

ENTRANCE EXAMINATION-2017

M.SC. BIOTECHNOLOGY

[Set B]

ROLL NO.

4	3	1	2	5	4	2	2
---	---	---	---	---	---	---	---

[Signature]
Signature of Invigilator

Time: 1 Hours 45 Minutes

Total Marks: 100

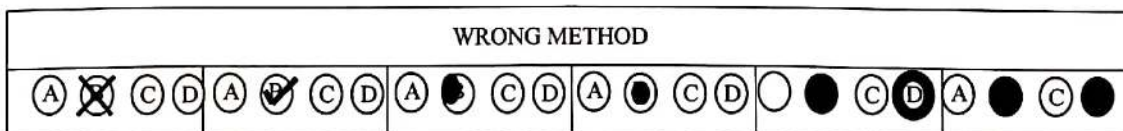
Instructions to Candidates

1. Do not write your name or put any other mark of identification anywhere in the OMR Answer Sheet. **IF ANY MARK OF IDENTIFICATIONS IS DISCOVERED ANYWHERE IN OMR ANSWER SHEET, the OMR sheet will be cancelled, and will not be evaluated.**
2. This Question Booklet contains this cover page and a total of **100 Multiple Choice Questions of 1 mark**. Space for rough work has been provided at the beginning and end. Available space on each page may also be used for rough work.
3. Each correct answer carries one mark.
4. There is negative marking in Multiple Choice Questions. For each wrong answer, 0.25 marks will be deducted.
5. **USE OF CALCULATOR IS NOT PERMITTED.**
6. **USE/POSSESSION OF ELECTRONIC GADGETS LIKE MOBILE PHONE, iPhone, iPad, pager ETC. is not permitted.**
7. Candidate should check the serial order of questions at the beginning of the test. If any question is found missing in the serial order, it should be immediately brought to the notice of the Invigilator. No pages should be torn out from this question booklet.
8. Answers must be marked in the OMR answer sheet which is provided separately. OMR answer sheet must be handed over to the invigilator before you leave the seat.
9. The OMR answer sheet should not be folded or wrinkled. The folded or wrinkled OMR/Answer Sheet will not be evaluated.
10. Write your Roll Number in the appropriate space (above) and on the OMR Answer Sheet. Any other details, if asked for, should be written only in the space provided.
11. There are four alternative answers to each question marked A, B, C and D. Select one of the answers you consider most appropriate and fill up the corresponding oval/circle in the OMR Answer Sheet provided to you. The correct procedure for filling up the OMR Answer Sheet is mentioned below.
12. Use Black or Blue Ball Pen only for filling the ovals/circles in OMR Answer Sheet while answering the Questions. For your Choice of answers darken the correct oval/circle completely. If the correct answer is 'B', the corresponding oval/circle should be completely filled and darken as shown below.

CORRECT
METHOD



WRONG METHOD



M.Sc. Biotechnology Entrance Test – 2017

- The use of the Hardy-Weinberg equation for a population shows that –
 - Immigration of new mating types can be accounted for
 - The results of breeding over a number of generations can be predicted
 - The proportion of phenotypes is 3:1
 - There are twice as many dominant phenotypes.
- A mRNA molecule is –
 - Transcribed from DNA
 - Translated into protein
 - Free of introns
 - All of the above
- A couple, both carriers for the gene sickle cell anaemia planning to marry. Chances of not having anaemic progeny would be –
 - 0%
 - 75%
 - 50%
 - 100%

Handwritten notes for Q3:
 x-linked recessive
 XX^S x XY
 X^SX^S (can) x X^SX^S (dise)
 Offspring: XY (25%), X^SXY (can), X^SX^S (dise), X^SX^S (dise)
- Which of the following is not necessary for chromosome replication?
 - Adenosine triphosphate
 - Ribosomes
 - Nuclear enzymes
 - A DNA template

Handwritten notes for Q4:
 ATP, AMP, DNA, RNA
- Photosystems are found embedded in –
 - Cell membranes
 - Chloroplast envelopes
 - Thylakoids
 - Grana lumen
- Scientist who demonstrated the mechanism of sugar translocation in plants –
 - Stanley Miller
 - Münch
 - J.C. Bose
 - Emerson

Handwritten notes for Q6:
 M, U, S, G
- The association between symplasmic and apoplasmic pathways is that –
 - Symplasm operates in root and apoplasm in leaf
 - Apoplasm operates in root and symplasm in leaf
 - Both symplasm and apoplasm operate in roots
 - Both symplasm and apoplasm operate in mitochondria
- Reduction of CO₂ in photosynthesis occurs during the following process –
 - Light-dependent reactions
 - Oxidative phosphorylation
 - Water splitting
 - Light-independent reactions

