



KCET BIOLOGY (2017)

- From which bacterium the REN – Sal – I is isolated?
(a) Escherichia coli (b) Streptococcus aureus
(c) Haemophilus influenza (d) Streptomyces albus
- Which one of the following is the identifiable character of Neanderthal man?
(a) buried their dead. (d) lived before 2 million years ago
(c) developed pre – historic cave art (d) brain capacity 650 cc – 800 cc
- In lac – operon concept of gene expression, allolactose acts as,
(a) co – repressor (b) inducer (c) repressor (d) co – enzyme
- In dihybrid cross, when F_1 plants (RrYy) are self hybridized, the ratio of segregation of yellow and green in F_2 is:
(a) 9 : 3 : 3 : 1 (b) 3 : 1 (c) 1 : 1 : 1 : 1 (d) 1 : 2 : 1
- Restriction endonucleases are isolated from some bacteria. Their role in bacteria is:
(a) defence against virus (b) synthesis of proteins
(c) act as genetic material (d) help in reproduction
- A transformed bacterium with human gene, fails to produce desired protein. The reason could be:
(a) Human gene may have intron which bacteria cannot process.
(b) The bacterial promotor gene cannot induce transcription of human gene.
(c) Human protein is formed but degraded by bacteria.
(d) Amino acid codons for human and bacteria differ.
- The secondary wall material Suberin is deposited on the walls of
(a) Phellum of stem and endodermis of root (b) Phellogen and phellogen
(c) Pericycle of stem and endodermis of root (d) Epidermis of stem and endodermis of root
- Which one of the following is not included under endomembrane system?
(a) Endoplasmic reticulum (b) Mitochondria (c) Lysosome (d) Vacuole
- The blood cell that secretes histamine, serotonin and heparin is:
(a) Neutrophil (b) Killer cell (c) Basophil (d) T – lymphocyte
- Amoeba is immortal because:
(a) it reproduces by sexual method only
(b) it is multicellular
(c) it is microscopic
(d) parental body is distributed among the offsprings during binary fission

11. If a tetraploid plant contains 48 chromosomes in its nucellus, then number of chromosomes in the egg cell and in synergid respectively:
 (a) 24 and 48 (b) 48 and 24 (c) 48 and 48 (d) 24 and 24
12. The type of epithelium found in the fallopian tube which functions to move particles or mucous in specific direction is:
 (a) Squamous epithelium (b) Cuboidal epithelium
 (c) Ciliated epithelium (d) Columnar epithelium
13. So far 1.5 million species are identified, in which the number of fungi species identified is more than the combined total of:
 (a) Fishes, amphibians, reptiles and mammals (b) Algae, lichens, mosses and ferns
 (c) Molluscs, fishes and amphibians (d) Molluscs and crustaceans
14. Read the statements 1 and 2. Choose the correct option:
 Statement – 1 : RNAi take place in all prokaryotic and eukaryotic organisms as a method of cellular defence.
 Statement – 2 : RNA interference is a pretranslational process.
 (a) Both statements are incorrect.
 (b) Both statements are correct.
 (c) Statement – 1 incorrect, statement – 2 correct.
 (d) Statement – 1 correct, statement – 2 incorrect.
15. Pollen grains are generally spherical, measuring about:
 (a) 25 – 50 centimeters (b) 25 – 50 nanometers
 (c) 25 – 50 micrometers (d) 25 – 50 millimeters
16. The hormones involved in maintaining calcium balance in the human body are:
 (a) PTH and LTH (b) TCT and FSH (c) MSH and ACTH (d) PTH and TCT
17. The type of sex determination in honey bee is:
 (a) ZZ – ZW (b) Haploidy (c) Haplo – diploidy (d) Diploidy
18. Which of the following is not a characteristic of facilitated transport?
 (a) Uphill transport (b) Highly selective
 (c) Requires special membrane proteins (d) Transport saturates
19. Which of the following characters is not required for autogamy?
 (a) Flowers should be bisexual (b) Required pollination agents
 (c) Anthers and stigma should lie close to each other (d) Flowers required synchrony in pollen release
20. The process of decomposition delays when,
 (a) the detritus is made up of sugars and nitrogen compounds.
 (b) detritus is rich in lignin and chitin.
 (c) warm and moist environment exists.
 (d) aeration is sufficient.
21. The volume of air inspired or expired by a healthy man per minute is:
 (a) 1000 ml – 1100 ml (b) 2500 ml – 3000 ml
 (c) 6000 ml – 8000 ml (d) 400 ml – 500 ml

