

117

QUESTION PAPER
SERIES CODE

A

Registration No. :

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Centre of Exam. : _____

Name of Candidate : _____

Signature of Invigilator

COMBINED ENTRANCE EXAMINATION, 2016

M.Sc. AGRICULTURAL BIOTECHNOLOGY

[Field of Study Code : BAG]

Time Allowed : 3 hours

Maximum Marks : 240

INSTRUCTIONS FOR CANDIDATES

Candidates must read carefully the following instructions before attempting the Question Paper :

- (i) Write your Name and Registration Number in the space provided for the purpose on the top of this Question Paper and in the Answer Sheet.
 - (ii) **Please darken the appropriate Circle of Question Paper Series Code on the Answer Sheet.**
 - (iii) The Question Paper is divided into two Parts : Part—A and Part—B. Both Parts have multiple-choice questions. All answers are to be entered in the Answer Sheet provided with the Question Paper for the purpose.
 - (iv) Part—A consists of 60 questions and all are compulsory. Answer all the questions in the Answer Sheet provided for the purpose by darkening the correct choice, i.e., (a) or (b) or (c) or (d) with BALLPOINT PEN only against each question in the corresponding circle. Each correct answer carries 1 mark. **There will be negative marking and ½ mark will be deducted for each wrong answer.**
 - (v) Part—B consists of 100 questions. **Answer any 60 questions** in the Answer Sheet by darkening the correct choice, i.e., (a) or (b) or (c) or (d) with BALLPOINT PEN only against the corresponding circle. Each correct answer carries 3 marks. **There will be negative marking and 1 mark will be deducted for each wrong answer.**
- In case any candidate answers more than the required 60 questions, the first 60 questions attempted will be evaluated.
- (vi) Answer written by the candidates inside the Question Paper will not be evaluated.
 - (vii) Calculators and Log Tables may be used.
 - (viii) Pages at the end have been provided for Rough Work.
 - (ix) Return the Question Paper and Answer Sheet to the Invigilator at the end of the Entrance Examination. **DO NOT FOLD THE ANSWER SHEET.**

INSTRUCTIONS FOR MARKING ANSWERS

1. Use only Blue/Black Ballpoint Pen (do not use Pencil) to darken the appropriate Circle.
2. Please darken the whole Circle.
3. Darken ONLY ONE CIRCLE for each question as shown in example below :

Wrong ● (b) (c) ●	Wrong ✗ (b) (c) (d)	Wrong ✗ (b) (c) (d)	Wrong ● (b) (c) ●	Correct ● (a) (b) (c) ●
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4. Once marked, no change in the answer is allowed.
5. Please do not make any stray marks on the Answer Sheet.
6. Please do not do any rough work on the Answer Sheet.
7. Mark your answer only in the appropriate space against the number corresponding to the question.
8. **Ensure that you have darkened the appropriate Circle of Question Paper Series Code on the Answer Sheet.**

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PART—A

Answer all questions

1. One gene-one enzyme was proposed by
 - (a) Watson and Crick
 - (b) Beadle and Tatum
 - (c) Kendrew and Perutz
 - (d) Meselson and Stahl

2. In meiosis I, a bivalent is an association of
 - (a) four chromatids and four centromeres
 - (b) two chromatids and two centromeres
 - (c) four chromatids and two centromeres
 - (d) two chromatids and four centromeres

3. Adrenalin is secreted by
 - (a) pineal
 - (b) adrenal cortex
 - (c) adrenal medulla
 - (d) thymus

4. *Agrobacterium tumefaciens* produces crown gall disease in
 - (a) gymnosperms
 - (b) monocotyledonous plants
 - (c) dicotyledonous plants
 - (d) angiosperms

5. The enzymes required to obtain wall-free/naked protoplasts are
 - (a) cellulase and amylase
 - (b) cellulase and pectinase
 - (c) cellulase and proteinase
 - (d) amylase and pectinase

