Q1. Who among the following challenged the patent right granted to the University of Mississippi Medical Centre for 'use of turmeric in wound healing'? **1 Mark**

A Mr. Ajay Phadke **B** Ms. Vandana Shiva **C** Dr. Venugopalan **D** Dr. R.A. Mashelkar

Q2. ELISA technique is based on the principle of:

1. DNA replication.
2. Antigen and Antibody interaction.
3. Pathogen and Antigen interaction.
4. Antigen and Protein interaction.

A DNA replication. **B** Antigen and Antibody interaction.
C Pathogen and Antigen interaction. **D** Antigen and Protein interaction.

Q3. Given below are two columns. In Column I is the list of four enzymes and in Column II is the list of functions of the given enzymes. Which one of the following options shows the enzymes matched with their respective functions correctly? **1 Mark**

	Column I (Enzyme)		**Column II (Function)**
P.	DNA Ligase	i.	Removes nucleotides from ends of DNA
Q.	Restriction exonuclease	ii.	Extends primer on a DNA template
R.	Taq polymerase	iii.	Joins the DNA fragments
S.	Restriction endonuclease	iv.	Cuts DNA at a specific position

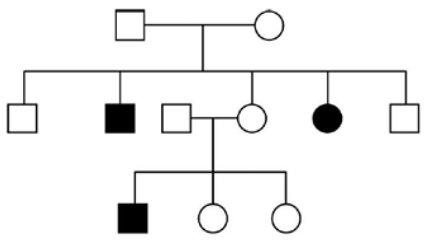
A P-i, Q-ii, R-iv, S-iii **B** P-iv, Q-iii, R-ii, S-i **C** P-i, Q-iv, R-ii, S-ii **D** P-ii, Q-i, R-ii, S-iv

Q4. Which one of the following processes results in the production of recombinants in future generations? **1 Mark**

1. Mutation
2. Independent assortment during meiosis I
3. Independent assortment during meiosis II
4. Crossing over of bivalents

A (iv) only **B** (ii) and (iv)
C (i), (ii) and (iii) **D** (i), (ii), (iii) and (iv)

Q5. Study the pedigree chart of a family sharing the inheritance of sickle cell anemia. **1 Mark**



The trait traced in the above pedigree chart is:

A Dominant X-linked **B** Autosomal dominant
C Recessive X-linked **D** Autosomal recessive

Q6. The organism used in construction of the first artificial recombinant DNA by Cohen and Boyer in 1972 was: **1 Mark**

A E. coli. **B** Salmonella typhimurium
C Agrobacterium tumefaciens **D** Bacillus thuringiensis

Q7. **1 Mark**

If a natural population of 60 individuals is in Hardy-Weinberg equilibrium for a gene with two alleles B and b, ith the gene frequency of allele B of 0·7, the genotype frequency of Bb will be:

A 0·21 **B** 0·42 **C** 0·48 **D** 0·56

Q8. After the completion of biosynthetic stage in a bioreactor, the product undergoes a series of processes before it is ready for marketing. **1 Mark**
List of the processes is given below. Identify the option that gives the correct sequence of the processes carried out:

1. Purification of product
2. Formulation with suitable preservative
3. Separation of product
4. Clinical trial of product

A (ii) → (iii) → (i) → (iv) **B** (iii) → (ii) → (i) → (iv)
C (iii) → (i) → (ii) → (iv) **D** (i) → (iii) → (iv) → (i)

Q9. Given below are the steps carried out to construct a recombinant DNA. Which one of the following gives the correct sequence of these steps? **1 Mark**

1. Isolation of genetic material
2. Insertion of recombinant DNA in the host cell/ organism
3. Obtaining the foreign gene product
4. Amplification of gene of interest
5. Downstream processing

A (i) → (iii) → (iv) → (ii) → (v) **B** (i) → (iv) → (ii) → (iii) → (v)
C (ii) → (i) → (iii) → (iv) → (v) **D** (ii) → (iv) → (v) → (iii) → (i)

Q10. Which one of the following is used during 'RNA i' process, to silence the desired gene? **1 Mark**

A dsDNA **B** dsRNA **C** rDNA **D** DNA polymerase

Q11. Which one of the following products was produced as a result of DNA manipulation in the first transgenic cow 'Rosie'? **1 Mark**

A α - 1 - antitrypsin **B** α - lactalbumin
C β - lactglucose **D** α - deaminase

Q12. A normal couple produces half the sons as haemophilic and half the daughters as carriers. **1 Mark**
Choose the option that correctly indicates the chromosome on which the gene for this trait is located.