22. In India the action plans for family planning were initiated in the year:
 (a) 1951 (b) 1947 (c) 1950 (d) 1972
23. Replacement of which one of the following nucleotides in the Hb^A gene causes sickle cell anaemia?
 (a) C to G (b) A to T (c) T to A (d) U to A
24. Which class of Algae reproduces asexually by non – motile gametes?
 (a) Phaeophyceae (b) Cyanophyceae (c) Chlorophyceae (d) Rhodophyceae
25. Identify the plants that are dominant during Jurassic Period.
 (a) Angiosperms and Bryophytes (b) Monocotyledons and Arborescent lycopods
 (c) Sphenopsida and Ginkgos (d) Ferns, Conifers and Cycads
26. Accessory ducts of reproductive system of human female include:
 (a) Oviduct, ovaries & mammary glands (b) Ovaries, uterus & vagina
 (c) Oviduct, uterus & vagina (d) Oviduct, ovaries & ovarian ligaments
27. Psammophytes are growing in/on
 (a) Deserts (b) Water (c) Rock (d) Shades
28. Inbreeding depression occurs due to continuous
 (a) Intra – breeding (b) Inter – breeding
 (c) Inter – generic breeding (d) Inter – specific breeding
29. The average length of hnRNA in humans is,
 (a) 500 bases (b) 3000 bases (c) 1500 bases (d) 2.4 million bases
30. In humans, common cold is caused by:
 (a) Rhinovirus (b) Retrovirus (c) Rhabdovirus (d) Baculovirus
31. The variety of indigenous cows is an example for:
 (a) Genetic diversity (b) Species diversity
 (c) Ecological diversity (d) Microbial diversity
32. Implantation is influenced by
 (a) LH (b) Progesteron (c) Relaxin (d) FSH
33. Which of the following vector – borne diseases caused by Aedes mosquitoes?
 (a) Kala azar and Filariasis (b) Malaria and Sleeping sickness
 (c) Dengue and Chikungunya (d) Ascariasis and Filariasis
34. Which one of the following has been commercialized as blood – cholesterol lowering agent?
 (a) Statins (b) Streptokinase (c) Cyclosporin – A (d) α – Trypsin – A
35. If E. coli is allowed to grow for 40 minutes in a medium containing N^{15} , then the number of N^{14}/N^{14} containing DNA would be:
 (a) zero (b) 2 (c) 10 (d) 20
36. As the organic matter increases in a water body the BOD:
 (a) increases (b) decreases (c) remains unchanged (d) not a parameter

37. A plant shows the following modifications:
(i) leaves covered with dense hairs
(ii) leaf surface shiny or glabrous
(iii) leaf blade remains rolled during day
The adaptation of the plant is to:
(a) Conserve water
(b) prevent excessive heat
(c) check transpiration
(d) absorb water
38. Identify the correct combination of crop variety and insect pests.
(a) Okra – Pusa swani – Shoot and Fruit borer
(b) Brassica – Pusa A – 4 – A Aphids
(c) Brassica – Pusa sem – 3 – Jassids
(d) Flat bean – Pusa Gaurav – Fruit borer
39. Mac Arthur's vision of 5 closely related species of warblers living on same tree were able to avoid competition and co – exist by behavioural difference. This is an example for:
(a) Competitive releases
(b) Resource partitioning
(c) Competitive exclusion principle
(d) Adaptive radiation
40. Which of the following crop is developed by mutation breeding, that is resistant to yellow mosaic virus and powdery mildew?
(a) Chilli
(b) Mung bean
(c) Okra
(d) Cow – pea
41. Which of the following plants produce zygomorphic flowers?
(a) Canna
(b) Mustard
(c) Hibiscus
(d) Gulmohar
42. Which of the following options show the characters of mycoplasma?
(a) Smallest living cell without cell wall survive without oxygen.
(b) Smallest living cell with cell wall survive without oxygen.
(c) Smallest living cell without cell wall survive with oxygen.
(d) Smallest living cell with cell wall survive with oxygen.
43. The outcome of Calvin cycle include:
(a) 6 CO₂, 18 ATP, 12 NADPH
(b) One glucose, 18 ADP, 12 NADP
(c) 6 CO₂, 18 ADP, 12 NADP
(d) One glucose, 18 ATP, 12 NADPH
44. The safe method of disposal of e – waste is:
(a) incineration
(b) burning in open field
(c) thrown into water
(d) dumping in forest
45. The human protein $\alpha - 1$ antitrypsin is obtained from:
(a) transformed bacteria
(b) transgenic animal
(c) transgenic plant
(d) a plant from Western Ghats
46. The inner cell mass of blastocyst becomes:
(a) extraembryonic membranes
(b) differentiated into embryo proper
(c) placenta
(d) chorionic villi
47. Which of the following is not a pre – fertilization events in higher organisms?
(a) Cleavage
(b) Gamete transfer
(c) Gametogenesis
(d) Meiosis

