

**QUESTION BOOKLET – 2016**  
**Subject : Paper II : Biology**

Question Booklet Version
(Write this number on your Answer Sheet)

Roll No.						

Question Booklet Sr. No.
(Write this number on your Answer Sheet)

Answer Sheet No.							

Duration : 1 Hour 30 Minutes

Total Marks : 100

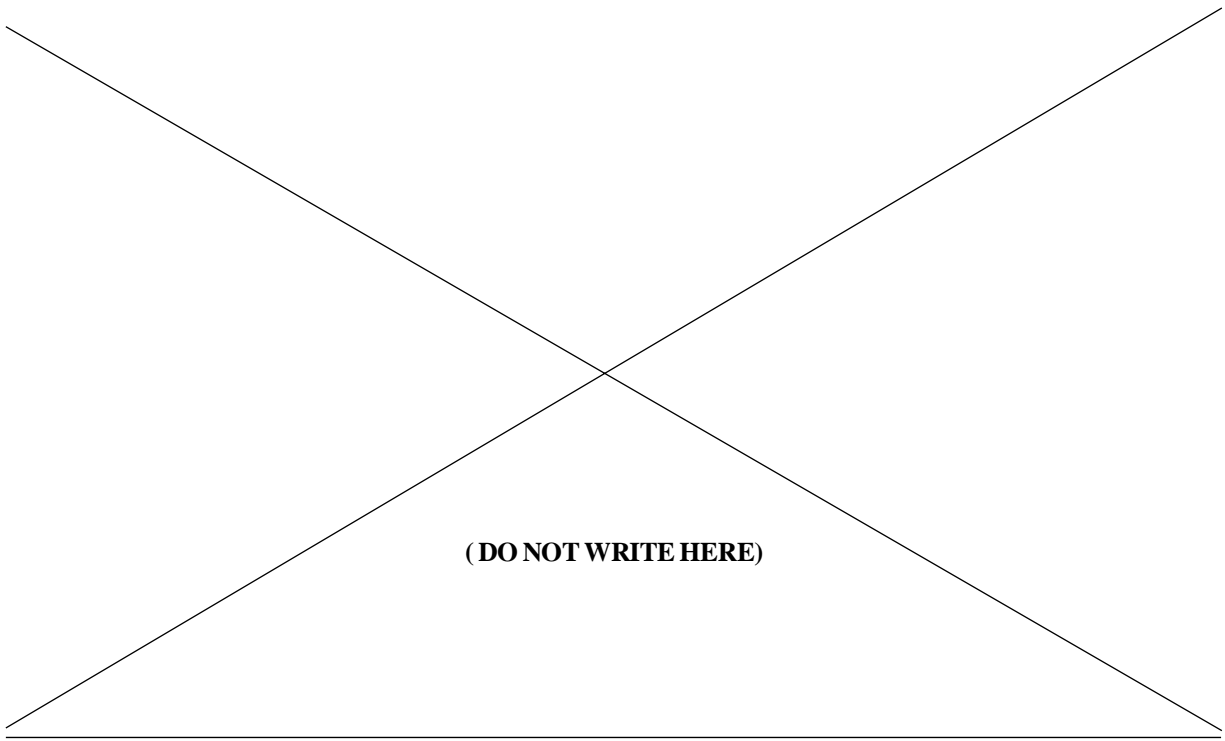
This is to certify that, the entries of Roll Number and Answer Sheet Number have been correctly written and verified.

