Sri Lankan Biology Olympiad 2016

Instructions:

This paper contains two parts, **A** and **B**.
Part A: 40 multiple choice questions; Total Marks 40.
Part B: 20 short answer questions; Total Marks 60.

Answer All Questions **Time: 2 hours**

Part A – Multiple Choice Questions

Mark the correct answer with an X on the answer sheet provided

1. Which one of the following is correct regarding triglycerides?

	Soluble in water	provide energy	produce water when respired
(1)	False	True	True
(2)	True	False	True
(3)	True	True	False
(4)	False	True	False
(5)	True	True	True

2. The two daughter cells produced at the end of meiosis I when compared to the parent diploid cell will have
   (1) same amount of DNA and the same number of chromosomes.
   (2) same amount of DNA and half the number of chromosomes.
   (3) half amount of DNA and half the number of chromosomes.
   (4) half amount of DNA and the same number of chromosomes.
   (5) double amount of DNA and half number of chromosomes.

3. An anticodon is the sequence of the nitrogenous bases on the
   (1) complementary strand of DNA which codes for one amino acid.
   (2) complementary strand of mRNA which codes for one amino acid.
   (3) tRNA molecule to which the amino acid is attached.
   (4) tRNA molecule which recognizes the appropriate sequence of bases on the mRNA.
   (5) mRNA molecule which instructs the ribosomes to initiate protein synthesis.

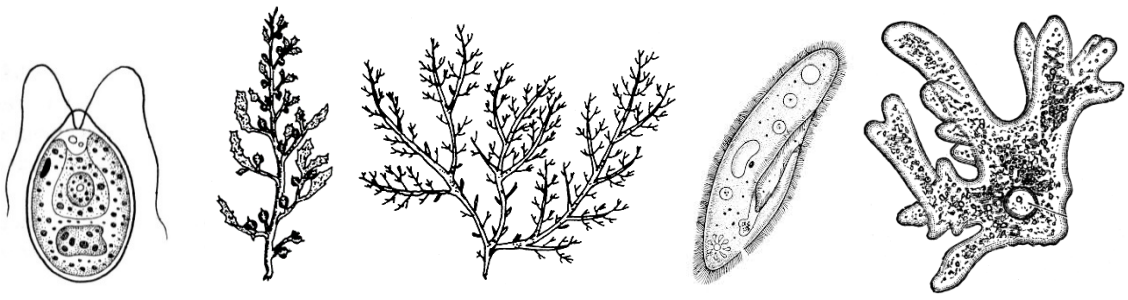
4. Which one of the following is incorrect regarding cell wall?
   (1) The pores in cell wall connect cytoplasms of adjacent cells.
   (2) The components in cell wall are synthesized by ribosomes.
   (3) Cell wall is mainly made up of cellulose.
   (4) After depositing secondary cell wall, cell growth is terminated.
   (5) Secondary cell wall consists of other substances in addition to cellulose.

5. Which of the following is incorrect regarding nucleus?
   (1) It helps in cell growth and cell division.
   (2) It directs the secretion of materials from cells.
   (3) It stores genetic information of the cell.
   (4) It synthesizes RNA required for protein synthesis.
   (5) Nucleolus located within it contains DNA, RNA and proteins.

6. When a glycoprotein is being synthesized for secretion from a cell, which route is it most likely to take?

   (1) Golgi apparatus → rough endoplasmic reticulum → smooth endoplasmic reticulum
   (2) Rough endoplasmic reticulum → Golgi apparatus → smooth endoplasmic reticulum
   (3) Rough endoplasmic reticulum → smooth endoplasmic reticulum → Golgi apparatus
   (4) Smooth endoplasmic reticulum → Golgi apparatus → rough endoplasmic reticulum
   (5) Smooth endoplasmic reticulum → Rough endoplasmic reticulum → Golgi apparatus

7. This question is based on the following five organisms.



A **B** **C** **D** **E**

Select correct combination.

	Organism	Pigments	Storage food	Cell wall	Flagella / Cilia
(1)	A	Chlorophyll a and d	Starch	Cellulose	Flagella Present
(2)	B	Chlorophyll a and c	Laminarin	Cellulose, Alginic acid	Flagella Present
(3)	C	Chlorophyll a and c	Floridian starch	Cellulose, Agar	Absent
(4)	D	Absent	Starch	Absent	Cilia present
(5)	E	Absent	Starch	Absent	Absent

8. Select the **incorrect** statement regarding Phylum Echinodermata.

   (1) Starfishes crawl by means of tube feet.
   (2) Sea cucumbers have tube feet and pedicellaria but no arms or spines.
   (3) This phylum has greatest evolutional similarity to Phylum Chordata.
   (4) They have spiny skin and life forms with bilateral and penta-radial symmetry.
   (5) They have a large coelom.