9. Both heterospory and circinate ptyxis occur in – *diff spores*
- A. Dryopteris
 - B. Pinus
 - C. Cycas
 - D. Funaria

10. Plant hormone causing abscission of leaves, senescence, bud dormancy and inhibition of cell division is –
- A. IAA
 - B. ethylene
 - C. cytokinins
 - D. ABA

11. Vascular cryptogams are –
- A. Bryophytes
 - B. Spermatophytes
 - C. Pteridophyte
 - D. None of these

12. Phytochrome is involved in –
- A. phototropism
 - B. photorespiration
 - C. photoperiodism
 - D. geotropism
- low red or red light*

13. Which of the following is used to determine the rate of transpiration in plants?
- A. Porometer/hygrometer
 - B. Potometer
 - C. Auxanometer
 - D. Tensiometer/barometer

14. Tropical plants like sugar cane show high efficiency of CO_2 fixation because of –
- A. Calvin cycle
 - B. Hatch-Slack cycle
 - C. Cyclic photo phosphorylation
 - D. TCA Cycle
- photorespiration*
(Acetyl CoA) Pyruvate Glyoxylate

15. In blue-green alga photosynthesis takes place in –
- A. Chloroplasts
 - B. Lamellae
 - C. Heterocysts
 - D. Carotene
- Cyanobacteria Heterocyst → Nitrogen*

16. Following is a group of compatible solutes in plants –
- A. Sucrose, DNA and RNA
 - B. Sucrose, Proline, Glycine betain
 - C. Lipid, Protein, DNA
 - D. DNA, RNA, miRNA
- sugar*

17. Protoplast can be defined as –

- A. Cell without cell membrane
- B. Cell without cytoplasm
- C. Cell without nucleus
- D. Cell without cell wall

18. On the molar scale which of the following interactions in a nonpolar environment provides highest contribution to the bio-molecule?

- A. Van der Waals interaction
- B. Hydrogen bonding
- C. Salt bridge
- D. Hydrophobic interaction

19. In drosophila (fruit flies), eye colour is sex-linked and red eye colour is dominant to white eye colour. Which of the following are not possible in a cross between a red-eyed male and a heterozygous female?

- A. Red-eyed male.
- B. White-eyed male.
- C. Carrier female.
- D. Homozygous white-eyed female

20. Which one of the following polymerase does not require a template –

- A. DNA polymerase I
- B. Terminal deoxynucleotide transferase
- C. Sequenase
- D. Reverse transcriptase

21. Glucose residues in amylose are linked by –

- A. $\beta 1 \rightarrow 4$
- B. $\alpha 1 \rightarrow 4$
- C. $\alpha 1 \rightarrow 6$
- D. $\beta 1 \rightarrow 6$

22. Tryptic digest of a heptapeptide {built from 3 lysine (K), 2 alanine (A), 1 tyrosine (Y) and 1 phenylalanine (F)} yielded tri and tetrapeptide. Which of the following is the correct sequence of the heptapeptide?

- A. KAYAKFK
- B. YKAAFKK
- C. KYKAAKF
- D. KYAAKFK

23. Proto-oncogene in normal cells –

- A. Code for proteins involved in the stimulus of cell division
- B. Suppresses progression through the cell cycle in response to DNA damage
- C. Initiates apoptosis
- D. Non-of the above

24. Which of the following is correct with regard to aneuploidy?

- A. Inversion
- B. $2n + 1$
- C. All aneuploid individuals die before birth
- D. $4n$

polyploidy
hexaploidy
triploidy

25. A method to create mice in which a specific gene is turned off to create knockout mice was discovered by =

- A. De Duve
- B. Günter Blobel
- C. Mario Capecchi
- D. Craig Mello

glucose
glycolysis
energy - 6 - pmw
ATP

26. The reaction catalyzed by phosphofructokinase-1 =

- A. Is activated by high concentrations of ATP and citrate
- B. Uses fructose 1-phosphate as substrate.
- C. Is the rate-limiting reaction of the glycolytic pathway
- D. Is inhibited by fructose 2,6-bisphosphate

27. The conversion of pyruvate to acetyl CoA and CO_2 =

- A. Depends on the coenzyme biotin
- B. Involves the participation of lipoic acid
- C. Is activated when pyruvate dehydrogenase (PDH, D. E1) of the pyruvate dehydrogenase complex is phosphorylated by PDH kinase in the presence of ATP
- D. Occurs in the cytosol

OAA
malic acid
PEP - PEP
pyruvate

28. Which one of the following reactions is unique to gluconeogenesis?

- A. Lactate \rightarrow pyruvate
- B. Phosphoenolpyruvate \rightarrow pyruvate
- C. Oxaloacetate \rightarrow phosphoenolpyruvate
- D. Glucose 6-phosphate \rightarrow fructose 6-phosphate

Glycolysis
from glucose

29. Following the intravenous injection of lactose into a rat, none of the lactose is metabolized. However, ingestion of lactose leads to rapid metabolism of this disaccharide. The difference in these observations is a result of =

- A. the presence of lactase in the serum
- B. the absence of hepatic galactokinase
- C. the absence of maltase in the serum
- D. the presence of lactase in the intestine

30. The rate of DNA synthesis in a culture of cells could be most accurately determined by measuring the incorporation of which of the following radiolabelled compounds?

