EXAMINATION—STPGT

SUBJECT: BIOLOGICAL SCIENCE

Do not open this Question Booklet until you are asked to do so.

Read carefully all the instructions given at the back page and on the front page of this Question Booklet.

Instructions for Candidates

1. Use **Black Ballpoint Pen only** for writing particulars of this Question Booklet and marking responses on the OMR Answer Sheet.

2. This test is of **2 hours and 30 minutes** duration and consists of **150 MCQ-type questions**. Each question carries 1 mark.

3. There is no negative marking for any wrong answer.

4. Rough work should be done only in the space provided in the Question Booklet for the same.

5. The answers are to be recorded on the OMR Answer Sheet only. Mark your responses carefully since there is no chance of alteration/correction.

6. Use of eraser or whitener is strictly prohibited.

7. Candidates should note that each question is given in bilingual form (English and Bengali). In case of any discrepancy or confusion in the medium/version, the English Version will be treated as the authentic version.

Name of the Candidate (in Capitals):

Roll No.:

OMR Answer Sheet No.:

Signature of the Invigilator with date

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Full Signature of the Candidate with date

[Signature]

This Booklet contains 40 printed pages.

AF16—XV  Question Booklet No. 1002637
1. Binomial nomenclature was first published in the book
   (A) Genera Plantarum
   (B) Systema Naturae
   (C) Genera Animalium
   (D) None of the above

2. Phylogenetic system of classification was proposed by
   (A) Bentham and Hooker
   (B) Theophrastus
   (C) Hutchinson
   (D) None of them

3. Which one of the following does not carry nucleic acid?
   (A) Viroid
   (B) Mycoplasma
   (C) Prion
   (D) None of the above

4. Viruses possess the following chemicals/chemical
   (A) nucleic acid and protein
   (B) DNA only
   (C) RNA only
   (D) None of the above
5. The largest herbarium in India is located at
(A) National Botanical Garden, Lucknow
(B) Indian Botanical Garden, Sibpur
(C) Lloyd Botanical Garden, Darjeeling
(D) None of the above

6. The chemical substance present in the cell wall of gram-positive bacteria only is
(A) teichoic acid
(B) peptidoglycan
(C) lipopolysaccharides
(D) None of the above

7. Clamp connection is found in which of the following classes of fungi?
(A) Zygomycetes
(B) Ascomycetes
(C) Basidiomycetes
(D) None of the above

8. Which of the following is an algal parasite?
(A) Porphyra
(B) Cephalurus
(C) Ulothrix
(D) None of the above
9. The function of peristome teeth of moss is
   (A) photosynthesis
   (B) spore dispersal
   (C) absorption
   (D) None of the above

10. Leaf of a gymnosperm carries 18 chromosomes. What would be the number of chromosomes in its endosperm?
   (A) 9
   (B) 18
   (C) 27
   (D) None of the above

11. Which of the following structures is found only in angiosperm?
   (A) Tracheid
   (B) Sieve cell
   (C) Companion cell
   (D) None of the above

12. Water vascular system is found in
   (A) Arthropoda
   (B) Echinodermata
   (C) Mollusca
   (D) None of the above
13. Polyp stage is absent or reduced in
   (A) Aurelia
   (B) Obelia
   (C) Physalia
   (D) None of the above

14. Excretory organ in hemichordata is
   (A) proboscis gland
   (B) flame cells
   (C) nephridia
   (D) None of the above

15. Cladode is a modified
   (A) root
   (B) leaf
   (C) stem
   (D) None of the above

16. Capitulum inflorescence occurs in which of the following families?
   (A) Mimosae
   (B) Asteraceae
   (C) Rosaceae
   (D) None of the above
17. Ovary is inferior when the flower is.
   (A) hypogynous
   (B) epigynous
   (C) perigynous
   (D) None of the above

18. Fruit of which of the following plants is not a drupe?
   (A) Mango
   (B) Coconut
   (C) Guava
   (D) None of the above

19. The floral formula of Solanaceae is
   (A) $\varphi K_5(C_5)A_5G(2)$
   (B) $\varphi K_5 C_5(5)A_5 G(2)$
   (C) $\varphi K_5(C_5)A_5G(2)$
   (D) None of the above

