CUET (UG)

Biology Sample Paper - 4

Solved

Time Allowed: 45 minutes **Maximum Marks: 200**

General Instructions:

1. The test is of 45 Minutes duration.
2. The test contains 50 questions out of which 40 questions need to be attempted.
3. Marking Scheme of the test:

a. Correct answer or the most appropriate answer: Five marks (+5).
b. Any incorrectly marked option will be given minus one mark (-1).
c. Unanswered/Marked for Review will be given zero mark (0).

Attempt any 40 questions

1. A flower having both male and female reproductive parts are termed as: **[5]**

   a) Monoecious
   b) Dioecious
   c) Homolithic
   d) Heterolithic

2. Which one of the following pairs is wrongly matched? **[5]**

   a) Agave : Bulbils
   b) Penicillium : Conidia
   c) Bryophyllum : Leaf buds
   d) Water hyacinth : Runner

3. Potato is a type of: **[5]**

   a) Root tuber
   b) Runner
   c) Stem tuber
   d) Rhizome

4. A dicotyledonous plant bears flowers but never produces fruits and seeds. The most probable cause for the above situation is: **[5]**

   a) Plant is dioecious and bears only staminate flowers
   b) Plant is dioecious and bears both pistillate and staminate flowers
   c) Plant is dioecious and bears only pistillate flowers
   d) Plant is monoecious

5. In a fertilised embryo sac, the haploid, diploid, and triploid structures are: **[5]**

   a) Synergid, polar nuclei, and zygote
   b) Synergid, antipodal, and polar nuclei

c) Synergid, zygote, and primary endosperm nucleus

d) Antipodal, synergid, and primary endosperm nucleus

6. The free occurring unit of gynoecium is called a pistil. Each pistil consists of three parts called: **[5]**

a) Ovary, style, and stigma

b) Ovary, filament, and stigma

c) Stigma, anther, and filament

d) Ovary, style, and anther

7. Which one forms the endosperm: **[5]**

a) Synergids

b) Antipodal cells

c) Oospore

d) Secondary or polar nuclei

8. Spermiation is the process of the release of sperms from: **[5]**

a) Epididymis

b) Seminiferous tubules

c) Vas deferens

d) Prostate gland

9. In human beings, fertilization of the egg takes place in: **[5]**

a) Ovary

b) Oviduct

c) Vagina

d) Uterus

10. Acrosomal reaction of the sperm occurs due to: **[5]**

a) Reactions within the uterine environment of the female

b) Androgens produced in the uterus

c) Reactions within the epididymal environment of the male

d) Its contact with zona pellucida of the ova

11. The side effects of the use of anabolic steroids in female: **[5]**

a) Aggressiveness

b) All of these

c) Irregular menses

d) Musculanisation

12. Increased IMR and decreased MMR in a population will: **[5]**

a) Not cause significant change in growth rate

b) Result in an explosive population

c) Result in decline in growth rate

d) Cause rapid increase in growth rate

13. _____ involve the transfer of embryo at an 8-celled stage in the fallopian tube of the female. **[5]**

a) POST
b) GIFT
c) IVF
d) ZIFT

14. Possibility of becoming hemophilic is extremely rare because the mother of such female to be at least: **[5]**

a) Carrier and father should be hemophilic
b) None of the parent should be hemophilic
c) Hemophilic and father should be a carrier
d) Both should be hemophilic

15. In sickle cell anaemia glutamic acid is replaced by valine. Which one of the following triplets codes for valine? **[5]**

a) G A A
b) G G G
c) A A G
d) G U G

16. Three genes R, S and T are located on the same chromosome. If the recombinant percentage between R and S is 20%, R and T is 35% and S and T is 15% respectively, can you predict the correct order of these genes on the chromosome? Which of the following shows the correct sequence of the genes on the chromosome? **[5]**

a) R-S-T
b) S-T-R
c) S-R-T
d) R-T-S

17. In a certain taxon of insects some have 17 chromosomes and the others have 18 chromosomes. The 17 and 18 chromosome-bearing organisms are: **[5]**

a) all females
b) all males
c) females and males, respectively
d) males and females, respectively

18. In the human genome project, the commonly used host was bacteria and yeast and their vectors are called as **[5]**

a) BAC and YAC
b) BBC and YBC
c) BAC and YBC
d) BAC and YCB

19. With regard to mature mRNA in eukaryotes: **[5]**

a) exons and introns do not appear in the mature RNA.

b) exons appear but introns do not appear in the mature RNA.

c) both exons and introns appear in the mature RNA.

d) introns appear but exons do not appear in the mature RNA.