9. Select the **incorrect** statement regarding classification of organisms.

   (1) Carolus Linnaeus classified flowering plants based on number of stamens.
   (2) Robert H. Whittaker's classification was based on cellular organization and mode of nutrition.
   (3) Base sequence of Mitochondrial DNA (mt DNA) is also used in modern systematics
   (4) Ernest Haeckel introduced taxonomic levels Phylum, Class, Order, Genus and Species.
   (5) Archea have more kinds of RNA polymerases than bacteria, hence they are more similar to Eukarya

10. Select which organisms show Heterospory, free living sporophyte, dependent multicellular gametophyte, presence of xylem tissue and cutinized cuticle.

    A. *Selaginella* *B Pinus.* *C. Nephrolepis* *D. Mangifera* *E. Pogonatum*

    (1) A B and D only
    (2) B and D only
    (3) A B C and D only
    (4) A and B only
    (5) A B C D and E

11. Which of the following parts of the human alimentary canal receives the most acidic food?

    (1) Oesophagus (2) Stomach (3) Duodenum
    (4) Ileum (5) large intestine

12. Which of the following statements regarding the human respiratory system is correct?

    (1) Lungs are located within the pleural cavity.
    (2) Contraction of the diaphragm aids in expiration.
    (3) Volume of air in the trachea is also included in the tidal volume.
    (4) Neurons in the respiratory control centre located in hypothalamus are sensitive to blood carbon dioxide level.
    (5) If breathing is excessive blood pH level may be abnormally reduced.

13. Which of the following statements regarding human circulatory system is correct?

(1) Nervous system can accelerate or inhibit rate of heart beat.
(2) Cardiac output is the volume of blood pumped out from the heart per second.
(3) Blood pressure of a normal healthy adult is 80/120 mm Hg.
(4) Hormones are not involved in the regulation of blood volume
(5) Lymphatic system as well as the blood circulatory system have a network of arteries.

14. A CO_2 molecule produced in the left ventricle will not pass through

(1) right auricle . (2) right ventricle. (3) Left auricle. (4) Left ventricle.
(6) liver.

15. Stomata opens when

(1) influx of ABA to guard cells occurs.
(2) influx of hydrogen ions to guard cells occurs.
(3) efflux of potassium ions from the guard cells occurs.
(4) efflux of water from the guard cells occurs.
(5) CO_2 concentration decreases in substomatal space.

16. Which of the following parts of the human brain had developed from the embryonic mid brain?

(1) Red nucleus (2) Thalamus (3) Hypothalamus
(4) Pons varolli (5) Cerebellum

17. Which of the following statements regarding white matter and grey matter is **incorrect**?

(1) White matter contains cell bodies.
(2) White matter is myelinated.
(3) Grey matter contains dendrites
(4) Both white matter and grey matter are found in the central nervous system
(5) Grey matter is unmyelinated

18. Human ear detects sound due to the vibration of

(1) round window. (2) oval window. (3) basilar membrane.
(4) endolymph. (5) perilymph.

19. Which of the following is **not** an example for negative feedback?

(1) Ovulation
(2) Re-absorption of water in the nephron
(3) Dilation of skin blood vessels
(4) Release of trophic hormones
(5) Release of thyroid hormones

20. Which of the following statements regarding reabsorption that takes place in human nephron is correct?

    (1) Na^+ reabsorption takes place in the proximal convoluted tubule, loop of Henle and distal convoluted tubule.
    (2) Amino acids are reabsorbed in the distal convoluted tubule.
    (3) Cl^- are reabsorbed in the loop of Henle.
    (4) Urea is not reabsorbed.
    (5) Water is not reabsorbed in the descending limb of loop of Henle.

21. Which of the following groups does **not** have animals with an exoskeleton?

    (1) Rhizopoda (2) Echinoidea (3) Reptilia (4) Osteichthyes (5) Polyplacophora

22. When the release of acetyl choline is inhibited

    (1) sodium potassium pump will be inhibited.
    (2) inward diffusion of Ca^{+2} into motor neurons will be inhibited.
    (3) conduction of nerve impulses along the axon will be inhibited.
    (4) contraction of skeletal muscle fibres will be inhibited.
    (5) storage of Ca^{+2} needed for muscle contraction will be inhibited.