48. The number of ATP molecules utilized for the breakdown of one molecule of glucose during glycolysis is:
 (a) 2 (b) 8 (c) 6 (d) 4

49. Identify the 'order' from the following
 (a) Muscidae (b) Panthera (c) Insecta (d) Carnivora

50. Match the enzymes of Column – I with the functions of Column – II. Choose the correct option:

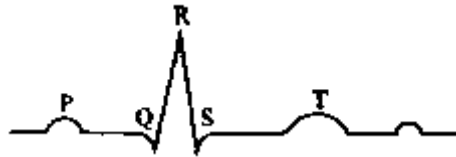
Column – I	Column – II
(1) Enterokinase	(p) digest milk proteins
(2) Rennin	(q) digests carbohydrates
(3) Amylase	(r) activates trypsinogen
(4) Lipase	(s) acts on nucleic acids
	(t) breakdown fats
(a) 1 – r, 2 – p, 3 – q, 4 – t	(b) 1 – s, 2 – p, 3 – t, 4 – q
(c) 1 – r, 2 – p, 3 – t, 4 – q	(d) 1 – s, 2 – q, 3 – p, 4 – t

51. Example for autosomal hyper aneuploidy is:
 (a) Down's syndrome (b) Klinefelter's syndrome (c) Turner's syndrome (d) Haemophilia

52. Identify the elements whose deficiency causes both neerosis and chlorosis.
 (a) Fe, Mn (b) Cu, Co (c) Mg, K (d) Mo, Ca

53. In the following diagrammatic representation of a standard ECG the 'T' represents.

- (a) Repolarisation of Ventricles
- (b) Repolarisation of Atria
- (c) Depolarisation of Atria
- (d) Depolarisation of Ventricles



54. Climax community is a state of:
 (a) non – equilibrium (b) near equilibrium (c) pioneer species (d) changing community

55. In human females, the number of primary follicles left in each ovary at puberty is:
 (a) 3000 – 30,000 (b) 30,000 – 60,000 (c) 60,000 – 80,000 (d) 1,50,000 – 1,60,000

56. The anticodon found on the t – RNA for tryptophan amino acid is
 (a) UCC (b) CUU (c) ACC (d) UGG

57. Which one of the following character favours the process of normal spermatogenesis in human male?
 (a) Descent of testes into scrotum (b) Testes remain in the abdominal cavity
 (c) Infection by mumps virus during childhood (d) Increased scrotal temperature

58. Match the number of nucleotides of genome of Column – I with the organisms of Column – II. Choose the correct option given below:

Column – I	Column – II
(1) 5386 nucleotides	(p) E. coli
(2) 48502 bp	(q) man
(3) 4.6×10^6 bp	(r) Drosophila
(4) 3.3×10^9 bp	(s) $\phi \times 174$ bacteriophage
	(t) bacteriophage – lambda
(a) 1 – s, 2 –t, 3 –p, 4 –q	(b) 1 – s, 2 – q , 3 – q , 4 – t
(c) 1 – s, 2 – p, 3 – q, 4 – r	(d) 1 –r, 2 –t, 3 –s, 4 – p