*Candidate's Signature*

*Invigilator's Signature*

**Instructions to Candidates**

1. This question booklet contains 100 Objective Type Questions (Single Best Response Type) in the subjects of Biology.
2. The question paper and OMR (Optical Mark Reader) Answer Sheets are issued to examinees separately at the beginning of the examination session.
3. Choice and sequence for attempting questions will be as per the convenience of the candidate.
4. Candidate should carefully read the instructions printed on the Question Booklet and Answer Sheet and make the correct entries on the Answer Sheet. As Answer Sheets are designed to suit the OPTICAL MARK READER (OMR) SYSTEM, special care should be taken to mark appropriate entries/answers correctly. Special care should be taken to fill QUESTION BOOKLET VERSION, SERIAL No. and Roll No. accurately. The correctness of entries has to be cross-checked by the invigilators. **The candidate must sign on the Answer Sheet and Question Booklet.**
5. Read each question carefully.
6. Determine the correct answer from out of the four available options given for each question.
7. Fill the appropriate circle completely like this ●, for answering the particular question, with Black ink ball point pen only, in the OMR Answer Sheet.
8. Each answer with correct response shall be awarded **one (1) mark**. There is **no Negative Marking**. If the examinee has marked two or more answers or has done scratching and overwriting in the Answer Sheet in response to any question, or has marked the circles inappropriately e.g. half circle, dot, tick mark, cross etc, mark/s shall NOT be awarded for such answer/s, as these may not be read by the scanner. Answer sheet of each candidate will be evaluated by computerized scanning method only (Optical Mark Reader) and there will not be any manual checking during evaluation or verification.
9. Use of whitener or any other material to erase/hide the circle once filled is not permitted. Avoid overwriting and/or striking of answers once marked.
10. Rough work should be done only on the blank space provided in the Question Booklet. **Rough work should not be done on the Answer Sheet.**
11. Immediately after the prescribed examination time is over, the Question Booklet and Answer sheet are to be returned to the Invigilator. Confirm that both the Candidate and Invigilator have signed on question booklet and answer sheet.
12. No candidate is allowed to leave the examination hall till the examination session is over.



**(DO NOT WRITE HERE)**

**SPACE FOR ROUGH WORK**

**BIOLOGY**

1. What will be the genotype of parents of a child with 'O' blood group ?
  - A)  $I^A I^A \times I^A I^A$
  - B)  $I^B I^B \times I^B I^B$
  - C)  $I^A I^A \times I^B I^B$
  - D)  $I^A i \times I^B i$
  
2. In Angiosperms, megaspores formed after meiosis of megaspore mother cell are arranged in \_\_\_\_\_
  - A) Isobilateral tetrad
  - B) Linear tetrad
  - C) Tetrahedral tetrad
  - D) T-shaped tetrad
  
3. During replication of DNA, the two strands of the double helix are separated from each other under the influence of enzyme \_\_\_\_\_
  - A) rep-protein
  - B) SSBP
  - C) initiator protein
  - D) DNA polymerase
  
4. Identify the INCORRECT statement from the following with reference to lac operon.
  - A) It is a unit of gene expression and regulation for lactose sugar metabolism in *E. Coli*.
  - B) Lactose sugar enters the cell due to the activity of enzyme permease.
  - C) Operators are present between promoters and structural genes.
  - D) The structural gene 'z' codes for  $\beta$ -galactosidase, 'y' for transacetylase and 'a' for permease.
  
5. High levels of Aspartic acid, low nitrogen and sugar content in maize plants prevent the attack by \_\_\_\_\_
  - A) Aphids
  - B) Jassids
  - C) Boll worms
  - D) Stem borers
  
6. The common feature in CAM and  $C_4$  plants is \_\_\_\_\_
  - A) Stomata open only during night
  - B) Acid concentration increases during night
  - C) Both  $C_3$  and  $C_4$  pathway occur
  - D) Having Kranz anatomy
  
7. Which one of the following electron acceptor is present in respiratory chain ?
  - A) Cytochrome f
  - B) Cytochrome  $a_3$
  - C) Plastocyanin
  - D) Ferredoxin