20. Petiole increases in length due to division of
   (A) lateral meristem
   (B) apical meristem
   (C) intercalary meristem
   (D) None of the above
21. In higher plants, vascular tissue develops from
(A) procambium
(B) promeristem
(C) protoderm
(D) None of the above

22. Protoxylem in stem is which of the following types?
(A) Exarch
(B) Endarch
(C) Mesarch
(D) None of the above

23. A growth ring in plants consists of
(A) early wood
(B) late wood
(C) spring wood and autumn wood
(D) None of the above

24. The type of epithelium which forms the inner wall of blood vessels is
(A) columnar epithelium
(B) squamous epithelium
(C) cuboidal epithelium
(D) None of the above
25. The main protein of connective tissue is
(A) collagen
(B) keratin
(C) myosin
(D) None of the above

26. The contractile unit of striated muscle is
(A) sarcomere
(B) z-band
(C) myofibril
(D) None of the above

27. The number of heart chambers in cockroach is
(A) 11
(B) 12
(C) 13
(D) None of the above

28. How many pairs of spiracles are found in cockroach?
(A) 8
(B) 10
(C) 2
(D) None of the above
29. Gonapophyses in cockroach are made up of the chemical
(A) keratin
(B) lipopolysaccharide
(C) chitin
(D) None of the above

30. The number of thoracic and abdominal ganglia in cockroach respectively are
(A) 3 and 6
(B) 6 and 3
(C) 3 and 3
(D) None of the above

31. The potential of a plant cell to develop into a full plant is called
(A) totipotency
(B) pluripotency
(C) unipotency
(D) None of the above

32. Distinction of prokaryotes and eukaryotes is mainly related to
(A) nucleus
(B) nucleic acid
(C) plasma membrane
(D) None of the above
33. The fluid mosaic model of cell membrane was proposed by
(A) Singer and Branton
(B) Dannielli and Schmitt
(C) Singer and Nicholson
(D) None of them

34. The function of rough endoplasmic reticulum is
(A) starch synthesis
(B) protein synthesis
(C) fat synthesis
(D) None of the above

35. Membrane covering the vacuole of a plant cell is called
(A) tonoplast
(B) tonoplasm
(C) cell membrane
(D) None of the above

36. Enzymes present in lysosome are
(A) lyases
(B) ligases
(C) acid hydrolases
(D) None of the above
37. Chitin is a
   (A) lipoprotein
   (B) polysaccharide
   (C) nitrogenous polysaccharide
   (D) None of the above

38. Chemically nucleoside is
   (A) nitrogenous base + phosphate
   (B) nitrogenous base + sugar
   (C) nitrogenous base + phosphate + sugar
   (D) None of the above

39. Which one is the sweetest sugar?
   (A) Fructose
   (B) Glucose
   (C) Sucrose
   (D) None of the above

40. The inactive protein part of enzyme combines with a nonprotein prosthetic group to form active
   (A) apoenzyme
   (B) holoenzyme
   (C) coenzyme
   (D) None of the above
41. The phase of cell cycle in which replication of DNA takes place is

(A) $G_1$

(B) $G_2$

(C) $S$

(D) None of the above

42. In mitosis, nuclear envelope and nucleolus disappear during

(A) prophase

(B) metaphase

(C) anaphase

(D) None of the above

43. During meiotic cell division

(A) linkage is disturbed

(B) homologous chromosomes are separated

(C) homologous chromosomes do not separate

(D) None of the above

44. Which of the following characters is related with telophase?

(A) Formation of nucleolus

(B) Formation of nuclear membrane

(C) Formation of two daughter nuclei

(D) None of the above
45. The pathway of movement of water through cell wall is called
(A) symplast pathway
(B) apoplast pathway
(C) plasmodesmata pathway
(D) None of the above

46. Osmotic pressure of a solution is
(A) greater than pure solvent
(B) less than pure solvent
(C) equal to pure solvent
(D) None of the above

47. Water potential of pure water at standard temperature is
(A) zero
(B) 10
(C) 20
(D) None of the above

48. Which one of the following is not an essential element?
(A) Iron
(B) Zinc
(C) Iodine
(D) None of the above
49. The most abundant element present in plants is
(A) nitrogen
(B) carbon
(C) oxygen
(D) None of the above