23. Which of the following statements regarding human axial skeleton is **incorrect**?

    (1) It is composed of 80 bones.
    (2) There are no movable joints in the skull.
    (3) Foramen for vertebral arteries are absent in the sacral vertebrae.
    (4) Ten pairs of ribs are attached to the sternum.
    (5) Facial region of the skull is composed of 14 bones.

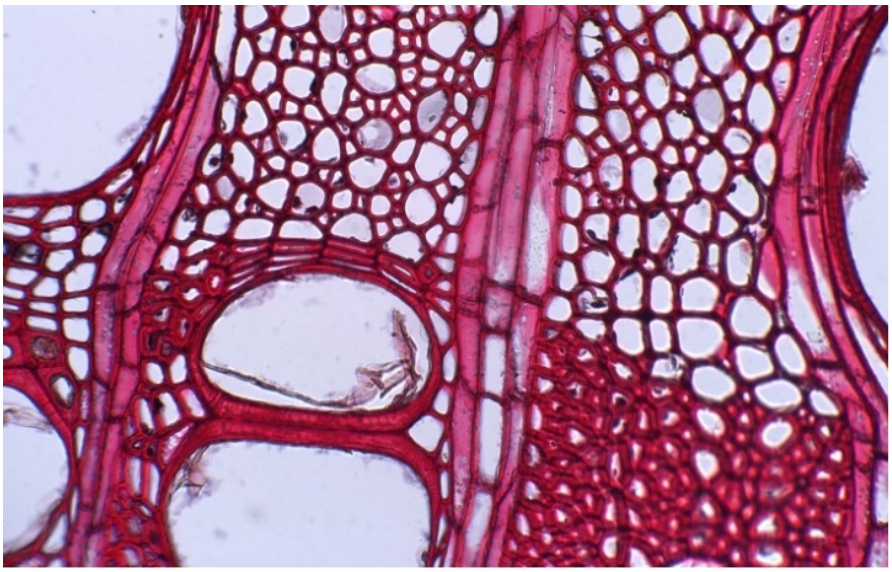
24. Which of the following statements regarding reproduction is correct?

    (1) Reproduction due to fragmentation is found in several kingdoms of domain Eukarya.
    (2) In the living world, bisexuality is confined to Anthophyta.
    (3) Budding is confined to Protista and Plantae.
    (4) Some species can reproduce either by binary fission or by multiple fission and not by both.
    (5) Sexual reproduction takes less time to generate offspring than asexual reproduction.

25. Human ovary

(1) consists of germinal epithelium, cortex and medulla.
(2) contains more than 200,000 secondary follicles at any given time.
(3) is an elongated pear-shaped organ.
(4) contains oocytes which have not undergone meiosis and surrounded by several layers of follicular cells.
(5) Contains several corpus albicans with glandular cells.

26. This diagram shows xylem tissue in a plant stem.



Select the **incorrect** statement.

(1) Main component of the cell walls of these cells are cellulose
(2) Vessels, tracheids, fibers, parenchyma and rays can be observed in this tissue
(3) This tissue contains only dead cells
(4) Fungi can destroy these cells
(5) This tissue is formed due to the activity of vascular cambium

27. Which of the following is an unique feature to flowering plants?

(1) Non-flagellated sperms
(2) Megasporangium is surrounded by a protective envelope called integument
(3) Haploid endosperm
(4) Secondary xylem
(5) Pollination

28. Select the **incorrect** combination.

(1) Bryophyta – Ovum is protected by gametophyte tissue
(2) Lycophyta – Homosporous or heterosporous
(3) Pterophyta – Developing sporophyte obtains nutrition from gametophyte
(4) *Crinum* – Vegetative reproduction by means of corm
(5) Cytokinin – Promotes shoot growth in plant tissue culture

29. In the fruit fly *Drosophila melanogaster*, the white-eye allele is X – linked and recessive. What would be the outcome of a cross between a white –eyed female and a red – eyed male?
    (1) The results would depend on the genotype of the parents.
    (2) All females will be red-eyed and all males will be white-eyed.
    (3) All males will be white-eyed and females will have a 1:1 red-eye to white-eye distribution.
    (4) Any combination of sex and eye colour is possible.
    (5) Female to male distributions and red-eyed to white-eyed distributions will be 1:1, independent of one another.

30. Your bone cells, muscle cells, and skin cells look different because

    (1) different kinds of genes are present in each kind of cell.
    (2) they are present in different organs.
    (3) different genes are active in each kind of cell.
    (4) they contain different numbers of genes.
    (5) different mutations have occurred in each kind of cell.

