
92. Which of the following pairs of important characteristics and animals are correctly matched?
- (i) Grey crescent-Amphioxus
(ii) Yolk plug-frog
(iii) Hensen's node-chick

Select the correct answer using the codes given below :

- (A) (i), (ii) and (iii) (B) (i) and (ii)
(C) (i) and (iii) (D) (ii) and (iii)

93. The coelom of *Amphioxus* is
- (A) schizocoelic (B) enterocoelic
(C) haemocoelic (D) pseudocoelic
94. The tadpole of a frog will stop metamorphosis if it is
- (A) kept in a beaker of pond water
(B) kept in a beaker of pond water containing a few drops of thyroxin
(C) thyroidectomised
(D) thyroidectomised and then kept in a beaker of water to which thyroxin has been added
95. If the dorsal lip of the blastopore from an early gastrula of frog is removed, then
- (A) notochord and nerve cord will not differentiate
(B) archenteron will not be formed
(C) lateral mesoderm will not be formed
(D) the embryo will immediately die
96. In an experiment, a piece of cellophane paper is placed between the chord mesoderm layer and the overlapping ectoderm in an early gastrula of frog, then
- (A) it will develop into a normal embryo
(B) it will stop further development
(C) an embryo with two central nervous system will be developed
(D) an embryo without a central nervous system will be developed
97. Which of the following protein breakdown products of chick embryo is stored by its allantois?
- (A) Ammonia (B) Amino acid (C) Urea (D) Uric acid

98. During metamorphosis of an ascidian tadpole larva, diminution and the eventual complete disappearance of the tail with the contained notochord and caudal part of the nerve cord is accomplished by
- (A) autophagy
 - (B) autolysis
 - (C) migration of cells from the tail region to the test of the adult
 - (D) reversal of the differentiated cells of the tail into a non-differentiated cell-mass that secondarily forms the endostyle of the pharynx.
99. Acrosomal enzymes in a mammalian sperm originate from:
- (A) peroxisomes (B) lysosomes (C) microsomes (D) mitochondria
100. Match list-I (cell type) with list-II (characteristic) and select the correct answer using the codes given below the lists :

List-I	List-II
A. Spermatogonium divide	1. Does not
B. Spermatocyte	2. Divides mitotically
C. Spermatid	3. Divides meiotically
D. Sertoli cell	4. Divides both mitotically and meiotically
	5. Nourishes other cell types

Codes :

- A B C D
- (A) 5 3 1 4
 - (B) 1 3 4 5
 - (C) 3 2 4 1
 - (D) 3 2 1 5
-