50. During nitrification which bacteria converts ammonia to nitrate?
(A) Nitrobacter
(B) Pseudomonas
(C) Nitrosomonas
(D) None of the above

51. C₄-plants have higher net photosynthetic rate, because
(A) they have no or least photorespiration
(B) they have 'Kranz' leaf anatomy where RuBisCo functions as oxygenase
(C) they have PEP as CO₂ acceptor
(D) None of the above

52. Calvin cycle is
(A) oxidative carboxylation
(B) reductive carboxylation
(C) decarboxylation
(D) None of the above
53. Electron acceptor of PS II is
(A) ferredoxin
(B) cytochrome-b
(C) plastoquinone
(D) None of the above

54. In Krebs cycle, acetyl CoA forms 6-carbon compound after combining with
(A) malic acid
(B) citric acid
(C) oxaloacetic acid
(D) None of the above

55. Respiratory quotient (RQ) of sprouting potato tuber will be
(A) 0
(B) 1
(C) >1
(D) None of the above

56. In which of the following processes direct use of oxygen is made?
(A) Electron transport system
(B) Glycolysis
(C) Krebs cycle
(D) None of the above
57. Which hormone is maximum in coconut milk?
(A) Auxin
(B) Gibberellin
(C) Cytokinin
(D) None of the above

58. Avena curvature test is the bioassay for which hormone?
(A) Gibberellin
(B) Auxin
(C) Cytokinin
(D) None of the above

59. Which one of the following is a day-neutral plant?
(A) Beta vulgaris
(B) Avena sativa
(C) Helianthus annuus
(D) None of the above

60. The term 'vernalization' was coined by
(A) Lysenko
(B) Melchers
(C) Gregory
(D) None of the above
61. Who coined the term 'vitamin'?
(A) Calvin
(B) C. Funk
(C) A. Vesalius
(D) None of them

62. Valves of Kerkring (Plicae circulares) are found in between
(A) right auricle and right ventricle
(B) left auricle and left ventricle
(C) stomach and duodenum
(D) None of the above

63. A person is passing grey white faecal matter. What is not functioning in the body?
(A) Liver
(B) Kidney
(C) Spleen
(D) None of the above

64. PEM classification can be
(A) IAP and WHO classification
(B) Gomez and Waterlow classification
(C) All of the above
(D) None of the above
65. Which of the following is termed as 'pneumoconiosis'?
(A) Restrictive lung disorder
(B) Obstructive lung disorder
(C) Occupational lung disorder
(D) None of the above

66. What is the location of troponin in actin filament?
(A) Attached to tropomyosin
(B) Attached to myosin cross-bridge
(C) Both of the above
(D) None of the above

67. Renin is released from
(A) juxtaglomerular apparatus
(B) cortical nephron
(C) collecting ducts
(D) None of the above

68. Hematuria is caused due to
(A) urinary tract infection
(B) stone in kidney, bladder
(C) Both of the above
(D) None of the above
69. During pregnancy which of the following is secreted through the urine of mother?

(A) Progesterone
(B) Luteinizing hormone
(C) Chorionic gonadotropin
(D) None of the above

70. The difference between systolic pressure and diastolic pressure is called

(A) blood pressure
(B) pulse pressure
(C) pulse rate
(D) None of the above

71. Which of the following is devoid of blood supply?

(A) Cornea
(B) Choroid
(C) Retina
(D) None of the above

72. The hormone which regulates the calcium level of blood is called

(A) glucagon
(B) parathormone
(C) thyroxine
(D) None of the above
73. Innominate bone is formed by fusion of how many bones?
   (A) Five  
   (B) Four  
   (C) Three  
   (D) None of the above

74. In cardiac cycle, the first event is
   (A) atrial diastole  
   (B) atrial systole  
   (C) ventricular systole  
   (D) None of the above

75. Glucose-6-phosphate dehydrogenase deficiency is associated with haemolysis of
   (A) leucocyte  
   (B) erythrocyte  
   (C) lymphocyte  
   (D) None of the above

76. Minimum concentration of nitrogenous waste is seen in
   (A) renal artery  
   (B) renal vein  
   (C) hepatic vein  
   (D) None of the above
77. Leaf as a means of vegetative reproduction is found in
(A) Aloe
(B) Begonia
(C) Bryophyllum
(D) None of the above