6. Two microbes found to be very useful in genetic engineering are
- (a) *Diplococcus* sp. and *Pseudomonas* sp.
 - (b) *Vibrio cholerae* and tailed bacteriophage
 - (c) crown gall bacterium and *Caenorhabditis elegans*
 - (d) *Escherichia coli* and *Agrobacterium tumefaciens*
7. Which of the following germ layers is best associated with development of heart?
- (a) Ectoderm
 - (b) Endoderm
 - (c) Mesoderm
 - (d) All of the above
8. Which of the following has unevenly thickened walls?
- (a) Collenchyma
 - (b) Sclerenchyma
 - (c) Parenchyma
 - (d) Chlorenchyma
9. An amphipathic phospholipid molecule is most likely to be found in which of the following locations in the cell?
- (a) Cytoplasm
 - (b) ER membrane
 - (c) Mitochondrial matrix
 - (d) Peroxisome matrix
10. Trypsinogen is a typical example of
- (a) coenzyme
 - (b) proenzyme
 - (c) apoenzyme
 - (d) holoenzyme

11. ACTH is secreted from
- (a) adrenal cortex
 - (b) pituitary
 - (c) adrenal medulla
 - (d) thyroid
12. Who wrote the famous book, *Origin of Species*?
- (a) Lamarck
 - (b) Darwin
 - (c) De Vries
 - (d) Mendel
13. Antibodies are produced by
- (a) monocytes
 - (b) lymphocytes
 - (c) red blood cells
 - (d) phagocytes
14. Plants developed *in vitro* culture from pollen grains are
- (a) androgenic plants
 - (b) pollen plants
 - (c) male plants
 - (d) sterile plants
15. Chlorophylls contain
- (a) magnesium
 - (b) manganese
 - (c) chlorine
 - (d) iron



16. Which of the following has the highest electronegativity?
- (a) Fluorine
 - (b) Hydrogen
 - (c) Chlorine
 - (d) Carbon
17. What is the oxidation state of manganese in Mn_2O_3 ?
- (a) Mn(II)
 - (b) Mn(IV)
 - (c) Mn(III)
 - (d) Mn(VI)
18. Which of the following bonds has the greatest degree of ionic character?
- (a) Li—Cl
 - (b) F—F
 - (c) H—Cl
 - (d) C—Cl
19. Which of the following elements can form the greater number of covalent bond?
- (a) Carbon
 - (b) Nitrogen
 - (c) Oxygen
 - (d) Sulphur
20. Which of the following elements forms a tetrahedral structure?
- (a) Boron
 - (b) Carbon
 - (c) Beryllium
 - (d) Fluorine

21. Among the following, the paramagnetic compound is
- (a) Na_2O_2
 - (b) O_3
 - (c) N_2O
 - (d) KO_2
22. The triple bond between the carbon atoms causes acetylene, C_2H_2 , to have which of the following shapes?
- (a) Trigonal planar
 - (b) Linear
 - (c) Tetrahedral
 - (d) Square planar
23. A radioactive element has a half-life of 20 minutes. How much time should elapse before the element is reduced to $\frac{1}{8}$ th of the original mass?
- (a) 40 minutes
 - (b) 60 minutes
 - (c) 80 minutes
 - (d) 160 minutes
24. In which compound, the C—H bond is more polar?
- (a) Acetylene
 - (b) Ethylene
 - (c) Ethane
 - (d) Methane
25. Reaction of water with P_4O_{10} gives
- (a) H_3PO_3
 - (b) H_3PO_4
 - (c) H_2PO_4
 - (d) $\text{H}_2\text{P}_4\text{O}_{11}$



26. Butane-2-ol is
- (a) primary alcohol
 - (b) secondary alcohol
 - (c) tertiary alcohol
 - (d) aldehyde
27. Aldehydes are isomeric with
- (a) ketones
 - (b) ethers
 - (c) alcohols
 - (d) fatty acids
28. The structural formula of methyl aminomethane is
- (a) $(\text{CH}_3)_2\text{CHNH}_2$
 - (b) $(\text{CH}_3)_3\text{N}$
 - (c) $(\text{CH}_3)_2\text{NH}$
 - (d) CH_3NH_2
29. The rate at which a substance reacts depends on its
- (a) atomic weight
 - (b) equivalent weight
 - (c) molecular weight
 - (d) active mass
30. In the chemical reaction, $\text{MnO}_2 + 4\text{HCl} \rightarrow \text{MnCl}_2 + 2\text{H}_2\text{O} + \text{Cl}_2$
- (a) manganese ion is oxidized
 - (b) manganese ion is reduced
 - (c) chloride ion is oxidized
 - (d) chloride ion is reduced