20. The hybridization of probes having radioactive isotopes with a various sequence of nitrogen bases with ssVNTR is called **[5]**

a) Western blotting

b) Northern blotting

c) Eastern blotting

d) Southern blotting

21. Which type of selection explains industrial melanism observed in the moth, *Biston bitularia*? **[5]**

a) Artificial

b) Disruptive

c) Stabilising

d) Directional

22. In the case of the peppered moth (Biston betularia), the black-coloured form became dominant over the light-coloured form in England during the industrial revolution. This is an example of: **[5]**

a) Appearance of the darker coloured individuals due to very poor sunlight.

b) Protective mimicry.

c) Natural selection whereby the darker forms were selected.

d) Inheritance of darker colour character acquired due to the darker environment.

23. Which of the following is an example for link species? **[5]**

a) Chimpanzee

b) Dodo bird

c) Sea weed

d) Lobe fish

24. Cancer cells can be easily be destroyed by radiations due to: **[5]**

a) Rapid cell division

b) Lack of oxygen

c) Lack of mutation

d) Fast mutation

25. AIDS is caused by HIV. Among the following, which one is not a mode of transmission of HIV? **[5]**

a) Shaking hands with infected persons

b) Sexual contact with infected persons

c) Transfusion of contaminated blood

d) Sharing the infected needles

26. A tumor enclosed within a capsule is termed: **[5]**

a) Basophils

b) Malignant

c) Benign

d) Metastasis

27. Which of the following drug are a very effective sedative and painkiller? **[5]**

a) Heroine

b) Morphine

c) Coke

d) Alcohol

28. Which of the following can yield a completely haploid plant: **[5]**

a) Stem apical meristem

b) Carpel

c) Anther

d) Root tip

29. Lysine rich Maize variety is: **[5]**

a) Kalayansona

b) IR-10

c) Sonalika

d) Shakti

30. “Blue revolution” is related to: **[5]**

a) Clean water

b) Fish

c) Milk

d) Oil

31. Which one of the following is not used in organic farming? **[5]**

a) Snail

b) Oscillatoria

c) Earthworm

d) Glomus

32. Which one of the following fixes the atmospheric nitrogen but is not an autotroph? **[5]**

a) Oscillatoria

b) Nostoc

c) Anabaena

d) Rhizobium

33. The chemical substances produced by some microbes and can kill or retard the growth of disease-causing microbes are called _____. **[5]**

a) Antigens
b) Antibiotics
c) Antibodies
d) Antivirus

34. PCR was discovered by: **[5]**

a) Kary Mullis
b) Stanley Cohen
c) Hargobind Khorana
d) Herbert Boyer

35. The group of letters that form same words when read both forward and backward are called: **[5]**

a) Endonucleases
b) Puzzle
c) Palindrome
d) Sticky ends

36. The transfer of genetic material from one bacterium to another through the mediation of a viral vector is termed as: **[5]**

a) Transduction
b) Transformation
c) Translation
d) Conjugation

37. Most industrialized nations are rich financially but poor in: **[1]**

a) Population
b) Biodiversity and traditional knowledge
c) Traditional knowledge and land requirement
d) Health and manpower

38. The first clinical gene therapy was done for the treatment of: **[1]**

a) Cystic fibrosis
b) AIDS
c) SCID (Severe Combined Immuno Deficiency resulting from deficiency of ADA)
d) Cancer

39. Actual birth rate under environmental conditions is much less and is thus also called: **[5]**

a) Biotic potential
b) Vital index
c) Potential natality
d) Realized natality

40. Which of the following is a partial root parasite? **[5]**

a) Orobanche
b) Mistletoe
c) Sandal wood
d) Ganoderma

41. Which statement explains amensalism? **[5]**

a) Both species are harmed.
b) One species is benefitted while other is not affected.
c) One species is harmed while other is not affected.
d) Both species are benefitted.