78. Flagellated motile spores are called
(A) aplanospore
(B) zoospore
(C) oospore
(D) None of the above

79. Heterosporous plants originated first in
(A) pteridophytes
(B) gymnosperms
(C) angiosperms
(D) None of the above

80. Gametogenesis is an event of
(A) pre-fertilization stage
(B) fertilization stage
(C) post-fertilization stage
(D) None of the above
81. Sexual reproduction in flowering plants was discovered by
   (A) Nawaschin
   (B) Strasburger
   (C) Camerarius
   (D) None of them

82. The fusion product of polar nuclei and male gamete is
   (A) secondary nucleus
   (B) primary endosperm nucleus
   (C) zygote
   (D) None of the above

83. In which part of human sperm, mitochondria are present?
   (A) Head
   (B) Tail
   (C) Middle piece
   (D) None of the above

84. When released from ovary, human egg contains
   (A) only Y chromosome
   (B) two X chromosome
   (C) only X chromosome
   (D) None of the above
85. Menstrual cycle is effected by
(A) LH only
(B) LH/FSH + estrogen
(C) estrogen only
(D) None of the above

86. When blastocoel is formed in it, the embryo is called
(A) blastula
(B) gastrula
(C) morula
(D) None of the above

87. In India the Family Planning Programme was launched in the year
(A) 1951
(B) 1952
(C) 1953
(D) None of the above

88. In India, common STD is
(A) syphilis
(B) herpes
(C) gonorrhoea
(D) None of the above
89. Most infertility problems are due to
(A) inadequate sperm production
(B) failure of ovulation
(C) Both of the above
(D) None of the above

90. When the phenotype and genotype ratio are same in F2-generation, it is an example of
(A) incomplete dominance
(B) linkage
(C) dominance
(D) None of the above

91. Polygenic inheritance was first studied by
(A) Davenport
(B) Kolreutor
(C) Mendel
(D) None of them

92. Which of the following genotypes represents a true hybrid condition?
(A) Tt Rr
(B) Tt rr
(C) Tt RR
(D) None of the above
93. Pleiotropic effect is found in
(A) dness
(B) skin colour
(C) cell anaemia
(D) one of the above

94. How many types of gamete are found in F1 progeny of a cross between genotype AA BB CC and aa bb cc?
(A) 4
(B) 8
(C) 16
(D) None of the above

95. Turner's syndrome is due to
(A) monosomic chromosome
(B) trisomic chromosome
(C) polysomic chromosome
(D) one of the above

96. Mutations are usually of
(A) incomplete nature
(B) dominant nature
(C) recessive nature
(D) None of the above

97. DNA molecule has a uniform diameter of
(A) 20 A
(B) 84 A
(C) 27 A
(D) None of the above
98. That DNA is a genetic material was proved conclusively by
(A) Alfred Griffith
(B) Hershey and Chase
(C) J. D. Watson
(D) None of them

99. UAA, UAG and UGA are
(A) nonoverlapping codon
(B) nonsense codon
(C) degenerate codon
(D) None of the above

100. In operon model, regulator gene functions as
(A) inhibitor
(B) regulator
(C) repressor
(D) None of the above

101. Which one of the following is the important event in origin of life?
(A) Formation of nucleoproteins
(B) Formation of NH₃
(C) Formation of CH₄
(D) None of the above

102. The main weakness of Darwin's theory was his failure to give satisfactory explanation of
(A) variation
(B) survival for fittest
(C) struggle for existence
(D) None of the above
103. Evolutionary history of an organism is called

(A) ontogeny
(B) ancestry
(C) phylogeny
(D) None of the above

104. Genetic drift is also called

(A) Founder effect
(B) Sewall Wright effect
(C) Bottleneck effect
(D) None of the above

105. The first prehistoric man who used fire for cooking food and defence is

(A) Cro-Magnon man
(B) Java Ape man
(C) Peking man
(D) None of them

106. Vascular cryptogames originated in earth during the

(A) Upper Silurian period
(B) Lower Devonian period
(C) Carboniferous period
(D) None of the above
107. World Health Day is celebrated on
(A) 6th May
(B) 7th May
(C) 7th April
(D) None of the above