31. In the human ABO blood group system, there are six possible genotypes but only four phenotypes. This is due to the presence of

    (1) one gene locus with three co-dominant alleles.
    (2) one gene locus with two co dominant alleles and two recessive alleles.
    (3) one gene locus with two co dominant alleles and one recessive alleles.
    (4) two unlinked gene loci each with two alleles, one dominant and one recessive.
    (5) two linked gene loci each with two alleles, one dominant and one recessive.

32. Which one of the following features is a discontinuous variation in Man?

    (1) Blood group (2) Body mass (3) Height (4) Intelligence (5) Skin colour

33. Select **incorrect** statement regarding Sri Lankan ecosystems

    (1) Lowland tropical rain forests have high degree of species richness and endemism
    (2) Stratification is not prominent in dry mixed evergreen and montane forests
    (3) Frequent fires are prominent in grassland ecosystems
    (4) Irrational filling of wetlands may also have contributed to recent flooding around Colombo
    (5) Mangrove trees show viviparity and culiflory.

34. Select the **incorrect** statement.

    (1) Montane forests in Sri Lanka are considered as a biodiversity hotspot.
    (2) Some mammals in temperate forests hibernate during winter
    (3) *Macrognathus aral* is more likely to become extinct compared to *Melursus ursinus*
    (4) Rearing elephant in Pinnawala orphanage is not an *in-situ* conservation method
    (5) RAMSAR wetlands are located both in the wet zone and dry zone of Sri Lanka

35. Select the correct sequence of evolution of the following groups of organisms.
A. Reptiles B. Ammonites C. Cnidaria D. Insectivora E. Trilobites F. Birds

(1) E C B A F D (2) C E B F A D (3) C E B A F D (4) C E B A D F (5) B C E A F D

36. Select the **incorrect** statement regarding natural resources.

(1) Air and water are renewable natural resources
(2) A large gene pool enables conservation of biodiversity in an ecosystem
(3) Biodiversity in a natural forest is a renewable resource
(4) Some natural resources are inexhaustible
(5) Some minerals are nonrenewable and recyclable

37. Which one of the flowing statements is i**ncorrect**?

(1) Lipopolysaccharides in the cell wall of *Salmonella typhi* act as endotoxins.
(2) Lactoferrin is present in breast milk.
(3) Antibodies are produced in Lymphocytes and plasma cells.
(4) HCl in stomach is involved in non-specific defense in humans.
(5) Vaccines produced for BCG are an example for artificially acquired passive immunity.

38. Which one of the following combinations is **incorrect**?

(1) *Rhizobium* – Biofertilizer
(2) *Thiobacillus* – denitrification
(3) *Glucanobacter* – Methane production
(4) *Rhizopus* – Synthesis of enzymes
(5) S*pirulina* – Single cell proteins

39. Which of the following statements is correct?

(1) Bioremidiation can be done using bacteria only.
(2) Without electrolysis, copper can be extracted from microbial leaching.
(3) *Bacillus thuringiensis* acts as an endotoxin in insect larvae.
(4) Retting is done by heterogenous microorganisms.
(5) Microbes in the gut produce vitamin $B_{12.}$

40. Which of the following is **incorrect** regarding coliform bacteria.

(1) They appear in pink colour when they are stained with gram stain.
(2) They release a gas after 48 hours of incubation.
(3) They are destroyed by bile.
(4) They are aerobic.
(5) Two types can be differentiated based on colour and shapes of colonies.

Index Number:

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Answer Sheet for Part A and Part B

Please handover this part to the Invigilator.

Only Part A is allowed to be moved out of the examination hall.