31. A die is thrown twice. The probability that the sum of points obtained is 7 is
- (a) $\frac{7}{36}$
 - (b) $\frac{4}{36}$
 - (c) $\frac{1}{6}$
 - (d) $\frac{11}{36}$
32. The equation of line having slope 2 and being tangent to the curve $y^2 + x = 0$ is
- (a) $y + 2x + 2 = 0$
 - (b) $2x - y + 2 = 0$
 - (c) $16x - 8y - 1 = 0$
 - (d) $y + 2x + 2 = 0$
33. The slope of the tangent to the curve $x = t^2 + 3t - 8$, $y = 2t^2 - 2t - 5$ at the point $(2, -1)$ is
- (a) $\frac{22}{7}$
 - (b) $\frac{5}{7}$
 - (c) $\frac{7}{6}$
 - (d) $\frac{6}{7}$
34. The normal at the point $(1, 1)$ on the curve $2y + x^2 = 3$ is
- (a) $x - y = 0$
 - (b) $x + y = 0$
 - (c) $x + y + 1 = 0$
 - (d) $xy = 1$
35. For what value of x , the expression $\frac{1 - x + x^2}{1 + x + x^2}$ has minimum value?
- (a) 0
 - (b) 1
 - (c) 3
 - (d) $\frac{1}{3}$



36. For what value of a , the function f defined by

$$f(x) = \begin{cases} 5 & \text{if } x \leq 2 \\ 5ax & \text{if } 2 < x < 10 \\ 21x^4 & \text{if } x \geq 10 \end{cases}$$

is continuous function at $x = 2$?

- (a) 0
- (b) $\frac{1}{2}$
- (c) 3
- (d) $\frac{1}{3}$

37. The function f given by $f(x) = |x - 1|$, $x \in \mathbb{R}$ is

- (a) differentiable at $x = 1$
- (b) not differentiable at $x = 1$
- (c) everywhere differentiable
- (d) nowhere differentiable

38. The greatest integer function defined by $f(x) = [x]$, $0 < x < 2$ is

- (a) not differentiable at $x = 1$
- (b) nowhere differentiable
- (c) differentiable at $x = 1$
- (d) everywhere differentiable

39. Let

$$A = \begin{bmatrix} 2 & 3 \\ 4 & 6 \end{bmatrix} \text{ and } B = \begin{bmatrix} -1 & -2 \\ 4 & 6 \end{bmatrix}$$

Then $A + B$ is

- (a) $\begin{bmatrix} 1 & 1 \\ 8 & 4 \end{bmatrix}$
- (b) $\begin{bmatrix} 1 & 1 \\ 8 & 8 \end{bmatrix}$
- (c) $\begin{bmatrix} 1 & 9 \\ 8 & 4 \end{bmatrix}$
- (d) $\begin{bmatrix} 10 & 1 \\ 8 & 4 \end{bmatrix}$

40. The function $f(x) = \sin x$ is
- even
 - odd
 - even and odd
 - neither odd nor even
41. Let x be a rational number and y be an irrational number. Then
- $x + y$ is an irrational number
 - $x + y$ is a rational number
 - xy is a rational number, if $x \neq 0$
 - $x - y$ is a rational number
42. The interval for which the expression $|x + 3| < 5$ is satisfied is
- $(-8, 2)$
 - $\left(\frac{-17}{2}, \frac{3}{2}\right)$
 - $\left(\frac{17}{2}, \frac{3}{2}\right)$
 - $\left(\frac{-17}{2}, \frac{1}{2}\right)$
43. The cube roots of ' a ', where a is a non-zero positive real number, are
- $a^{1/3}, a^{1/3}\omega, a^{1/3}\omega^2$
 - $a^{1/3}, a^{1/3}\omega, a^{1/3}\omega^3$
 - $a^{2/3}, a^{1/3}\omega, a^{2/3}\omega^3$
 - $a^{3/2}, a^{2/3}\omega, a^{2/3}\omega^3$
- where $1, \omega, \omega^2$ are cube roots of unity.
44. The maximum value of $3\sin x + 4\cos x$ is
- 5
 - 5.5
 - 3
 - 5