59. Morphine is obtained from the :
 (a) Inflorescence of Cannabis (b) Leaves of Erythroxyllum
 (c) Latex of Poppy plant (d) Root of Atropa
60. Polymerisation of DNA nucleotides during the synthesis of lagging strand occurs in:
 (a) 3' → 5' direction (b) 5' → 3' direction
 (c) Any direction (d) promotor to terminator direction

ANSWER KEY:

1. d	2. a	3. b	4. b	5. a	6. a	7. a	8. b	9. c	10. d
11. d	12. c	13. a	14. c	15. c	16. d	17. c	18. a	19. d	20. b
21. c	22. a	23. b	24. d	25. d	26. c	27. a	28. a	29. b	30. a
31. a	32. b	33. c	34. a	35. a	36. a	37. c	38. a	39. b	40. b
41. d	42. a	43. b	44. a	45. b	46. b	47. a	48. a	49. d	50. a
51. a	52. c	53. a	54. b	55. c	56. c	57. a	58. a	59. c	60. b

SOLUTIONS:

- (d) The restriction endonuclease Sal I is obtained from *Streptomyces albus*.
- (a) Evidence suggests that the Neanderthals were the first human species to practice burial behavior and intentionally bury their dead, doing so in shallow graves along with stone tools and animal bones.
- (b) Allolactose is called an inducer because it turns on, or induces the expression of, the lac genes.
- (b) In dihybrid cross, when F1 plants (RrYy) are self hybridised, 12 yellow and 4 green seeds are produced. Therefore the ratio of segregation of yellow and green in F2 is 3:1
- (a) In bacteria, restriction endonucleases function to defend the cell against invading viral bacteriophages.
- (a) If the gene is directly from the nuclear DNA, bacteria would not be able to express the insulin protein because the gene will have introns; which bacteria don't. If we cloned the gene directly, the bacteria would produce mRNA that includes the introns and be unable to splice it. Therefore, no functional protein will be made.
- (a) Suberin is a waterproofing waxy substance found in higher plants. Suberin is found in the phellem layer of the periderm in the stem and forms casparian strips in the endodermis of roots. Its main function is as a barrier to movement of water and solutes.
- (b) The endo membranes divide the cell into functional and structural compartments, or organelles. In eukaryotes, the organelles of the endomembrane system include: the nuclear membrane, the endoplasmic reticulum, the Golgi apparatus, lysosomes, vesicles, endosomes and the cell membrane, among others.
- (c) Basophils produce histamine and serotonin that induce inflammation, and heparin that prevents blood clotting.
- (d) Amoeba reproduce by binary fission asexually so that each daughter cell is the same as the parent. Running this process backward from the present, each existing amoeba is the same as its predecessor back as far in time as the first amoeba existed. In this regard, the amoeba is immortal.

11. (d) If a tetraploid plant contains 48 chromosomes in its nucellus, then number of chromosomes in the egg cell and in a synergid will both be diploid, $2n = 24$.
12. (c) The fallopian tubes are lined by ciliated epithelia. These tubal cilia are essential for the movement of the egg through the tube into the uterus.
13. (a) The number of fungi species in the world is more than the combined total of the species of fishes, amphibians, reptiles and mammals.
14. (c) RNA interference takes place in all eukaryotic organisms as a method of cellular defence.
15. (c) Pollen grains are generally spherical measuring about 25 – 50 micrometers in diameter.
16. (d) Parathyroid hormone (PTH) and thyrocalcitonin (TCT) profoundly influence the metabolism of calcium. Thyrocalcitonin reduces calcium levels in the blood. When the blood calcium level is too low, PTH is released to bring the calcium level back up to normal.
17. (c) Haplodiploidy is seen in honeybees. It is a sex-determination system in which males develop from unfertilized eggs and are haploid, and females develop from fertilized eggs and are diploid.
18. (a) Facilitated diffusion is a process by which molecules are passively transported across the plasma membrane with the help of membrane proteins.
19. (d) Autogamous flowers do not require pollinating agents.
20. (b) The rate of decomposition is slower if detritus is rich in lignin and chitin and faster if detritus is rich in nitrogen and water soluble substances like sugars.
21. (c) A healthy man can inspire or expire approximately 6000 – 8000 ml of air per minute.
22. (a) In India the action plants for family planning were initiated in the year 1951.
23. (b) The mutation causing sickle cell anemia is a single nucleotide substitution (A to T) in the codon for amino acid 6. The change converts a glutamic acid codon (GAG) to a valine codon (GTG). The form of hemoglobin in persons with sickle cell anemia is referred to as HbS.
24. (d) Members of Rhodophyceae lack motile cells in their lifecycle. They reproduce asexually by non-motile spores and sexually by non-motile gametes.
25. (d) Ferns, Conifers and Cycads were dominant during the Jurassic period.
26. (c) Accessory ducts of reproductive system of human female include Oviducts, uterus & vagina.
27. (a) Psammophytes are plants that grow on sand.
28. (a) Inbreeding is Breeding within the limits of the pure stock or race or tribe. It causes inbreeding depression, the reduced biological fitness in a given population.
29. (b) The average length of hnRNA in humans is 3000 bases.