Answer Sheet for Part A

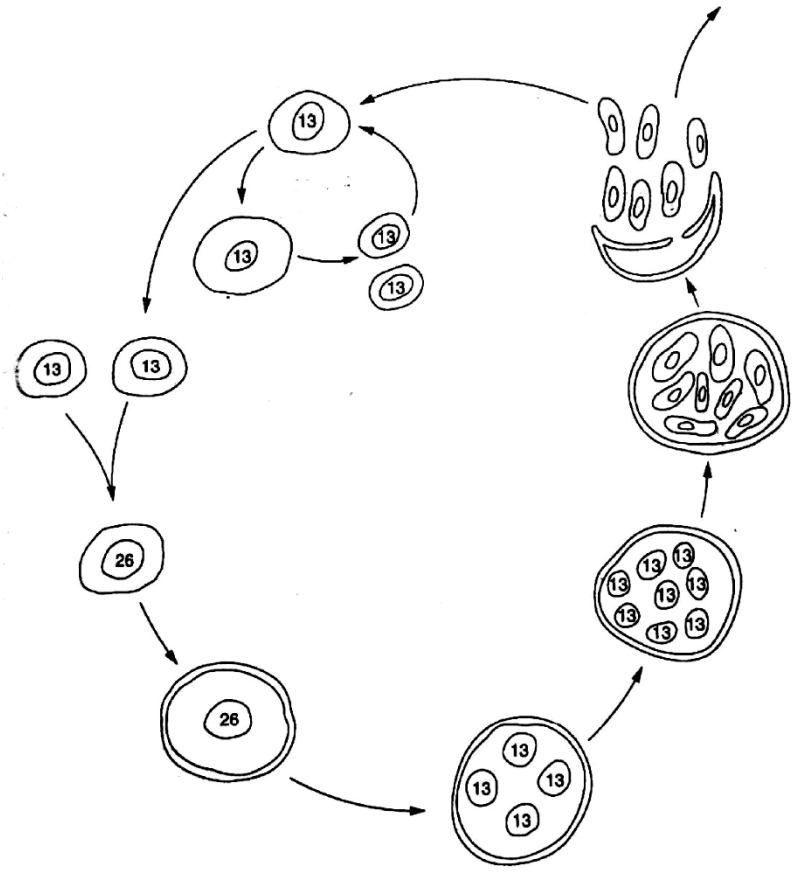
Mark the correct answer with a X

01.	(1)	(2)	(3)	(4)	(5)	**21.**	(1)	(2)	(3)	(4)	(5)
02.	(1)	(2)	(3)	(4)	(5)	**22.**	(1)	(2)	(3)	(4)	(5)
03.	(1)	(2)	(3)	(4)	(5)	**23.**	(1)	(2)	(3)	(4)	(5)
04.	(1)	(2)	(3)	(4)	(5)	**24.**	(1)	(2)	(3)	(4)	(5)
05.	(1)	(2)	(3)	(4)	(5)	**25.**	(1)	(2)	(3)	(4)	(5)
06.	(1)	(2)	(3)	(4)	(5)	**26.**	(1)	(2)	(3)	(4)	(5)
07.	(1)	(2)	(3)	(4)	(5)	**27.**	(1)	(2)	(3)	(4)	(5)
08.	(1)	(2)	(3)	(4)	(5)	**28.**	(1)	(2)	(3)	(4)	(5)
09.	(1)	(2)	(3)	(4)	(5)	**29.**	(1)	(2)	(3)	(4)	(5)
10.	(1)	(2)	(3)	(4)	(5)	**30.**	(1)	(2)	(3)	(4)	(5)
11.	(1)	(2)	(3)	(4)	(5)	**31.**	(1)	(2)	(3)	(4)	(5)
12.	(1)	(2)	(3)	(4)	(5)	**32.**	(1)	(2)	(3)	(4)	(5)
13.	(1)	(2)	(3)	(4)	(5)	**33.**	(1)	(2)	(3)	(4)	(5)
14.	(1)	(2)	(3)	(4)	(5)	**34.**	(1)	(2)	(3)	(4)	(5)
15.	(1)	(2)	(3)	(4)	(5)	**35.**	(1)	(2)	(3)	(4)	(5)
16.	(1)	(2)	(3)	(4)	(5)	**36.**	(1)	(2)	(3)	(4)	(5)
17.	(1)	(2)	(3)	(4)	(5)	**37.**	(1)	(2)	(3)	(4)	(5)
18.	(1)	(2)	(3)	(4)	(5)	**38.**	(1)	(2)	(3)	(4)	(5)
19.	(1)	(2)	(3)	(4)	(5)	**39.**	(1)	(2)	(3)	(4)	(5)
20.	(1)	(2)	(3)	(4)	(5)	**40.**	(1)	(2)	(3)	(4)	(5)

Part B – Short Answer Questions

Answer in the spaces provided. Use only the given letters, numbers or symbols (√ or X).

1. Figure bellow shows the possible life cycle of *Pneumocystis jirovecii*, a yeast-like fungus that lives in human lungs. The numbers on the diagram represent the number of chromosomes in each stage.



State the relevant letter in respect of the process in the life cycle.