45. If $\sin\theta + \operatorname{cosec}\theta = 2$, then the value of $\sin^n\theta + \operatorname{cosec}^n\theta$ is
- (a) 3
 - (b) 4
 - (c) 2
 - (d) 5
46. A resistor of 6Ω with tolerance 10% and another resistor of 4Ω with tolerance 10% are connected in series. The tolerance of the combination is
- (a) 5%
 - (b) 10%
 - (c) 15%
 - (d) 20%
47. If force (F), acceleration (A) and time (T) are taken as fundamental physical quantities, then the dimensions of energy are
- (a) FT
 - (b) F^2AT
 - (c) FAT
 - (d) FAT^2
48. Bernoulli's theorem is a consequence of
- (a) conservation of mass
 - (b) conservation of energy
 - (c) conservation of linear momentum
 - (d) conservation of angular momentum
49. Density of water is 1 gm/cc in CGS unit. The density in MKS unit is
- (a) 10^{-3} kg m^{-3}
 - (b) 10^3 kg m^{-3}
 - (c) 1 kg m^{-3}
 - (d) 0.1 kg m^{-3}



50. Hubble's law states that the speed of recession of galaxy is proportional to its distance r as
- (a) r^{-2}
 - (b) r^{-1}
 - (c) r^2
 - (d) r
51. Which of the following is correct ascending order of frequency?
- (a) X-ray, red, violet, ultraviolet
 - (b) Microwave, radiowave, X-ray, gamma ray
 - (c) Yellow, microwave, ultraviolet, X-ray
 - (d) Infrared, blue, ultraviolet, X-ray
52. Unidirectional property of a $p-n$ junction is used in
- (a) rectifier
 - (b) amplifier
 - (c) transistor
 - (d) oscillator
53. Two identical wires of equal length are first connected in series and then in parallel. The ratio of heat produced in the two cases is
- (a) 1:4
 - (b) 1:16
 - (c) 1:1
 - (d) 1:2
54. The use of heavy water in a nuclear reactor is
- (a) to absorb neutrons
 - (b) to increase the energy of neutrons
 - (c) to decrease the energy of neutrons
 - (d) to produce protons
55. In photoelectric emission, the number of electrons emitted depends upon
- (a) the energy of incident photon
 - (b) the work function of the metal
 - (c) the intensity of incident light
 - (d) the wavelength of incident light



56. To make an n -type semiconductor from pure silicon one has to
- (a) inject electrons in silicon
 - (b) dope silicon with an element of group V
 - (c) dope silicon with an element of group III
 - (d) dope silicon with an element of group IV
57. Which of the following measurements is **not** a unit of distance?
- (a) Ammeter
 - (b) Cu bit
 - (c) Parsec
 - (d) Angstrom
58. Which one of the following remains constant while throwing a ball upward?
- (a) Displacement
 - (b) Potential energy
 - (c) Acceleration
 - (d) Velocity
59. Why is the color red used for danger signals?
- (a) It is very bright
 - (b) It is scattered most
 - (c) It is scattered least
 - (d) Our eyes are most sensitive to red color
60. The dimensional formulas for Planck's constant and angular momentum are
- (a) $[ML^2T^2]$ and $[MLT^{-1}]$
 - (b) $[ML^2T^{-1}]$ and $[ML^2T^{-1}]$
 - (c) $[ML^3T^1]$ and $[ML^2T^{-2}]$
 - (d) $[MLT^{-1}]$ and $[MLT^{-2}]$

PART—B

Answer *any sixty* questions

- 61.** Who is the Father of Plant Pathology?
- (a) T. J. Burill
 - (b) Needham
 - (c) Anton De Bary
 - (d) E. J. Butler
- 62.** Loose smut is a disease of wheat which is
- (a) internally seed borne
 - (b) externally seed borne
 - (c) soilborne
 - (d) airborne
- 63.** Yellow leaf mosaic of Okra is spreaded by
- (a) jassids
 - (b) borers
 - (c) jassids and borers
 - (d) whitefly
- 64.** Little leaf in brinjal is caused by
- (a) fungus
 - (b) bacteria
 - (c) virus
 - (d) mycoplasma
- 65.** The rice inflorescence is known as
- (a) panicle
 - (b) spikelets
 - (c) ear
 - (d) siliqua