A X-chromosome of father **B** Y-chromosome of father
C One X-chromosome of mother **D** Both the X-chromosomes of the mother

Q13. Examples that show commensalism are: **1 Mark**

1. An orchid growing on mango tree.
2. Cuckoo bird and crow.
3. Cuscuta growing on Nerium tree.
4. Barnacles growing on a whale.

A (i) and (ii) **B** (i) and (iv) **C** (i) and (iii) **D** (ii) and (iv)

Q14. Nematode specific genes were introduced into the tobacco host plant using a vector: **1 Mark**

1. pBR 322.
2. Plasmid.
3. Bacteriophage.
4. Agrobacterium.

A pBR 322. **B** Plasmid. **C** Bacteriophage. **D** Agrobacterium.

Q15. 'Cry' 'protein' coded by gene Cry IAb controls: **1 Mark**

A Cotton bollworm. **B** Corn borer. **C** Tobacco budworm. **D** Mosquito.

Q16. **1 Mark**

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?

A R - T - 8 **B** R - S - T **C** S - R - T **D** S - T - R

Q17. Choose the option that gives the correct number of pollen grains that will be formed after 325 microspore mother cells undergo microsporogenesis. **1 Mark**

A 325 **B** 650 **C** 1300 **D** 975

Q18. Meselson and Stahl carried out centrifugation in $CsCl_2$ density gradient to separate: **1 Mark**

A DNA from RNA.
B DNA from protein.
C The normal DNA from ^{15}N-DNA.
D DNA from tRNA.

Q19. The total energy fixed by a gram plant (Cicer arietinum) in an ecosystem as a whole is called: **1 Mark**

A Primary production **B** Gross production **C** Secondary production **D** Tertiary production

Q20. Which one of the following options gives one correct example each of convergent evolution and divergent evolution? **1 Mark**

A Eyes of octopus and mammals - Bones of forelimbs of vertebrates.
B Thorns of Bougainvillea and tendrils of Cucurbita - Wings of butterflies and birds.
C Bones of forelimbs of vertebrates - Wings of butterfly and birds.
D Thorns of Bougainvillea and tendrils of Cucurbita - Eyes of octopus and mammals.

Q21. Species diversity increases as one proceeds from: **1 Mark**

A High altitude to low altitude and high latitude to low latitude.
B Low altitude to high altitude and high latitude to low latitude.
C Low altitude to high altitude and low latitude to high latitude.
D High altitude to low altitude and low latitude to high latitude.

Q22. Select the correct sequence of stages of spermatogenesis in a human male. **1 Mark**

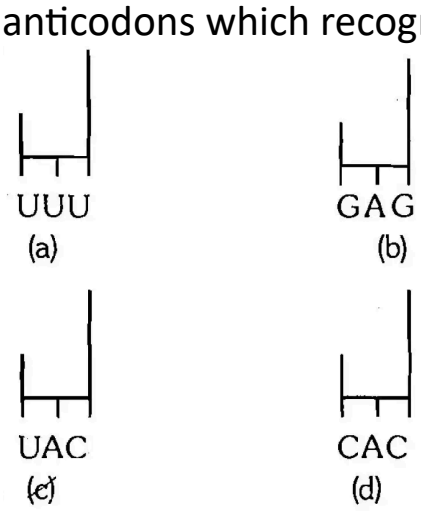
A Spermatogonium Spermatids → Spermatocytes → Spermatozoa.
B Spermatogonium → Spermatocytes → Spermatids → Permatozoa.
C Spermatids → Spermatogonium → Spermatocytes → Spermatozoa.
D Spermatocytes → Spermatogonium → Spermatids → Spermatozoa.

Q23. Today, transgenic models exist for many human diseases which includes. **1 Mark**

1. Cancer.
2. Cystic fibrosis.
3. Rheumatoid arthritis.
4. Alzhiemer's disease.

A (i) and (iii) only. **B** (ii) and (iii) only.
C (i), (ii) and (iii) only. **D** All of these.