8. The codon sequence on coding strand of transcription unit is ATG GTG AGC TAC GCG. What will be the codon sequence on mRNA formed on template strand ?  
A) ATG GTG AGC TAC GCG      B) GCG TAC AGC GTG ATG  
C) TAC CAC TGC ATG CGC      D) AUG GUG AGC UAC GCG
9. A cross between two pea plants tall with axial flowers and dwarf with terminal flowers produced offsprings tall with axial flowers and tall with terminal flowers in the ratio 1 : 1. What will be the genotype of parents ?  
A) TTAa × ttaa      B) TtAa × ttaa  
C) TtAA × ttaa      D) TTAA × ttaa
10. Which one of the following is used by green sulphur bacteria for reduction of  $\text{CO}_2$  to  $\text{CH}_2\text{O}$  ?  
A)  $\text{H}_2\text{S}$       B)  $\text{H}_2\text{O}$   
C)  $\text{CH}_4$       D)  $\text{NH}_4$
11. The CORRECT sequence of events during double fertilization in Angiosperms is  
A) Triple fusion, syngamy, porogamy  
B) Syngamy, triple fusion, porogamy  
C) Porogamy, syngamy, triple fusion  
D) Syngamy, porogamy, triple fusion
12. When genomic DNA is fragmented and cloned, the screening of the desired gene is done by using  
A) Plasmid DNA      B) DNA probes  
C) Southern blotting      D) PCR technique
13. The guano deposits are obtained from the excreta of \_\_\_\_\_  
A) Reptiles      B) Human  
C) Marine birds      D) Micro-organisms
14. In an angiosperm a female plant having  $2n = 24$  is crossed with a male plant having  $2n = 12$ . What will be the chromosome number of the endosperm ?  
A) 12      B) 18  
C) 24      D) 30
15. Two alternative forms of a gene or alleles are located on \_\_\_\_\_  
A) Identical loci of the same chromosome  
B) Non-identical loci of the same chromosome  
C) Identical loci of homologous chromosomes  
D) Non-identical loci of homologous chromosomes

16. In Krebs's cycle Guanosine Triphosphate is formed during the conversion of  
A) Isocitrate to oxalosuccinate      B) Oxalosuccinate to  $\alpha$ -ketoglutarate  
C) Succinyl CoA to succinate      D) Fumarate to malate
17. Mycorrhiza is \_\_\_\_\_  
A) Alga      B) Fungus  
C) Bacteria      D) Virus
18. During PCR technique, the pairing of primers to ssDNA segment is called \_\_\_\_\_  
A) Denaturation      B) Annealing  
C) Polymerisation      D) Isolation
19. \_\_\_\_\_ is the most convenient and cheap method of artificial vegetative propagation.  
A) Grafting      B) Budding  
C) Cutting      D) Micropropagation
20. Glycosidic bond exists in DNA molecule between \_\_\_\_\_  
A) Sugar and phosphate      B) Any two nitrogen bases  
C) Sugar and nitrogen base      D) Purines and pyrimidines
21. Which of the following wall layer of anther shows fibrous thickenings of callose ?  
A) Epidermis      B) Tapetum  
C) Middle layer      D) Endothecium
22. Photosynthesis is considered as an oxidation reaction because \_\_\_\_\_  
A)  $\text{CO}_2$  is oxidised      B)  $\text{H}_2\text{O}$  is oxidised  
C)  $\text{O}_2$  is released      D)  $\text{CH}_2\text{O}$  is oxidised
23. Which one of the following is the CORRECT order of conversion of waste materials during biogas formation ?  
A) Monomers  $\rightarrow$  polymers  $\rightarrow$  methane  $\rightarrow$  organic acids  
B) Organic acids  $\rightarrow$  methane  $\rightarrow$  polymers  $\rightarrow$  monomers  
C) Methane  $\rightarrow$  organic acids  $\rightarrow$  polymers  $\rightarrow$  monomers  
D) Polymers  $\rightarrow$  monomers  $\rightarrow$  organic acids  $\rightarrow$  methane