- A. Adenine
- B. Guanine
- C. Phosphate
- D. Thymidine

DNA synthesis
DNA replication

31. Nobel Prize for Physiology or Medicine (2016) was awarded to Yoshinori Ohsumi for his research on-

- A. Developing anti-cancerous oral vaccines
- B. Successful gene therapy in adults
- ☒ C. Understanding the mechanism for autophagy
- D. Discovery of anti-viral oral vaccines

32. A natural common host of influenza A viruses in the types/subtypes H1N1 (swine flu), H2N2 and H3N3 is -

- A. Horse
- B. Pig
- C. Cat
- D. Bat

33. Zika virus is associated with the disease -

- A. Microcephaly, characterized by abnormal smallness of the head, a congenital condition associated with incomplete brain development
- B. Macrocephaly, characterized by big head with circumference greater than the 98th percentile
- C. Hernia, characterized by the exit of an organ through the wall of the cavity in which it normally resides
- D. All of the above

34. TIM-TOM are the proteins operating in -

- A. Chordates
- B. Chloroplast stroma
- C. Central part of mitochondria
- ☒ D. Mitochondria

35. Alpha-amanitin is toxin found mainly in -

- A. Death cap mushroom
- B. Horse mushroom
- C. Giant Puffball
- D. Bay Boletus

36. Recently, WHO has named 12 bacteria that pose the greatest threat to human health. Among these, three of the following are considered to be of critical priority -

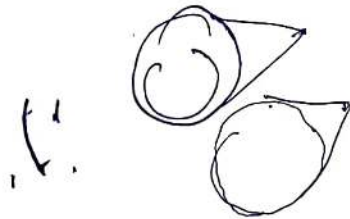
- A. *Pseudomonas aeruginosa*, *Enterobacteriaceae*, *Acinetobacter baumannii*
- B. *Helicobacter pylori*, *Salmonellae*, *Shigella*
- C. *Helicobacter pylori*, *Salmonellae*, *Mycobacteria*
- D. *Streptococcus pneumoniae*, *Salmonellae*, *Shigella*

☒ 37. World Cancer Day is observed on -

- A. February 16
- ☒ B. February 04
- C. February 21
- D. February 22

38. Short-sightedness occurs due to -

- A. Weakening of the retina
- B. Elongation of eye balls
- C. Shifting of the iris
- D. None of the above



B-2017

BM31/2

39. Inside the body, blood does not coagulate due to presence of -

- A. Thromboplastin
- B. Fibrin
- C. Heparin
- D. Haemoglobin

40. Proximal and distal convoluted tubules are parts of -

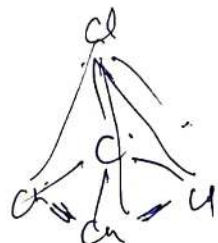
- A. Nephron
- B. Neuron
- C. Thigh muscle
- D. Oviduct

41. The $n \rightarrow \pi^*$ transition for carbonyl compounds experience bathochromic shift when polarity of the solvent is increased.

- A. True
- B. False
- C. Both
- D. None

42. In peri-condensed systems, a carbon atom belongs to:

- A. One ring
- B. No rings
- C. More than two rings
- D. Less than two rings



43. Predict structure of CCl_4 molecule if its Raman spectra show four lines at 213, 312, 454 and 759 cm^{-1} , having depolarization ratio 0.86, 0.86, 0.046 and 0.83, respectively:

- A. Planar
- B. Tetrahedral
- C. Intermediate
- D. None

44. Electron donating groups often _____ in the blank).

- A. Stabilizes
- B. Decreases
- C. Enhances
- D. None

fluorescence (pick appropriate word to fill)

due to chromophore molecule

*e-
me*

45. In a conductometric titration of NaOH against HCl the following readings were obtained:

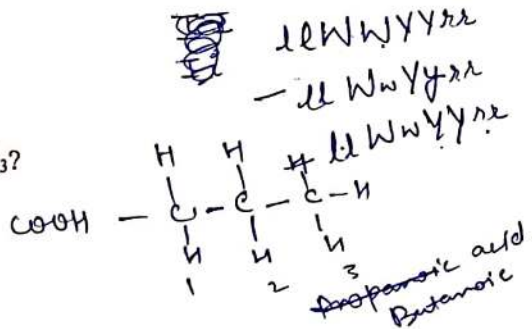
mL of titrant:	0	1	2	3	4	5	6
Conductance	3.15	2.6	2.04	1.40	1.97	2.86	3.66

What is the number of gram equivalent of NaOH in solution?