(1) Meiosis I ……

(2) Asexual phase ……

(3) Infective stage ……

(4) Meiosis II ……

(5) Sexual phase ……

(6) Mitosis ……

2. Complete the following table by indicating the presence (✓) or absence (×) of features indicated in column 1.

Feature	Myoglobin	DNA	Glycolipids	Maltase
1. Contains iron				
2. Contains phosphate				
3. Able to replicate				
4. Hydrogen bonds are present to stabilise the molecule				
5. Contains nitrogen				

3. Indicate whether each of the following statements regarding vertebrates is correct (√) or incorrect (X).

(1) Reptiles have external ears. ☐
(2) Chondrichthyes show internal fertilization. ☐
(3) Aves have a larval stage. ☐
(4) Mammals do not have a nictitating membrane. ☐
(5) All amphibians excrete urea ☐

4. Indicate whether each of the following statements is correct (√) or incorrect (X).

(1) Insects and annelids have nephridia. ☐
(2) Crustaceans and Insects have ommatidia. ☐
(3) Arthropod coelom is divided into segments. ☐
(4) All mollusks have radula. ☐
(5) Some cephalopods have exoskeleton. ☐

5. Indicate whether each of the following statements regarding the large intestine of man is correct (√) or incorrect (X).

(1) Fat contained in food is finally digested in the large intestine. ☐
(2) Fluids in the food is mostly absorbed in the large intestine. ☐
(3) The number of villi in the large intestine is only about 4% of that in the small intestine. ☐
(4) Many bacteria reproduce in the large intestine. ☐
(5) Large intestine absorbs only the water that is contained in the food. ☐

6. Indicate whether each of the following statements regarding resting membrane potential of a human axon is correct (√) or incorrect (X).

(1) Electric potential outside is -70 mV relative to the inside of the cell membrane. ☐
(2) K^+ diffuse out through the axolemma. ☐
(3) Negatively charged proteins inside the cell attract K^+ from the outside. ☐
(4) Both the electrical and diffusional forces are needed to maintain resting potential. ☐
(5) Na+ are moved into the neuron by sodium-potassium pump. ☐

7. Indicate whether each of the following statements regarding the human hormones is correct (√) or incorrect (X).

(1) Parathyroid hormone acts on small intestine, kidneys and bones. ☐
(2) Pancreatic hormones regulate carbohydrate metabolism. ☐
(3) Hormones are secreted by neurons also. ☐
(4) Hormones secreted by adrenal medulla act on kidney tubules. ☐
(5) Oxytocin stimulates the production of milk. ☐

8. Indicate whether each of the following statements regarding excretion is correct (√) or incorrect (X).

(1) Salt glands of crustaceans secrete salts. ☐
(2) Contractile vacuoles are the excretory organs of *Amoeba*. ☐
(3) Sweat glands of man excrete salts. ☐
(4) Production of some excretory products does not need energy. ☐
(5) Marine birds excrete nitrogenous waste through green glands. ☐

9. Indicate whether each of the following statements regarding human skeleton is correct (√) or incorrect (X).

(1) Acromion process of the scapula articulates with the humerus. ☐
(2) Appendicular and axial skeletons are not connected to each other. ☐
(3) Pelvic girdle is composed of odd number of bones. ☐
(4) Female pelvis is heavier than male pelvis to bear the weight of the fetus during pregnancy ☐
(5) There are five arches in the foot ☐

10. Indicate whether each of the following statements regarding sexually transmitted diseases is correct (√) or incorrect (X).

(1) Gonorrhea can be transmitted from mother to child. ☐
(2) AIDS can be transmitted without sexual contact. ☐
(3) Sexual contact is essential to get an infection of *Treponema pallidum*. ☐
(4) Gonorrhea can cause sterility in females. ☐
(5) Syphilis can be transmitted from mother to child. ☐

11. Indicate whether each of the following statements regarding birth controlling pills of women is correct (√) or incorrect (X).

(1) They contain oestrogen. ☐
(2) They prevents the maturation of ovarian follicles. ☐
(3) They prevent implantation. ☐
(4) They are poisonous to sperms. ☐
(5) They thickens mucosal layers. ☐

12. Indicate whether each of the following statements is correct (√) or incorrect (X).

(1)	Ethylene is produced in immature seeds	
(2)	2,4-D is used for induction of root cuttings	
(3)	Gibberellins are transported through parenchyma cells	
(4)	Abscisic acid is used to induce abscission of fruits	
(5)	Auxins induce cambial activity	

13. A beaker contains a sucrose solution with a solute potential of -300 kPa. A flaccid cell with a solute potential of -900 kPa is placed in this solution.