24. Match the plant and the part in relation to Vegetative Propagation.
- |                             |                                |
|-----------------------------|--------------------------------|
| 1) <u>Dahlia</u>            | a) Eyes                        |
| 2) <u>Solanum tuberosum</u> | b) Runner                      |
| 3) <u>Begonia</u>           | c) Fasciculated tuberous roots |
| 4) <u>Cynodon</u>           | d) Epiphyllous buds            |
- A) (1) – c, (2) – a, (3) – b, (4) – d      B) (1) – d, (2) – a, (3) – b, (4) – c  
 C) (1) – c, (2) – a, (3) – d, (4) – b      D) (1) – b, (2) – c, (3) – a, (4) – d
25. Agrobacterium tumefaciens is most widely used for gene transfer because \_\_\_\_\_
- A) it causes crown gall tumours  
 B) of its ability to insert Ti plasmid into nuclear genome  
 C) it can grow anywhere  
 D) it has ability to kill pathogenic bacteria
26. Which of the following event does NOT lead into secondary succession ?
- A) All organisms that existed are lost  
 B) Where no living organisms ever existed  
 C) Abandoned crop field  
 D) Land affected by flood
27. A nucleosome along with linker DNA consists of \_\_\_\_\_
- A) eight molecules of histones and 146 base pairs  
 B) eight molecules of histones and 200 base pairs  
 C) nine molecules of histones and 146 base pairs  
 D) nine molecules of histones and 200 base pairs
28. During aerobic respiration the final electron acceptor is
- |           |                      |
|-----------|----------------------|
| A) Cyto b | B) NADH <sub>2</sub> |
| C) Water  | D) Oxygen            |
29. In quantitative inheritance, when a character is controlled by two pairs of genes, the ratio obtained in F<sub>2</sub> generation is \_\_\_\_\_
- |                  |                                 |
|------------------|---------------------------------|
| A) 1 : 2 : 1     | B) 1 : 4 : 6 : 4 : 1            |
| C) 9 : 3 : 3 : 1 | D) 1 : 6 : 15 : 20 : 15 : 6 : 1 |
30. Which one of the following pigment functions as a reaction center in photosynthesis ?
- |                  |                |
|------------------|----------------|
| A) Chlorophyll-a | B) Xanthophyll |
| C) Carotenoid    | D) Anthocyanin |

31. Remarkable increase in rice production from 35 million tones to 89.5 million tones during 1960 – 2000 was mainly due to \_\_\_\_\_
- A) Improved semidwarf varieties  
 B) Introduction of Golden rice  
 C) Increased use of chemical fertilizers  
 D) Cultivation of wild varieties
32. Which of the following is the first cell of female gametophytic generation in Angiosperms ?
- A) Megaspore mother cell                      B) Microspore mother cell  
 C) Functional megaspore                      D) Egg cell
33. During dihybrid cross, in the F<sub>2</sub> generation, the ratio of individuals showing one dominant and the other recessive character will be \_\_\_\_\_ of parents with contrasting characters.
- A)  $\frac{4}{16}$     B)  $\frac{6}{16}$   
 C)  $\frac{8}{16}$     D)  $\frac{9}{16}$
34. In an ecological succession the pioneers are generally \_\_\_\_\_
- A) Autotrophs                                      B) Carnivores  
 C) Herbivores                                      D) Detrivores
35. Given below are some antibiotics and their microbial source. Match the correct pairs.
- |                  |  |
|------------------|--|
| 1) Chloromycetin | a) <u><i>Streptomyces griseus</i></u>    |
| 2) Erythromycin  | b) <u><i>Penicillium chrysogenum</i></u> |
| 3) Penicillin    | c) <u><i>Streptomyces erythreus</i></u>  |
| 4) Streptomycin  | d) <u><i>Streptomyces venezuelae</i></u> |
- A) 1 – a, 2 – b, 3 – c, 4 – d                      B) 1 – d, 2 – c, 3 – b, 4 – a  
 C) 1 – b, 2 – d, 3 – a, 4 – c                      D) 1 – c, 2 – a, 3 – d, 4 – b
36. In plasmid pBR 322, 'BR' stands for
- A) Baculovirus and Retrovirus                      B) Boyer and Reed  
 C) Bolivar and Rodrigues                      D) *Bacillus* and *Rhizobium*
37. How many glucose molecules are required for the formation of 52 pyruvic acid molecules at the end of glycolysis ?
- A) 52    B) 46  
 C) 32    D) 26