108. Ringworm is caused by
(A) *Trichophyton rubrum*
(B) *Microsporum canis*
(C) Both of the above
(D) None of the above

109. Antibodies in our body are a complex
(A) glycoprotein
(B) lipoprotein
(C) carbohydrate
(D) None of the above

110. Interferons inhibit infection of
(A) bacteria
(B) viruses
(C) Protozoa
(D) None of the above
111. When the body starts rejecting its own cell, it is called

(A) immunodeficiency
(B) immunosuppression
(C) autoimmunity
(D) None of the above

112. Sarcoma is a cancer of which tissue?

(A) Epithelial tissue
(B) Mesodermal tissue
(C) Endodermal tissue
(D) None of the above

113. Which drug is called superman?

(A) Amphetamine
(B) Heroin
(C) LSD
(D) None of the above

114. The virus causing AIDS is called

(A) HIV
(B) HTLV-3
(C) Both of the above
(D) None of the above
115. Which one of the following is exotic variety of honeybee?
(A) *Apis dorsata*
(B) *Apis mellifera*
(C) *Apis florae*
(D) None of the above

116. Bread wheat (*Triticum aestivum*) originates through the cross between
(A) *Triticum monococcum* and *Aegilops speltoides*
(B) *Triticum turgidum* and *Aegilops squarrosa*
(C) *Triticum dicoccum* and *Aegilops speltoides*
(D) None of the above

117. Ranikhet disease in poultry is a
(A) viral disease
(B) bacterial disease
(C) fungal disease
(D) None of the above

118. Citric acid is produced by the microbe
(A) *Rhizopus nigricans*
(B) *Aspergillus flavum*
(C) *Aspergillus niger*
(D) None of the above
119. Which of the following are included in biopesticide?

(A) Virus, bacteria
(B) Virus, bacteria, fungi
(C) Virus, bacteria, fungi, protozoa
(D) None of the above

120. *Azolla* is used as biofertilizer, because it contains

(A) Rhizobium
(B) Cyanobacteria
(C) Mycorrhiza
(D) None of the above

121. The first recombinant DNA was constructed by

(A) Stanley Cohen and Herbert Boyer
(B) Boliver and Rodríguez
(C) Collins and Hohn
(D) None of them

122. Which of the following is not a cloning vector?

(A) Cosmid
(B) Yeast Artificial Chromosome (YAC)
(C) Prion
(D) None of the above
123. The first step in genetic engineering is
(A) isolation of protein
(B) isolation of genetic material
(C) cutting of DNA at specific location
(D) None of the above

124. Enzyme that is generally used in PCR technology is
(A) polymerase
(B) taq polymerase
(C) RNA polymerase
(D) None of the above

125. Restriction endonucleases used in recombinant DNA technology is obtained from
(A) bacterial cells
(B) bacteriophage
(C) plasmids
(D) None of the above

126. First genetically modified plant commercially released in India is
(A) golden rice
(B) Bt brinjal
(C) Bt cotton
(D) None of the above
127. The new strain of bacteria produced by biotechnology for alcohol industry is
(A) *Bacillus subtilis*
(B) *Escherichia coli*
(C) *Pseudomonas putida*
(D) None of the above

128. Human insulin is commercially produced from a transgenic species of
(A) *Mycobacterium*
(B) *Bacillus*
(C) *Escherichia*
(D) None of the above

129. The enzyme extracted from the stomach of calf and used in cheese making is
(A) lactase
(B) rennin
(C) cheecin
(D) None of the above

130. Which of the following is commonly used in transferring of foreign DNA into crop plants?
(A) *Trichoderma harzianum*
(B) *Agrobacterium tumefaciens*
(C) *Penicillium expansum*
(D) None of the above
131. The reagent used in ELISA test is 
(A) ligase
(B) polymerase
(C) peroxidase
(D) None of the above

132. Natural genetic engineer is 
(A) Agrobacterium tumefaciens
(B) Escherichia coli
(C) Pseudomonas sp.
(D) None of the above

133. Which of the following is used in biowar?
(A) Pathogen
(B) Toxin from pathogen
(C) Both of the above
(D) None of the above