Q24. In a mRNA sequence of N_2-base is 5' AUG GUG CUC AAA 3'. What is the correct sequence of anticodons which recognizes codons of mRNA: **1 Mark**



A a, b, c, d **B** d, a, b, c **C** c, d, b, a **D** d, c, b, a

Q25. What kind of evidence suggested that man is more closely related with chimpanzee than with other hominoid apes? **1 Mark**

A Evidence from DNA from sex chromosomes only.
B Comparison of chromosomes morphology only.
C Evidence from fossil remains and the fossil mitochondrial DNA alone.
D Evidence from DNA extracted from sex chromosomes, autosomes and mitochondria.

Q26. Which was the last human chromosome to be completely sequenced: **1 Mark**

A Chromosome 1. **B** Chromosome 11. **C** Chromosome 21. **D** Chromosome x.

Q27. Transplantation of tissues/organs to save certain patients often fails due to rejection of such tissues/ organs by the patient. Which type of immune response is responsible for such rejections? **1 Mark**

A Physiological immune response.
B Humoral immune response.
C Auto-immune response.
D Cell-mediated immune response.

Q28. Which of the following factors regulate human life with reference to population density: **1 Mark**

A Availability of blood, housing and health facilities
B Urbanization
C Climatic conditions
D All the above

Q29. In which method, collected ovum and sperm are placed inside the woman's oviduct? **1 Mark**

A Artificial insemination
B Intra-cytoplasmic sperm injection
C In vitro fertilization
D Gamete intrafallopian transfer

Q30. Which of the following is caused by the Haemophilus ducreyi? **1 Mark**

A Chlamydiasis **B** Chancroid **C** Candidiasis **D** Scabies

Q31. More than 70% of world’s fresh water is contained in: **1 Mark**

A Antarctica. **B** Glaciers and mountains. **C** Greenland. **D** Polar ice.

Q32. Transfer of genes from one gene pool to another is: **1 Mark**

A Genetic drift **B** Gene flow **C** Speciation **D** Mutation

Q33. Biotrophic nutrition is shown by: **1 Mark**

A Humans **B** Saprophytic plants **C** Invertebrates **D** Insectivorous plants

Q34. Exponential growth in a given population of a microorganism is limited by: **1 Mark**

A Competition for food
B Accumulation of waste matter
C Both of (A) and (B)
D None of the above

Q35. Population explosion in India is due to: **1 Mark**

A Climate **B** Increased death rate **C** Lack of education **D** All of the above

Q36. If the sequence of nitrogen bases of the coding strand of DNA in a transcription unit is: **1 Mark**
5' - ATGAATG - 3',
The sequence of bases in its RNA transcript would be:

A 5' - AUGAAUG - 3' **B** 5' - UACUUAC - 3' **C** 5' - CAUUCAU - 3' **D** 5' - GUAAGUA - 3'

Q37. The correct set of a single endocrine gland hormone is: **1 Mark**

A Oxytocin, prolactin, ACTH
B Oxytocin, vasopressin, ADH
C Thyroxin, secretin, ACTH
D Epinephrin, cortisol, ICSH

Q38. Sickle cell anaemia has not been eliminated from the African population because: **1 Mark**

A It is controlled by recessive genes.
B It is not a fatal disease.

C It provides immunity against malaria. **D** It is controlled by dominant genes.

Q39. The common Nitrogen-fixer in paddy fields is **1 Mark**

A Frankia **B** Rhizobium **C** Azospirillum **D** Oscillatoria

Q40. Segregation of Mendelian factors (no linkage, no crossing over) occurs during. **1 Mark**

A Anaphase-I. **B** Anaphase-II. **C** Diplotene. **D** Metaphase-I.

Q41. If any following part of flower, is involved in the formation of fruit is called as false fruit. Such part is: **1 Mark**

A Thalamus **B** Tepal **C** Calyx **D** All of the above

Q42. The genes causing cancer are: **1 Mark**

A Structural genes. **B** Sxpressor genes. **C** Oncogenes. **D** Regulatory genes.