38. The pitch angle of deflection between two successive base pairs in DNA double helix is  
A) 20° B) 34°  
C) 36° D) 360°
39. Which one of the following processes involved in alcohol production is NOT involved in wine production ?  
A) Malting B) Mashing  
C) Fermentation D) Distillation
40. Which one of the following is formed as a result of cyclic photophosphorylation ?  
A) NADPH<sub>2</sub> B) O<sub>2</sub>  
C) ATP D) H<sub>2</sub>O
41. Which of the following in embryo sac of angiosperms shows filiform apparatus ?  
A) Antipodals B) Polar nuclei  
C) Egg D) Synergids
42. Which one of the following organism's plasmid was used successfully for the first time as a vector by Stanley Cohen and Herbert Boyer ?  
A) *Salmonella typhimurium* B) *Streptococcus pneumoniae*  
C) *Staphylococcus aureus* D) *Rhizobium leguminosarum*
43. During a dihybrid cross with contrasting characters in the F<sub>2</sub> generation parental genotypes will appear in \_\_\_\_\_ ratio.  
A)  $\frac{1}{16}$  B)  $\frac{2}{16}$   
C)  $\frac{3}{16}$  D)  $\frac{9}{16}$
44. The wall of pollen tube is made up of  
A) Cellulose and Pectin B) Only sporopollenin  
C) Lignin and Pectin D) Pectin and Sporopollenin
45. The micro consumers are commonly called \_\_\_\_\_  
A) Autotrophs B) Herbivores  
C) Decomposers D) Carnivores
46. Which of the following is a character of Castor plant to avoid autogamy ?  
A) Unisexuality B) Protogyny  
C) Protandry D) Heterostyly



47. During hybridization offsprings with hybrid vigour superior to both parents are self pollinated for few successive generations to \_\_\_\_\_
- A) retain their parental characters    B) remove their parental characters  
C) get homozygosity    D) segregate characters
48. Which of the following is the WRONG match between the plant and its character for adaptation of cross pollination ?
- A) Zostera → Bright coloured flowers with nectar  
B) Bougainvillea → Petaloid bracts  
C) Passion flower → Corona  
D) Adansonia → Copious nectar
49. What is the outbreeding device, where the stamens and carpels mature at different times called ?
- A) Monoecy    B) Self sterility  
C) Dichogamy    D) Heterostyly
50. In anaerobic respiration acetaldehyde is reduced to form alcohol by utilising  $\text{NADH}_2$  obtained from \_\_\_\_\_
- A) Glycolysis    B) Terminal oxidation  
C) Kreb's cycle    D) Acetylation
51. A pair of analogous organs is
- A) Wing of bird – flipper of whale    B) Forelimbs of horse and man  
C) Wing of bird – forelimb of horse    D) Wing of insect and wing of bird
52. In diploid set of chromosomes, deletion or addition of a member leads to
- A) Aneuploidy    B) Euploidy  
C) Polyploidy    D) Triploidy
53. Select the correct match :
- | I                                 | II                                |
|-----------------------------------|-----------------------------------|
| i) Competition                    | a) Tapeworm and man               |
| ii) Commensalism                  | b) Lichen                         |
| iii) Mutualism                    | c) Cattle egret and cattle        |
| iv) Parasitism                    | d) Lions and Leopards             |
| A) i – d, ii – c, iii – b, iv – a | B) i – d, ii – b, iii – c, iv – a |
| C) i – c, ii – b, iii – d, iv – a | D) i – a, ii – b, iii – d, iv – c |

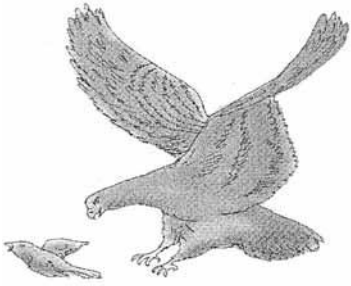
54. Which one of the following statement is CORRECT ?