134. First clinical gene therapy was given in the year
(A) 1989
(B) 1990
(C) 1991
(D) None of the above
135. **Symecology** is the study of

(A) community in relation to environmental effect

(B) biosphere

(C) environment

(D) None of the above

136. Individuals of one kind (species) occupying a particular geographical area are called

(A) population

(B) community

(C) ecotone

(D) None of the above

137. Climax community is

(A) unstable community

(B) first stable community

(C) last stable community

(D) None of the above

138. Primary succession on rocks starts with

(A) herbs

(B) lichens

(C) shrubs

(D) None of the above
139. Plants growing on cold soil are called
(A) sciophyte
(B) psychrophyte
(C) oxylophyte
(D) None of the above

140. Ecological pyramids are of
(A) two types
(B) three types
(C) four types
(D) None of the above

141. The species which are in danger of extinction are called
(A) vulnerable species
(B) threatened species
(C) endangered species
(D) None of the above

142. World Biodiversity Day is on
(A) December, 29
(B) December, 19
(C) September, 29
(D) None of the above
143. Eutrophication causes decrease in
(A) dissolved oxygen
(B) dissolved hydrogen
(C) dissolved carbon dioxide
(D) None of the above

144. The chemical compound associated with Bhopal Gas Tragedy is
(A) malathion
(B) methyl isocyanate
(C) sodium isocyanate
(D) None of the above

145. Which one of the following is secondary air pollutant?
(A) SO₂
(B) CO₂
(C) PAN
(D) None of the above

146. Which one of the following compounds causes fibrosis in lungs?
(A) DDT
(B) Asbestos
(C) Mercury
(D) None of the above
147. The term ‘alpha diversity’ refers to
(A) community and ecosystem diversity
(B) diversity among plants
(C) species diversity
(D) None of the above

148. Pollutants released by jet planes are
(A) colloids
(B) smogs
(C) aerosols
(D) None of the above

149. Acid rain is due to pollution by
(A) carbon monoxide
(B) sulphur dioxide
(C) chlorine
(D) None of the above

150. Sound becomes noise pollution if its level is above
(A) 80 dB
(B) 120 dB
(C) 150 dB
(D) None of the above
READ THE FOLLOWING INSTRUCTIONS CAREFULLY:

1. Out of the four alternatives for each question, only one circle for the correct answer is to be darkened completely with Black Ballpoint Pen on the OMR Answer Sheet. The answer once marked is not liable to be changed.

2. The candidates should ensure that the OMR Answer Sheet is not folded. Do not make any stray marks on the OMR Answer Sheet. Do not write your Roll No. anywhere else except at the specified space on the OMR Answer Sheet.

3. Handle the Question Booklet and the OMR Answer Sheet with utmost care, as under no circumstances (except technical defect), another set will be provided.

4. The candidates will write the correct Question Booklet Number and the OMR Answer Sheet Number in the Attendance Sheet.

5. Candidates are not allowed to carry any textual material, printed or written, bits of papers, pager, mobile phone, electronic devices or any other material except the Admit Card and Photo Identity Card inside the Examination Hall/Room.

6. Each candidate must show on demand his/her Admit Card and Photo Identity Card to the Invigilator/Examination Officials.

7. No candidate, without special permission of the Centre Superintendent or Invigilator, should leave his/her seat.

8. Candidates will have to sign twice in the Attendance Sheet presented by the Invigilator on duty; first after taking their seats in the Examination Hall/Room and second at the time of handing over their OMR Answer Sheet to the Invigilator.

9. The candidates should not leave the Examination Hall/Room without handing over their OMR Answer Sheet to the Invigilator on duty and signed the Attendance Sheet twice. Cases where a candidate has not signed the Attendance Sheet a second time will be deemed not to have handed over the OMR Answer Sheet and dealt with as an unfair means case.

10. Use of any type of calculating device is prohibited.

11. The candidates are governed by all rules and regulations of the Board with regard to their conduct in the Examination Hall/Room. All cases of unfair means will be dealt with as per rules and regulations of the Board.

12. No part of the Question Booklet and the OMR Answer Sheet shall be detached under any circumstances.

13. On completion of the test the candidate must hand over the OMR Answer Sheet to the Invigilator in the Hall/Room. The candidates are allowed to take away this Question Booklet with them.