66. The first wheat variety having short plant height lodging resistance and higher grain yield was
- (a) Dee-gee-woo-gen
 - (b) Norin 10
 - (c) Larma Rojo 64A
 - (d) Sonara 64
67. The highest production of mustard in India is recorded in which of the following States?
- (a) Gujarat
 - (b) Uttar Pradesh
 - (c) Punjab
 - (d) Rajasthan
68. The oil and protein contents of groundnut are
- (a) 20% and 50%
 - (b) 26% and 45%
 - (c) 45% and 26%
 - (d) 50% and 26%
69. Pusa Meghali is an improved variety of
- (a) carrot
 - (b) raddish
 - (c) beetroot
 - (d) turnip
70. Pungency in chilli is due to presence of
- (a) capsaicin
 - (b) allyl isothiocyanate
 - (c) curcumin
 - (d) olerin

71. Gladiolus is propagated by
- (a) true seed
 - (b) bulbs
 - (c) stem cutting
 - (d) roots
72. CFTRI is located in
- (a) Delhi
 - (b) Bangalore
 - (c) Hyderabad
 - (d) Mysore
73. Fe is **not** an important component of which of the following enzymes?
- (a) Nitrogenase
 - (b) Nitrate hydratase
 - (c) Nitrate reductase
 - (d) Glutamate dehydrogenase
74. Which one of the following is an immobile element?
- (a) Ca
 - (b) Mg
 - (c) N
 - (d) P
75. Hill soils are generally
- (a) acidic
 - (b) alkaline
 - (c) neutral
 - (d) saline



- 76.** Which one of the following polyols is commercially manufactured by the hydrogenation of glucose?
- (a) Sorbitol
 - (b) Mannitol
 - (c) Dulcitol
 - (d) Glycerol
- 77.** An example of non-reducing sugar is
- (a) lactose
 - (b) maltose
 - (c) glucose
 - (d) sucrose
- 78.** An example of essential amino acid is
- (a) serine
 - (b) glutamine
 - (c) asparagine
 - (d) tryptophan
- 79.** An example of saturated fatty acid is
- (a) stearic acid
 - (b) linolenic acid
 - (c) oleic acid
 - (d) linoleic acid
- 80.** The induced fit theory to explain the mechanism of enzyme action was given by
- (a) Fischer
 - (b) Koshland
 - (c) Michaelis
 - (d) Menten



81. The additional non-protein component required by enzymes to carry out its catalytic functions is
- (a) coenzyme
 - (b) isoenzyme
 - (c) cofactor
 - (d) apoenzyme
82. The false statement with respect to competitive inhibition of enzymes is
- (a) Inhibitors bind to the active site
 - (b) Inhibitors are not acted upon by the enzyme
 - (c) Inhibition is not reversed by increasing the substrate concentration
 - (d) Inhibition is reversed by increasing the substrate concentration
83. Enzymes that remove groups by a mechanism other than hydrolysis leaving a double-bond in which one of the following products?
- (a) Isomerases
 - (b) Lyases
 - (c) Transferases
 - (d) Hydrolases
84. The water-soluble vitamin is
- (a) vitamin A
 - (b) vitamin B
 - (c) vitamin D
 - (d) vitamin E
85. Nucleic acids are polymers of
- (a) nucleoside
 - (b) phosphorylated nucleoside
 - (c) glycoside
 - (d) peptides

86. Electron microscope was invented by
- (a) Brown and Baker
 - (b) Fleming and Brown
 - (c) Schell and Schultz
 - (d) Knoll and Ruska
87. A cell becomes turgid when placed in
- (a) isotonic solution
 - (b) hypotonic solution
 - (c) hypertonic solution
 - (d) monotonic solution
88. Lysosomes are often called as
- (a) energy bags
 - (b) lipid bags
 - (c) suicide bags
 - (d) enzyme bags
89. A complete cell cycle usually consists of
- (a) G_0 and G_1 stages
 - (b) G_0 , G_1 and S stages
 - (c) G_1 , S_1 , G_2 and M stages
 - (d) S and M stages
90. What is the sequence of Pribnow box?
- (a) TATATT
 - (b) TTGACA
 - (c) TTATAT
 - (d) TATAAT