- A) Fertilization in human takes place in womb
- B) Zygote contains haploid number of chromosomes
- C) Fertilization membrane avoids polyspermy
- D) Primary oocyte inhibits the process of oogenesis

55. Osmoreceptors are present in the

- A) Hypothalamus
- B) Hypophysis
- C) Epiphysis
- D) Epithalamus

56. The interaction observed in this diagram is



- A) Commensalism
- B) Competition
- C) Mutualism
- D) Predation

57. Select the correct match :

- | I              | II                       | III                       |
|----------------|--------------------------|---------------------------|
| i) Monocyte    | a) Large round nucleus   | l) Antihistamine property |
| ii) Lymphocyte | b) Twisted nucleus       | m) Release heparin        |
| iii) Basophil  | c) Bilobed nucleus       | n) Phagocytic             |
| iv) Eosinophil | d) Kidney shaped nucleus | o) Produce antibodies     |
- A) i – d – n, ii – a – o, iii – b – m, iv – c – l  
 B) i – b – m, ii – a – l, iii – c – n, iv – d – o  
 C) i – c – n, ii – b – o, iii – d – m, iv – a – l  
 D) i – a – o, ii – d – m, iii – c – l, iv – b – n

58. The parietal and temporal lobes are separated by

- A) Central sulcus
- B) Longitudinal fissure
- C) Lateral sulcus
- D) Parieto-occipital sulcus

59. The corpus callosum interconnects

- A) Cerebral hemispheres
- B) Cerebellar hemispheres
- C) Corpora quadrigemina
- D) Crura Cerebri

60. The parotid salivary glands are innervated by branches of \_\_\_\_\_ nerve.  
A) Vagus  
B) Spinal accessory  
C) Facial  
D) Glossopharyngeal
61. Lac is used in the  
A) Production of guano  
B) Production of Isinglass  
C) Silvering mirrors  
D) Production of soaps
62. Bacterial poultry diseases mainly include  
A) Avian influenza, Bronchitis, Ranikhet  
B) Enteritis, TB, CRD  
C) Favus, Thrush, Aspergillosis  
D) Bird Flu, Coccidiosis, Pullorum
63. A change in a wart or mole on the skin is observed in  
A) Adenoma  
B) Carcinoma  
C) Lymphoma  
D) Melanoma
64. The spermatozoa not ejaculated are reabsorbed in the  
A) Ejaculatory duct  
B) Urethra  
C) Vas efferens  
D) Vas deferens
65. All of the following are ape-men stages in origin of man EXCEPT  
A) Ramapithecus  
B) Kenyapithecus  
C) Dryopithecus  
D) Australopithecus
66. Linkage groups can be separated during \_\_\_\_\_ in meiosis.  
A) Crossing over  
B) Synapsis  
C) Tetrad formation  
D) Terminalization
67. One of the most polluted river in Maharashtra is  
A) Brahmaputra  
B) Ganga  
C) Jamuna  
D) Panchaganga
68. Hypercalcemic hormone is  
A) Aldosterone  
B) Calcitriol  
C) PTH  
D) TCT
69. An oral contraceptive pill checks  
A) Fertilization  
B) Implantation  
C) Infection  
D) Ovulation