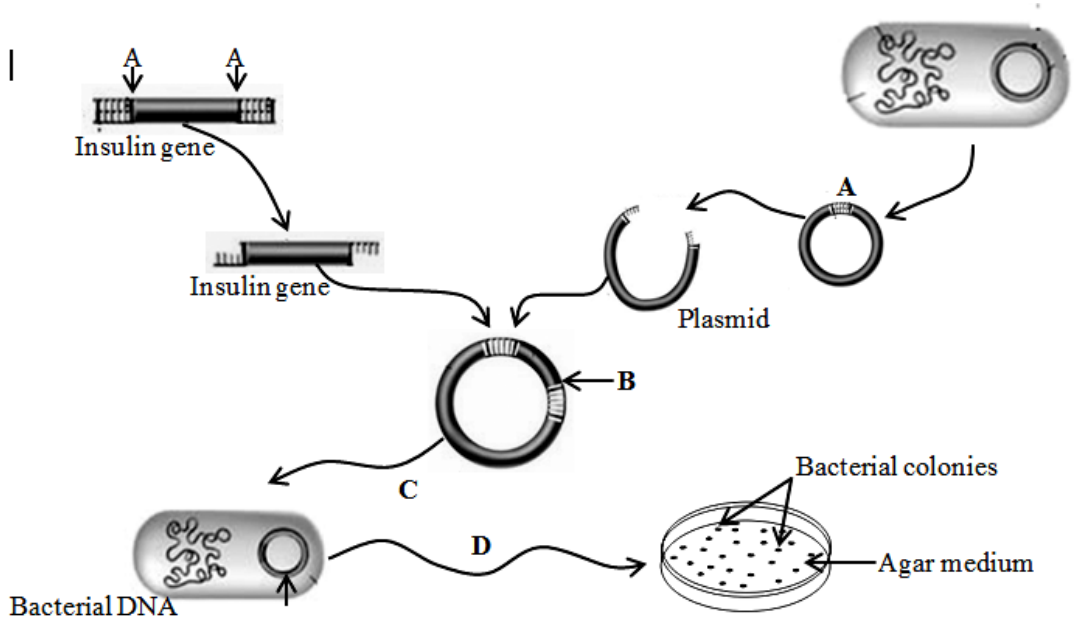
Indicate whether each of the following statements is correct (√) or incorrect (X).

(1)	Pressure potential of the flaccid cell before it was placed in the solution is 300 kPa	
(2)	Water potential of the cell before it was placed in the solution is – 300 kPa	
(3)	Water potential of the sucrose solution is –300 kPa	
(4)	Pressure potential of the plant cell when it is in equilibrium with the sucrose solution is 600 kPa	
(5)	When cell is placed in the sucrose solution, water moves out of the cell.	

14. Indicate whether each of the following statements regarding fungi is correct (√) or incorrect (X).

(1)	In *Aspergillus,* meiosis occurs inside conidia	
(2)	In *Mucor*, sexual and asexual spores are produced inside sporangium	
(3)	Zygomycetes lack a prominent dikaryotic phase	
(4)	Basidium can be observed in bread mold	
(5)	In *Chytirdium*, spores are dispersed by water	

15. The below diagram illustrates the fundamental procedure for cloning insulin gene.



1. Innoculation 2. DNA ligase 3. DNA gyrase 4. Restriction endonuclease
5. Recombinant DNA 6. Transfection 7. DNA polymerase 8. Transformation

Indicate the relevant number in respect of the enzymes/ processes given in the figure.

Enzymes/ Processes	Relevant number
(1) A	
(2) B	
(3) C	
(4) D	

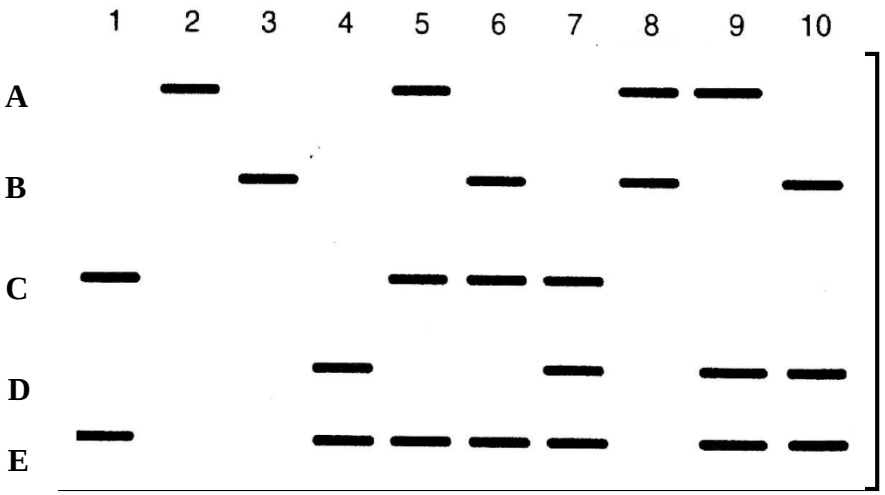
16. Few genetic phenomena are given below