91. A DNA strand with the sequence AACGTAACG is transcribed. What is the sequence of the mRNA molecule synthesized?
- (a) AACGTAACG
 - (b) UUGCAUUGC
 - (c) AACGUAACG
 - (d) TTGCATTGC
92. The effort to decipher the genetic code was led by which of the following scientists who was awarded a Nobel Prize for his work?
- (a) Nirenberg
 - (b) Lederberg
 - (c) Watson
 - (d) Crick
93. Which one of the following is the site of protein synthesis?
- (a) Ribosomes
 - (b) tRNA
 - (c) mRNA
 - (d) rRNA
94. The longevity of mRNA is related to
- (a) the length of the poly(A) tail
 - (b) the 5' capping of the mRNA
 - (c) transfer of mRNA from nucleus to cytosol
 - (d) formation of hnRNA to mRNA
95. Pulses are deficient in
- (a) lysine
 - (b) threonine
 - (c) methionine
 - (d) tryptophan



96. Which of the following is **not** a biological function of protein?
- (a) Biological catalysis
 - (b) Regulation of cellular process
 - (c) Carrying genetic information
 - (d) Transport of molecules or ions
97. Which type of bonds links the individual nucleotides together in DNA?
- (a) Glycosidic
 - (b) Peptide
 - (c) Phosphodiester
 - (d) Electrostatic
98. Star activity refers to
- (a) nonspecific recognition of restriction sites by RE I
 - (b) high specificity recognition by RE
 - (c) nonspecific ligation by ligase
 - (d) nonspecific recognition of restriction sites by RE II
99. BLASTn refers to searching for the
- (a) nucleotide query sequence against protein sequence
 - (b) nucleotide query sequence against nucleotide sequence
 - (c) protein query sequence against nucleotide sequence
 - (d) protein query sequence against protein sequence
100. Removal of 5'P is performed by
- (a) alkaline phosphatase
 - (b) ligase
 - (c) lambda exonuclease
 - (d) polynucleotide kinase



- 101.** The first discovered molecular marker is
- (a) RFLP
 - (b) AFLP
 - (c) RAPD
 - (d) SSR
- 102.** Major cause of evolution of gene and protein is
- (a) point mutation
 - (b) chromosomal aberration
 - (c) sexual reproduction
 - (d) gene duplication and divergence
- 103.** Cry 1 A(c) encoding endotoxin is effective against which of the following classes of insects?
- (a) Diptera
 - (b) Lepidoptera
 - (c) Coleoptera
 - (d) Hemiptera
- 104.** Monocot plants can be effectively transformed by *Agrobacterium tumefaciens* by using
- (a) PEG
 - (b) leaf mesophyll cells
 - (c) mature embryos
 - (d) acetosyringone
- 105.** The situation where an egg cell develops into an embryo without fertilization is called
- (a) parthenogenesis
 - (b) parthenocarpy
 - (c) diplospory
 - (d) apogamy



- 106.** Transfer of DNA from one bacterial cell to another by a virus is called
- (a) transformation
 - (b) transduction
 - (c) transfection
 - (d) conjugation
- 107.** Cytoplasmic male sterility is generally associated with
- (a) chloroplast
 - (b) transposon
 - (c) nucleus
 - (d) mitochondria
- 108.** Catabolic repression of *lac* operon is mediated through
- (a) ATP
 - (b) GTP
 - (c) ADP
 - (d) cyclic AMP
- 109.** The herbicide glyphosate inhibits
- (a) RNA polymerase
 - (b) DNA polymerase
 - (c) EPSP synthase
 - (d) aspartate aminotransferase
- 110.** Rabies is transmitted to humans by
- (a) water
 - (b) food
 - (c) air
 - (d) dog bite