42. Zone of Earth occupied by living organisms is called: **[5]**

a) Flora and Fauna
b) Biosphere
c) Ecosystem
d) Biome

43. Which one of the following has the largest population in a food chain? **[5]**

a) Secondary consumers
b) Producers
c) Decomposers
d) Primary consumers

44. Pyramid of numbers is: **[5]**

a) Always upright
b) Ether upright or inverted
c) Always inverted
d) Neither upright nor inverted

45. Exponential growth in plants can be expressed as: **[5]**

a) $W_1 = W_0$ ert
b) $L_t = L_0 + rt$
c) $W_1 = W_0 + e^{rt}$
d) $W_1 = W_0\, e^{rt}$

46. Which of the following is not an invasive alien species in the Indian context? **[5]**

a) Eichhornia
b) Lantana
c) Parthenium
d) Cynodon

47. The three zones of biosphere reserves are **[5]**

a) Natural zone, buffer zone and transition zone.

b) Core zone, natural zone and central zone

c) Protected zone, buffer zone and natural zone

d) Main zone, middle zone and outer zone

48. Global warming will cause: **[5]**

a) Rise in level of oceans, decrease in glaciers and reduction in ice caps.

b) Decrease in glaciers only

c) Reduction in ice caps

d) Rise in level of oceans

49. Which one of the following impurities is easiest to remove from wastewater? **[5]**

a) Suspended solids

b) Dissolved solids

c) Colloids

d) Bacteria

50. Effect of gaseous pollutants on the human body will depend upon: **[5]**

a) their solubility in organic solvent.

b) their solubility in water.

c) their sources as point, line, and area.

d) their carcinogenic behavior.

Solutions

1. **(a)** Monoecious
   Explanation: The male and female reproductive parts of the flower are stamen and carpel. If both stamen and pistil are present in the same flower, the flower is called monoecious.
2. **(d)** Water hyacinth : Runner
   Explanation: Water hyacinth develops offset for vegetative propagation. It forms a large number of branches in a very short interval of time to cover the whole water bodies and depriving other aquatic organisms of oxygen dissolved in water.
3. **(c)** Stem tuber
   Explanation: Potato is a stem tuber as it contains nodes in the form of eyes although it is formed inside the soil. New potato can be grown using the tuber in which new plantlets grow out from the eyes.
4. **(a)** Plant is dioecious and bears only staminate flowers
   Explanation: A dicotyledonous plant bears flowers but never produces fruits and seeds. The most probable cause for the above situation is the plant is dioecious and bears only staminate flowers as it will need pistil (embryo sac) so it can carry out fertilization and form seeds and fruit.
5. **(c)** Synergid, zygote, and primary endosperm nucleus
   Explanation: During fertilization, egg fuses with male gamete to form a diploid zygote and two male polar nuclei fuse with another male gamete to form a triploid primary endosperm nucleus. Synergids and antipodals remain haploid and degenerate later.
6. **(a)** Ovary, style, and stigma
   Explanation: The pistil is a flash shaped structure having basal swollen ovary, stalk-like style, and a terminal receptive part called stigma. Ovules are formed inside the ovary of the pistil. Hence option A is correct.
7. **(d)** Secondary or polar nuclei
   Explanation: The endosperm is the product of the fusion of two polar nuclei with one male gamete. The endosperm provides nourishment to the growing embryo.
8. **(b)** Seminiferous tubules
   Explanation: After spermiogenesis, sperm heads become embedded in the Sertoli cells, and are finally released from the seminiferous tubules by the process called spermiation.
9. **(b)** Oviduct
   Explanation: Fertilization of egg in human females takes place in the oviduct or fallopian tube at the junction of ampullar-isthmus. The fertilized egg travels towards the uterus after that.

10.

(d) Its contact with zona pellucida of the ova

Explanation: During fertilization, a sperm comes in contact with the zona pellucida layer of the ovum and induces changes in the membrane that block the entry of additional sperms. Thus, it ensures that only one sperm can fertilize an ovum. The secretions of the acrosome help the sperm enter into the cytoplasm of the ovum through the zona pellucida and the plasma membrane.

11.

(b) All of these

Explanation: Side effects of anabolic steroids specifically in women are acne, hair loss, withdrawal of the frontal hairline, male pattern boldness, lowering of the voice, increased facial hair growth, and breast atrophy. The lowering of the voice, decreased breast size, clitoris hypertrophy and hair loss are generally irreversible. Females using AS (anabolic steroids) may develop masculine facial traits, male muscularity, and coarsening of the skin.

12. **(a)** Not cause significant change in growth rate

Explanation: IMR(infant mortality rate) and MMR (maternal mortality rate) are two factors that affect population growth. If IMR is increased and MMR is decreased then there will be not any significant effect on population growth rate.

13.

(d) ZIFT

Explanation: The transfer of embryo at the 8-celled stage in the fallopian tube of the female is called ZIFT (zygote intrafallopian transfer). During the test tube, baby program egg fertilized in vitro is transferred to fallopian tube for further growth and development.

