QUESTION BOOKLET – 2016
Subject : Paper II : Biology

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

Answer Sheet No.

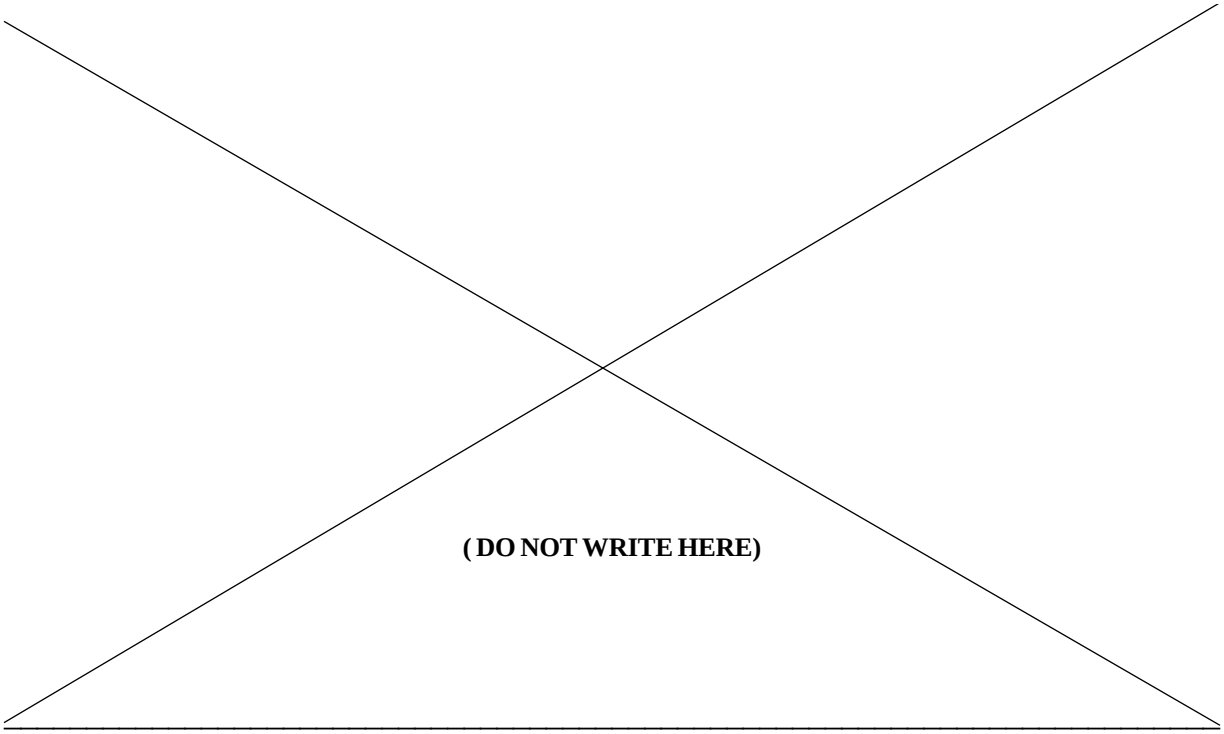
Duration : 1 Hour 30 Minutes Total Marks : 100

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.



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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 β-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 CO_2 to CH_2O ?
   A) H_2S
   B) H_2O
   C) CH_4
   D) 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 Kreb's cycle Guanosine Triphosphate is formed during the conversion of
    A) Isocitrate to oxalosuccinate
    B) Oxalosuccinate to α-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) Micropropogation

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) CO_2 is oxidised
    B) H_2O is oxidised
    C) O_2 is released
    D) CH_2O is oxidised

23. Which one of the following is the <u>CORRECT</u> 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) Dahlia	a) Eyes
2) Solanum tuberosum	b) Runner
3) Begonia	c) Fasciculated tuberous roots
4) Cynodon	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) $NADH_2$
C) Water
D) Oxygen

29. In quantitative inheritance, when a character is controlled by two pairs of genes, the ratio obtained in F_2 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) Chlorophy*ll*-a
B) Xanthophy*ll*
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_2 generation, the ratio of individuals showing one dominant and the other recessive character will be _____ of parents with contrasting characters.
    A) $^{4}/_{16}$
    B) $^{6}/_{16}$
    C) $^{8}/_{16}$
    D) $^{9}/_{16}$

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) *Streptomyces griseus*
2) Erythromycin	b) *Penicillium chrysogenum*
3) Penicillin	c) *Streptomyces erythreus*
4) Streptomycin	d) *Streptomyces venezuelae*

    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) $NADPH_2$ B) O_2
    C) ATP D) H_2O

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_2 generation parental genotypes will appear in _____ ratio.
    A) $1/16$ B) $2/16$
    C) $3/16$ D) $9/16$

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* $\rightarrow$ Bright coloured flowers with nectar
B) *Bougainvillea* $\rightarrow$ Petaloid bracts
C) Passion flower $\rightarrow$ Corona
D) *Adansonia* $\rightarrow$ 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 $NADH_2$ 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 efferns 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

70. AB blood group was discovered by
    A) Decastello and Sturli
    B) Karl Landsteiner
    C) William Harvey
    D) Wallace Alfred

71. The process by which primary germinal layers are formed is called
    A) Blastulation
    B) Cleavage
    C) Gastrulation
    D) Implantation

72. Select the group of animals adapted for ammonotelism, guanotelism and ureotelism respectively from the following
    A) Tadpole larva of frog, spider, pigeon
    B) Scorpion, turtle and labeo
    C) Catla, penguin and cat
    D) Cobra, cockroach and Bombay duck

73. Muscular ridges at inner surface of ventricles are called
    A) Chordae tendinae
    B) Inter ventricular septum
    C) Papillary muscle
    D) Trabeculae carnae

74. Which of the following is NOT a breed of buffalo ?
    A) Gir
    B) Nili
    C) Nagpuri
    D) Surti

75.

	Column A	**Column B**	**Column C**
i)	Coenozoic	2 – 65 mya	Origin of vertebrates
ii)	Palaeozoic	500 – 165 mya	Rise of egg laying mammals
iii)	Mesozoic	135 – 225 mya	Reptiles dominant
iv)	Proterozoic	350 – 500 mya	Trilobites dominant

The correct match of Columns A, B and C is
    A) i
    B) ii
    C) iii
    D) iv

76. Which of the following organisms is NOT involved in genome sequencing and mapping technique ?
    A) *Drosophila melanogaster*
    B) *E. Coli*
    C) *Mus musculus*
    D) *Salmonella typhi*

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^{st} to 3^{rd} B) 2^{nd} to 4^{th}
C) 5^{th} to 7^{th} D) 6^{th} to 8^{th}

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

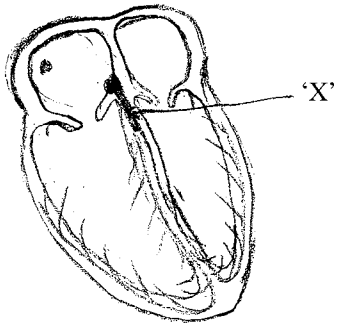
92. ADH carries out following functions EXCEPT
A) Increases blood pressure
B) Increases glomerular filtrate rate
C) Increases permeability for water in DCT
D) Increases Na^+ excretion

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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