111. Site of fiber digestion in horse is
- (a) rumen
 - (b) small intestine
 - (c) stomach
 - (d) large intestine
112. Bird flu is caused by
- (a) avian adenovirus
 - (b) avian influenza virus
 - (c) avian pox virus
 - (d) Rous sarcoma virus
113. Neurotransmitter substance present at neuromuscular junction is
- (a) dopamine
 - (b) epinephrine
 - (c) norepinephrine
 - (d) acetylcholine
114. Site of fertilization in cow is
- (a) uterus
 - (b) cervix
 - (c) vagina
 - (d) oviduct
115. Which of the following two elements are **not** found in proper amount in normal milk?
- (a) Fe and Cu
 - (b) Ca and Mg
 - (c) K and Ca
 - (d) Ca and Na



116. Virus infested plants are diagnosed using which one of the following?
- (a) Nanodrop
 - (b) Spectrophotometer
 - (c) Electrophoresis
 - (d) ELISA
117. Auxin and cytokinin in equal ratio favour the development of
- (a) shoot
 - (b) root
 - (c) callus
 - (d) shoot and root
118. Which one of the following is **not** a form of outbreeding?
- (a) Crossbreeding
 - (b) Line breeding
 - (c) Grading-up
 - (d) Species hybridization
119. The most useful species cross is
- (a) mule
 - (b) churu
 - (c) cattalo
 - (d) zebroid
120. Which microbial process produces a form of nitrogen that can be leachable?
- (a) Nitrification
 - (b) Symbiosis
 - (c) Immobilization
 - (d) Autotrophism

- 121.** Secondary metabolic products are produced during which of the following growth phases of bacteria?
- (a) Log phase
 - (b) Trophophase
 - (c) Idiophase
 - (d) Lag phase
- 122.** Chronobiology is the study of
- (a) cold-blooded animals
 - (b) temperate environment
 - (c) biological clocks
 - (d) photoperiod
- 123.** Which ingredient killed hundreds of people in Bhopal Gas Tragedy?
- (a) Nitrous acid
 - (b) Mustard gas
 - (c) Hydrogen cyanide
 - (d) Methyl isocyanate
- 124.** Large number of clonal plants are produced through
- (a) anther culture
 - (b) single-cell culture
 - (c) micropropagation
 - (d) callus culture
- 125.** Embryo rescue is the technique employed, when
- (a) embryo endosperm incompatibility occurs
 - (b) pollens are sterile
 - (c) ovules are sterile
 - (d) seeds are very small



- 126.** Most effective preservative used for preservation of canned foods is
- (a) nystatin
 - (b) nisin
 - (c) thermolysin
 - (d) tylosin
- 127.** The name of the enzyme used for cheese production is
- (a) amylase
 - (b) cellulase
 - (c) raffinase
 - (d) rennin
- 128.** Which one of the following is fermented milk product obtained through the controlled lactic acid fermentation of milk by *S. thermophilus* and *L. bulgaricus*?
- (a) Kefir
 - (b) Yoghurt
 - (c) Kumiss
 - (d) Probiotic milk
- 129.** The rich source of enzyme ficin is
- (a) meat
 - (b) fig
 - (c) orange
 - (d) flower
- 130.** Which of the following chemicals is used to induce polyploidy?
- (a) Ethyl methane sulfonate
 - (b) Methyl methane sulfonate
 - (c) Colchicine
 - (d) Nitrous acid

131. The effect of the genotype of the pollen grain on the phenotype of seed is termed as
- (a) apospory
 - (b) pollinia
 - (c) endoploidy
 - (d) xenia
132. The vector used for the construction of cDNA libraries is
- (a) plasmid
 - (b) BAC
 - (c) fosmid
 - (d) phagemid
133. Which of the following methods of crossing is used for the transfer of oligogenic character in plant?
- (a) Testcross
 - (b) Backcross
 - (c) Crisscross
 - (d) Z-cross
134. Omics technology that is used to analyze the functions of the genes is
- (a) genomics
 - (b) transcriptomics
 - (c) proteomics
 - (d) ionomics
135. Sickle-cell anemia in human is due to the reason that
- (a) valine is replaced by glutamic acid
 - (b) glutamic acid is replaced by valine
 - (c) glutamic acid is replaced by lysine
 - (d) valine is replaced by lysine