14. **(a)** Carrier and father should be hemophilic

Explanation: Possibility of becoming hemophilic is extremely rare because the mother of such a female to be at least carrier and father should be hemophilic which becomes unviable at the later stage of life.

15.

(d) G U G

Explanation: GUG is a codon triplet that codes for amino acid valine.

16. **(a)** R-S-T

Explanation: R-S-Tis correct sequence of gene on the chromosomes.

17.

(d) males and females, respectively

Explanation: Some insects show XO type of sex determination where males have only one sex chromosome beside autosomes while females have two sex chromosomes beside autosomes. Grasshopper is an example.

18. **(a)** BAC and YAC

Explanation: YAC (Yeast artificial chromosome): It is a vector used to clone DNA fragments larger than 100 kb and up to 3000 kb. The major advantage of using artificial chromosomes such as YACs is that it can carry much larger DNA fragments than ordinary plasmids.

BAC (Bacterial artificial chromosome: It is an artificially constructed vector containing the origin of replication and selectable marker for identification. It is capable of carrying large

DNA fragments and can replicate easily inside a bacterial cell.
These vectors are used in the human genome project for mapping or sequencing of genomes to be studied.

19. **(b)** exons appear but introns do not appear in the mature RNA.
Explanation: The primary transcribed RNA contains both the exons and the introns and is non-functional. Hence, it is subjected to a process called splicing where the introns are removed and exons are joined in a defined order. hnRNA undergoes additional processing called as capping and tailing. In capping an unusual nucleotide (methyl guanosine triphosphate) is added to the 5'-end of hnRNA. In tailing, adenylate residues (200-300) are added at 3'-end in a template-independent manner. It is the fully processed hnRNA, now called mRNA, that is transported out of the nucleus for translation.

20. **(d)** Southern blotting
Explanation: A Southern blot is a method used in molecular biology for the detection of a specific DNA sequence in DNA samples. Southern blotting combines the transfer of electrophoresis-separated DNA fragments to a filter membrane and subsequent fragment detection by probe hybridization.

21. **(d)** Directional
Explanation: Directional natural selection occurs when one extreme character is favoured and the favoured extreme character becomes more common. During industrial melanism, dark coloured moths were favoured and they became more common.

22. **(c)** Natural selection whereby the darker forms were selected.
Explanation: In England, the places where industrialization is more, peppered moth which was originally white coloured have become dark coloured as the dominant due inheritance of darker color character acquired due to the darker environment.

23. **(d)** Lobe fish
Explanation: Lobe-finned fishes or the lobe fishes are the species that were found as the closest relationship between the animals in the sea and the animals that ventures into the land (amphibians).

24. **(a)** Rapid cell division
Explanation: Radiation therapy targets the DNA inside the cell by making them unable to divide and reproduce. Cancer cells perform unlimited cell division. Now, when their dividing ability is targeted, naturally they respond more. Newly formed cells can be easily destroyed by radiation of high frequency. They stop dividing. Thus, the tumor shrinks. However, the adjoining normal cells also get affected by radiation but they can repair themselves more effectively.

25. **(a)** Shaking hands with infected persons
Explanation: AIDS is caused only by exchange or transfer of body fluids and shaking hands do not cause the exchange of body fluids.

26. **(c)** Benign
Explanation: A tumor enclosed within a capsule is called a benign tumor. Benign tumors normally remain confined to their original location and do not spread to other parts of the body and cause little damage.
27. **(b)** Morphine
Explanation: Morphine is a very effective sedative and painkiller and is very useful in patients who have undergone surgery.
28. **(c)** Anther
Explanation: Anther can yield a completely haploid plant because anther is produced by meiosis cell division contain half the number of chromosomes their normal cells have.
29. **(d)** Shakti
Explanation: Lysine is a type of amino acid present in the proteins. Maize variety Shakti is rich in lysine amino acids.
30. **(b)** Fish
Explanation: Blue revolution is related to fish production. This revolution is brought about by using aquaculture and pisciculture on the line of green revolution for wheat production.
31. **(a)** Snail
Explanation: In organic farming, the snail is not used. Glomus is a kind of fungi used in organic farming for maintaining the fertility of the soil. Earthworm the process of composting to form vermiform compost and Oscillatoria is an algae that fix the nitrogen.
32. **(d)** Rhizobium
Explanation: Rhizobium is heterotrophic soil bacteria with diverse lifestyles.
33. **(b)** Antibiotics
Explanation: Antibiotics, also called antibacterials, are a type of antimicrobial drug used in the treatment and prevention of bacterial infections. They may either kill or inhibit the growth of bacteria.
34. **(a)** Kary Mullis
Explanation: Polymerase chain reaction (PCR) was discovered by Kary Mullis. PCR technique is used to amplify the DNA segments to obtain large number of identical copies.
35. **(c)** Palindrome
Explanation: A palindrome is a word, phrase, number, or other sequences of characters that reads the same backward as forward. For example, MALAYALAM which read the same from both side.
36. **(a)** Transduction
Explanation: Transduction is the process by which foreign DNA is introduced into a cell