(a) Co-dominance (b) Recombination (c) Aneuploidy (d) Dominance (e) Polyploidy
(f) Transformation

Indicate the relevant genetic phenomena given as a – f in the following

(1) Increase or decrease one chromosome in the chromosome compliment .....
(2) Dominant allele suppress the activity of recessive allele .....
(3) Transfer of gene from one bacterium to another .....
(4) Process which produces new combination of genetic material .....
(5) There is no dominance and recessiveness .....

17. DNA was prepared from small sample of white blood cells from a large number of people. Ten different patterns were seen when their DNAs were digested with *Eco*RI followed by electrophoresis and southern blotting. Finally, the blot was probed with a radioactively labeled cloned human DNA sequence. The following figure shows ten DNA patterns taken from ten people.



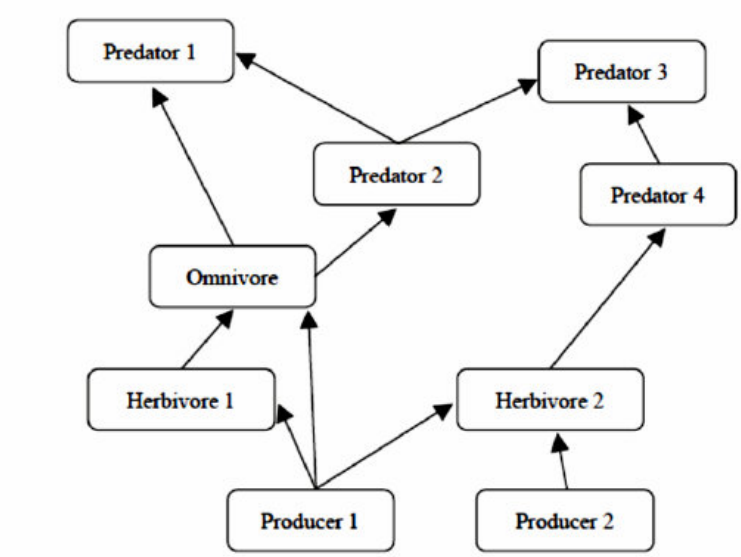
Indicate if each of the following statements is true or false

	True	False
1. Number of different alleles appear in the blot is six		
2. The largest fragment size is present at A		
3. Individuals number 2 and 3 have only one restriction site for *Eco*RI		
4. Maximum number of restriction sites per individual is 4		
5. Individual 5 would be a child of individuals 1 and 2		

18. Indicate whether each of the following statements regarding nitrogen cycle is correct (√) or incorrect (X).

(1)	Due to lightening nitrogen is converted into ammonium ions	
(2)	Proper sequence of nitrogen cycling is nitrogen fixation → Nitrification → Ammonification → Denitrification	
(3)	*Nitrobacter* converts nitrates to nitrites	
(4)	Nitrifying bacteria are autotrophic	
(5)	*Acetobacter* and *Clostridium* are nitrogen fixing bacteria	

19. In the food web given below, the population of Predator 4 has been declining sharply due to hunting by humans. This is expected to affect the population of the other species.



Indicate whether each of the following statements is correct (√) or incorrect (X).

(1)	Decrease in the population of Predator 4 will result in an increase in the population of Herbivore 2	
(2)	Decrease in the population of Predator 4 will result in an increase in the population of Predator 3	
(3)	Decrease in the population of Predator 4 will result in a decrease in the population of Omnivore	
(4)	There are four tertiary consumers in the food web above	
(5)	Highest tropic level in this ecosystem is 4	

20. Indicate whether each of the following statement is correct (✓) or incorrect (×)

(1)	*Staphylococcus aurues* causes food borne infections	
(2)	*Halobacterium* is a thermophlic bacterium	
(3)	Cyanobateria has chlorophyll pigments	
(4)	*Clostridium tetani* is a chemoheterotrophic bacterium	
(5)	*Canidia* is a bacterium which can be used as single cell proteins	