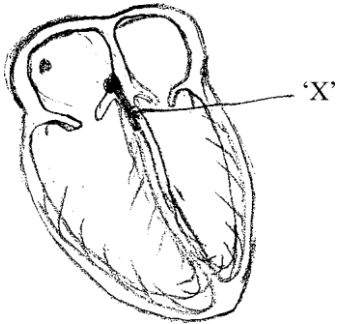


77. The most common chemical compounds formed in Urey-Miller's experiment were
- A) Amino acids
  - B) Ammonia
  - C) Methane
  - D) Vitamins
78. Select the CORRECT pair of endodermal derivatives.
- A) Adrenal medulla – Dermis of skin
  - B) Lungs – Thyroid gland
  - C) Lymphatic vessel – Vagina
  - D) Retina – Tonsil
79. Peacock shows following genotype.
- A) XX
  - B) XY
  - C) ZZ
  - D) ZW
80. Incubation period of *Treponema Pallidum* is about
- A) 2 to 14 days
  - B) 7 to 21 days
  - C) 1 to 2 weeks
  - D) 3 to 4 weeks
81. Acromegaly is caused by hypersecretion of \_\_\_\_\_ in the adult.
- A) ACTH
  - B) GH
  - C) MSH
  - D) TSH
82. Restriction endonuclease, in DNA finger printing, carries out following process.
- A) Fragmentation of DNA
  - B) Getting copies of DNA
  - C) Loading DNA on agaroseplate
  - D) Synthesis of DNA
83. Which one of the following is NOT the symptom of malaria ?
- A) Arthralgia
  - B) Fever
  - C) Dysentery
  - D) Shivering
84. In ECG, P – wave represents
- A) Ventricular repolarization
  - B) Ventricular depolarization
  - C) Atrial depolarisation
  - D) Atrial repolarization
85. The isthmus which connects right and left lobes of thyroid gland is located from \_\_\_\_\_ tracheal cartilages.
- A) 1<sup>st</sup> to 3<sup>rd</sup>
  - B) 2<sup>nd</sup> to 4<sup>th</sup>
  - C) 5<sup>th</sup> to 7<sup>th</sup>
  - D) 6<sup>th</sup> to 8<sup>th</sup>

86. Asexual reproduction through formation of gemmule occurs in  
A) Ascidian B) Hydra  
C) Planaria D) Spongilla
87. The marsupial mammal amongst the following animals is  
A) Gibbon B) Kangaroo  
C) Lemur D) Spiny ant-eater
88. When white eyed and miniature winged *Drosophila melanogaster* is crossed with its wild type, it produces following percent of recombinants.  
A) 1.3% B) 37.2%  
C) 62.8% D) 98.7%
89. Asiatic wild ass is an example of  
A) Endangered species B) Extinct species  
C) Rare species D) Vulnerable species
90. The quantitative and statistical study of human population is  
A) Calligraphy B) Demography  
C) Topography D) Seismography
91. Cystic fibrosis can be treated by \_\_\_\_\_ in gene therapy.  
A) TGF-B B) TPA  
C) DNase D) BGH
92. ADH carries out following functions EXCEPT  
A) Increases blood pressure  
B) Increases glomerular filtrate rate  
C) Increases permeability for water in DCT  
D) Increases Na<sup>+</sup> excretion
93. Which of the following are NOT produced as transgenic animals ?  
A) Sheep and Pig B) Rat and Rabbit  
C) Dog and Banded Krait D) Cow and Fish
94. Temporal lobe of cerebrum is concerned with the detection of following sensations EXCEPT  
A) Hearing B) Pressure  
C) Smell D) Taste

95. The sterilization procedure in human female is
- A) Coitus interruptus
  - B) Rhythm method
  - C) Tubectomy
  - D) Vasectomy

96. In the given diagram, the role of 'X' is to



- A) Generate cardiac impulse
  - B) Cause atrial systole
  - C) Cause ventricular diastole
  - D) Carry cardiac impulse to ventricles
97. A pair of hormones produced by kidneys is
- A) Erythropoietin and relaxin
  - B) Erythropoietin and calcitriol
  - C) Calcitonin and relaxin
  - D) Calcitonin and calcitriol
98. Alec Jeffreys used \_\_\_\_\_ as genetic marker.
- A) HUMULIN
  - B) Radioactive probe
  - C) RFLP
  - D) VNTR
99. Which constituent of seminal fluid helps in coagulation of semen after ejaculation ?
- A) Fibrin
  - B) Fibrinogen
  - C) Fructose
  - D) Prostaglandins
100. Which one of the following statement is CORRECT ?
- A) Lysergic acid diethylamide is a depressant
  - B) Heroin is diacetylmorphine
  - C) Hashish has hallucinogenic property
  - D) Cocaine is opioid drug

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**SPACE FOR ROUGH WORK**