30. (a) In Humans, common cold is caused by rhinovirus.
31. (a) The variety of indigenous cows is an example for genetic diversity, which refers to diversity within species.
32. (b) Progesterone influences implantation. A lack of progesterone can hinder a fertilized egg from implanting or staying implanted due to an unhealthy lining.
33. (c) Dengue and Chikungunya are vector-borne diseases caused by Aedes mosquitoes
34. (a) Statins produced by the yeast *Monascus purpureus* have been commercialised as blood-cholesterol lowering agents.
35. (a) If *E. coli* is allowed to grow for 40 minutes in a medium containing N^{15} , then the number of N^{14}/N^{14} containing DNA would be zero.
36. (a) Biochemical oxygen demand or BOD is a chemical procedure for determining the amount of dissolved oxygen needed by aerobic biological organisms in a body of water to break down organic material present in a given water sample at certain temperature over a specific time period. As the organic matter increases, BOD increases.
37. (c) The modifications check transpiration.
38. (a) Okra – Pusa sawani – shoot and Fruit borer
39. (b) MacArthur's vision of 5 closely related species of warblers living on same tree were able to avoid competition and co-exist by behavioural differences in their foraging activities. This is an example for resource partitioning.
40. (b) In mung bean, resistance to yellow mosaic virus and powdery mildew were induced by mutations.
41. (d) Gulmohar produces zygomorphic flowers.
42. (a) Mycoplasma are Smallest living cells known without cell wall that can survive without oxygen.
43. (b) The outcome of Calvin cycle include One glucose, 18 ADP, 12 NADP.
44. (a) E wastes are buried in landfills or incinerated.
45. (b) The human protein α - 1 antitrypsin used to treat emphysema is obtained from transgenic animals.
46. (b) The inner cell mass of blastocyst becomes differentiated into the embryo proper.
47. (a) Cleavage is a post-fertilisation event.
48. (a) The number of ATP molecules utilised for the breakdown of one molecule of glucose during glycolysis is 2.
49. (d) Carnivora is an order.
50. (a) Enterokinase - activates trypsinogen, Rennin - digests milk proteins, Amylase - digests carbohydrates and Lipase – breaks down fats.

51. (a) Down's syndrome or 21 trisomy is an example for autosomal hyperaneuploidy.
52. (c) Deficiency of Magnesium and Potassium causes both necrosis and chlorosis.
53. (a) The T wave represents the return of the ventricles from excited to normal state (repolarisation)
54. (b) Climax community is a term for a biological community of plants, animals, and fungi which, through the process of ecological succession in the development of vegetation in an area over time, had reached a steady state or equilibrium.
55. (c) In human females, the number of primary follicles left in each ovary at puberty is 60,000 – 80,000.
56. (c) The anticodon found on the t-RNA for tryptophana amino acid is ACC.
57. (a) The testes descend into the scrotum which has a protective function and acts as a climate control system for the testes. For normal sperm development, the testes must be at a temperature slightly cooler than the body temperature.
58. (a) 5386 nucleotides → ϕ x 174 bacteriophage p.
48502 bp → Bacteriophage lambda
4.6 x 10⁶bp → E. coli
3.3 x 10⁹bp → man
59. (c) Morphine is obtained from the latex of Poppy plant.
60. (b) Polymerisation of DNA nucleotides during the synthesis of lagging strand occurs in 5' → 3' direction.