by a virus or viral vector. An example is the viral transfer of DNA from one bacterium to another and hence an example of horizontal gene transfer.

37.

(b) Biodiversity and traditional knowledge

Explanation: Most industrialized nations are rich financially but poor in biodiversity and traditional knowledge. Biodiversity and traditional knowledge related to bio-resources are can be exploited to develop modern applications.

38.

(c) SCID (Severe Combined Immuno Deficiency resulting from deficiency of ADA)

Explanation: The first clinical gene therapy was given in 1990 to a 4-year old girl with adenosine deaminase (ADA) deficiency.

39.

(d) Realized natality

Explanation: Natality or birth rate is the number of birth in a given period in the population that are added to the initial population. The actual birth rate under environmental conditions is much less than total birth because all organisms do not survive adulthood due to predation, completion, etc.

40.

(c) Sandal wood

Explanation: Sandalwood is a partial root parasite, which synthesizes its own food but is dependent on the host's roots for water and inorganic nutrients. Mistletoe is a partial stem parasite. Orobanche (Broomrope) is the complete root parasite. Ganoderma, a fungus, is parasitic on the hardwood.

41.

(c) One species is harmed while other is not affected.

Explanation: One type of relationship that has been classified by biologists and ecologists is amensalism.

Amensalism is any relationship between organisms of different species in which one organism is inhibited or destroyed while the other organism remains unaffected.

42.

(b) Biosphere

Explanation: The zone of the earth occupied by the living organism is called the biosphere. It includes lands, water, and air where living organisms survive.

43.

(c) Decomposers

Explanation: Decomposers include micro-organisms such as bacteria and fungi. They form the largest population in a food chain and obtain nutrients by breaking down the remains of dead plants and animals.

44.

(b) Ether upright or inverted

Explanation: In most ecosystems, all the pyramids, of number, of energy and biomass are upright, i.e., producers are more in number and biomass than the herbivores, and herbivores are more in number and biomass than the carnivores but, If you were to count

the number of insects feeding on a big tree, we will find that the number of insects is far larger than number of trees. Exceptionally, this makes the pyramid of numbers inverted.

45.

(d) $W_1 = W_0 e^{rt}$

Explanation: Exponential growth in plant expresses as $W_1 = W_0 e^{rt}$

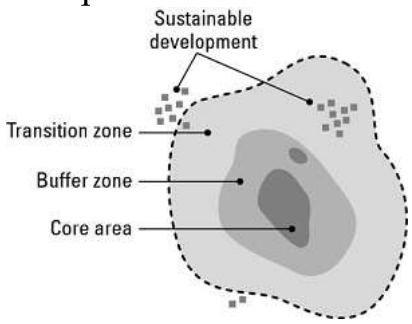
46.

(d) Cynodon

Explanation: Carrot grass (Parthenium), Lantana, and water hyacinth (Eichhornia) caused environmental damage and posed a threat to our native species by invasive weed species.

47. **(a)** Natural zone, buffer zone and transition zone.

Explanation: The three zones of biosphere reserves are natural zone, buffer zone, and transition zone. The natural zone is also known as core zone and transition zone is called as manipulation zone.



48. **(a)** Rise in level of oceans, decrease in glaciers and reduction in ice caps.

Explanation: Global warming is caused by green house effect in which temperature of inner atmosphere increases that result into melting of ice caps and glaciers. The melting results into rise in levels of oceans.

49. **(a)** Suspended solids

Explanation: Solids are relatively easy to remove, what is most difficult to remove are dissolved salts such as nitrates, phosphates, and other nutrients, and toxic metal ions, and organic compounds.

50.

(b) their solubility in water.

Explanation: Effect of gaseous pollutants on the human body depends upon their solubility in water. Most of the gases except carbon dioxide and oxygen enter the human body in the form of solute.