Q43. Which one of the following statements is correct with respect to AIDS? **1 Mark**

A The causative HIV retrovirus enters helper T-lymphocytes thus, reducing their numbers.
B The HIV can be transmitted through eating food together with an infected person.
C Drug addicts are least susceptible to HIV infection.
D AIDS patients are being fully cured cent percent with proper care and nutrition.

Q44. Evolution in which the animals of two different gene ecology show too much similarity with one another, as a result of adaptation is termed as: **1 Mark**

A Parallel evolution **B** Retrogressive evolution **C** Progressive evolution **D** Convergent evolution

Q45. In an analysis of a semen sample, it was observed that the total number of sperms were 18 millions, of which 80% shows high motility and 20% shows less motility. How many sperms have Y chromosome (approximately)? **1 Mark**

A 12 million. **B** 6 million. **C** 3.6 million. **D** 9 million.

Q46. Sequence of which of the following is used to know the phylogeny? **1 Mark**

A mRNA **B** rRNA **C** tRNA **D** DNA

Q47. At which stage, of HIV infection does one usually show symptoms of AIDS? **1 Mark**

A Within 15 days of sexual contact with an infected person.
B When the infecting retrovirus enters host cells.
C When viral DNA is produced by reverse transcriptase.
D When HIV replicates rapidly in helper T-lymphocytes and starts to reduce the number of T cells by destroying them.

Q48. Formation of additional embryo from part of the same embryo or embryo sac is: **1 Mark**

A True polyembryony **B** False polyembryony
C Adventitive polyembryony **D** Haploid-diploid polyembryony

Q49. Starting from the innermost part, the correct sequence of parts in an ovule are: **1 Mark**

A Egg, nucellus, embryo sac, integument. **B** Egg, embryo sac, nucellus, integument.
C Embryo sac, nucellus, integument, egg. **D** Egg, integument, embryo sac, nucellus.

Q50. There are two alleles A_1 and A_2, out of which, one A_1 has nil abundance in a population, then the abundance of second allele A_2 is: **1 Mark**

A 0.25 **B** 1.00 **C** 0.40 **D** 0.50

Q51. The arrangement of the nuclei in a normal embryo sac in the dicot plants is. **1 Mark**

A 3 + 2 + 3. **B** 2 + 3 + 3. **C** 3 + 3 + 2. **D** 2 + 4 + 2.

Q52. What changes are observed in the uterus subsequent to implantation of young embryo? **1 Mark**

A The uterine wall thickens. **B** Placenta develops.

C Both A and B.

D The uterine wall shrinks.

Q53. If the haploid number of chromosomes in Pinus is 12, the number in its endosperm cells will be: **1 Mark**

A 12 **B** 24 **C** 36 **D** 6

Q54. The trigger for activation of toxin of Bacillus thuringiensis is: **1 Mark**

A Alkaline pH of gut.
B Mechanical action in the insect gut.
C High temperature.
D Acidic pH of stomach.

Q55. Out of 8 ascospores formed in Neurospora the arrangement is 2a : 4a : 2a showing.

A No crossing over.
B Some meiosis.
C Second generation division.
D First generation division.

Q56. Production of human protein in bacteria by genetic engineering is possible because:

A Mechanism of gene regulation is identical in humn and bacteria.
B Bacterial cell can undertake RNA splicing.
C Genetic code is universal.
D None of these.

Q57. A normal green male maize is crossed with albino female. The progeny is albino because: **1 Mark**

A Trait for albinism is dominant.
B The albinos have biochemical to destroy plastids derived from green male.
C Plastids are inherited from female parent.
D Green plastids of male must have mutated.

Q58. Development of an organism from female gamete/egg without involving fertilization is. **1 Mark**

A Adventitive embryony. **B** Polyembryony. **C** Parthenocarpy. **D** Parthenogenesis.

Q59. Production of a human protein in bacteria by genetic engineering is possible because: **1 Mark**

A Bacterial cell can carry out the RNA splicing reactions.
B The human chromosome can replicate in bacterial cell.
C The mechanism of gene regulation is identical in humans and bacteria.
D The genetic code is universal.

Q60. Interleukin which is recently discovered, is a cure for: **1 Mark**

A Arthritis **B** Diabetes **C** Cancer **D** Influenza