136. Segregation of gene occurs in
- (a) F_1 generation
 - (b) F_2 generation
 - (c) gametic formation of F_1
 - (d) F_3 generation
137. The cereal variety developed by mutation breeding in India is
- (a) Sonalika
 - (b) Jagannath
 - (c) Varun
 - (d) CSH-1
138. Transfer of resistance gene to high-yielding self-pollinated varieties is achieved by
- (a) hybridization and pedigree selection
 - (b) recurrent backcrossing and selection
 - (c) hybridization and bulk selection
 - (d) hybridization and mass selection
139. Genes which suppress or enhance the expression of other gene are called
- (a) dominant genes
 - (b) recessive genes
 - (c) modifier genes
 - (d) duplicate genes
140. Predominant pest in brinjal is
- (a) leucinodes
 - (b) helioverpa
 - (c) spodoptera
 - (d) pectinophora

141. Double haploid lines can be generated by
- (a) protoplast fusion
 - (b) transformation
 - (c) anther culture
 - (d) RNAi technology
142. The process of integration and excision of transposable elements is called as
- (a) transposon
 - (b) translation
 - (c) transposition
 - (d) transversion
143. Hardy and Weinberg law is related to
- (a) molecular genetics
 - (b) population genetics
 - (c) functional genomics
 - (d) microbial genetics
144. Generally, the specificity and nature of gene action of vertical resistance (VR) in crop plants are
- (a) specific and polygenic
 - (b) specific and oligogenic
 - (c) nonspecific and polygenic
 - (d) nonspecific and oligogenic
145. A unit to measure a distance between genes is called
- (a) dalton
 - (b) kilobase
 - (c) megabase
 - (d) centimorgan

146. Symptoms of sulphur deficiency initially appear on
- (a) lower leaves
 - (b) middle leaves
 - (c) upper leaves
 - (d) All of the above
147. The primary photoreceptor involved in the control of flowering is
- (a) cryptochrome
 - (b) phytochrome
 - (c) xanthophyll
 - (d) chlorophyll
148. For most plant species, the effective temperature range for vernalization is
- (a) -10°C to -5°C
 - (b) -1°C to 9°C
 - (c) 10°C to 12°C
 - (d) 13°C to 15°C
149. Translocation of carbohydrates takes place through
- (a) phloem
 - (b) xylem
 - (c) pith
 - (d) endodermis
150. Numbers are stored and transmitted inside a computer in
- (a) binary form
 - (b) ASCII code form
 - (c) decimal form
 - (d) alphanumeric form

151. The square root of variance of sample mean refers to
- (a) standard deviation
 - (b) mean deviation
 - (c) standard error
 - (d) median
152. The Student *t*-test was given by
- (a) R. A. Fisher
 - (b) J. B. S. Haldane
 - (c) W. S. Gosset
 - (d) K. Mather
153. Fusion of two polar nuclei with egg is known as
- (a) double fertilization
 - (b) parthenocarpy
 - (c) synthetic seed
 - (d) artificial seed
154. Notification of varieties is necessary for
- (a) certification
 - (b) labelling
 - (c) truthfull labelling
 - (d) carryover of seed
155. GA3 is sprayed in hybrid rice to enhance
- (a) panicle exertion
 - (b) seed set
 - (c) fertility
 - (d) seed maturity

156. In the three-domain system of classification, the traditional bacteria is placed in
- (a) Eukarya
 - (b) Monera
 - (c) Archaea
 - (d) Eubacteria
157. The 70S prokaryotic ribosomes consist of
- (a) two 40S subunits
 - (b) 40S and 30S subunits
 - (c) 50S and 60S subunits
 - (d) 50S and 30S subunits
158. Which of the following statements is **not** true?
- (a) Symbiosis refers to different organisms living together
 - (b) Members of symbiotic relationship cannot live without each other
 - (c) Symbiosis refers to different organisms living together and benefitting from each other
 - (d) A parasite is not a symbiosis with its host
159. Microbes involved in lactic acid fermentation are
- (a) aerobes
 - (b) microaerophiles
 - (c) facultative anaerobes
 - (d) obligate anaerobes
160. Bulky ball consists of
- (a) 58 carbon atoms
 - (b) 60 carbon atoms
 - (c) 63 carbon atoms
 - (d) 66 carbon atoms

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