- A. 2.043
- B. 0.401
- C. 0.920
- D. 0.127

A. $\text{IIWwyy}\pi$
B. LLWWyYRr
C. LIWwYYRr
D. $\text{IIWwYY}\pi$

A. Butanoic Acid
B. Butanal
C. Methyl propanoate
D. Propyl methanoate



1. Ethane 2. Fluoroethane

3. Ethanol 4. Ethanoic Acid

- A. 4,3,1,2
B. 4,3,2,1
C. 3,4,1,2
D. 2,1,3,4

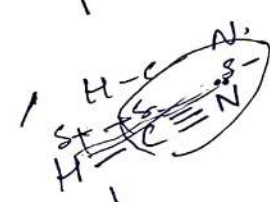
2.11.3

4
2
1
3

4-
3
2
1

SN(1)
Nurt
Al.

- A. Electrostatic attraction between H^+ and CN^-
- B. Only Van der Waals' forces
- C. Van der Waals' forces and hydrogen bonding
- D. Electrostatic forces between pairs of electrons and positively charged nuclei



A. 60 min
B. 50 min
C. 45 min
D. 120 min

$$= \frac{0.693}{K}$$

siRNA

31. Which of the following statements is ~~not~~ correct about siRNA molecules?

- ✓ A. siRNA has a 21-25 nucleotide sequence with 2 nucleotides overhanging at the 3' end
- B. siRNA is processed by the RNA-protein complex RISC ✓
- C. siRNA is often induced by viruses ✓
- D. siRNA does not generally act at the level of transcription manish

manus.

- A. Inhibits its translation
- B. Promotes its post transcription processing
- C. Has no impact on its translation
- D. Promotes its translation under adverse conditions



10



53. Mutation in a gene x in *Zea mays* results in more number of lateral root formation. Which one of the following is the correct statement?

- A. The gene product acts as a positive regulator of lateral root formation ✓
- B. The gene product acts as a negative regulator of lateral root formation
- C. The gene product is not likely to be involved in lateral root formation
- D. The gene product promotes replication for lateral root formation



54. The following statements are made on DNA replication –

- a. Replication fork is a branch point in a replication 'eye' or 'bubble'.
- b. A replication bubble contains two replication forks.
- c. DNA replication is continuous according to the interpretation made by Okazaki.
- d. Multiple priming events are required for both leading and lagging strands to initiate DNA synthesis.

Which one of the following is the correct combination?

- A. a and b
- B. b and c
- C. c and d
- D. a and c

55. *E. coli* proliferates faster on glucose than it does on lactose because lactose is –

- A. Taken up more slowly than glucose
- B. Not hydrolyzed by *E. coli*
- C. Taken up faster than glucose
- D. Toxic to the cells

56. The migration of a protein on an SDS polyacrylamide gel is best described as inversely proportional to the –

- A. Negative charge
- B. Isoelectric point
- C. Log of molecular weight
- D. Native volume

Protein amino acid sequence
rate of migration of protein $\propto \frac{1}{\log M_w}$

57. G-protein linked receptors exhibit which of the following?

- A. Tyrosine kinase activity TKA
- B. ATPase activity
- C. Seven transmembrane domains
- D. Nuclear localization

58. Which would be best to separate a protein that binds strongly to its substrate?

- A. Gel filtration
- B. Affinity chromatography
- C. Cation exchange
- D. Anion exchange

59. The most important buffering system for maintaining proper blood pH is:

- A. The charges on the amino acids
- B. The bicarbonate buffer system of CO_2 , carbonic acid, and bicarbonate
- C. Phosphate groups of serum phosphoproteins
- D. All of the above

60. The following amino acid sometimes is called as imino acid –
- A. Cysteine
 - B. Threonine
 - C. Proline
 - D. Methionine

61. Myoglobin and the subunits of hemoglobin have –
- A. No obvious structural relationship
 - B. Very different primary and tertiary structures
 - C. Very similar primary structures, but different tertiary structures
 - D. Very similar tertiary structures, but different primary structures

↓ Oxidation
PDM.

62. One of the important enzyme that protects against oxidative stress is –
- A. Superoxide dismutase
 - B. Pyruvic kinase
 - C. Pyruvate dehydrogenase
 - D. Citrate synthase

63. Which one from the following is co-factor for transaminases –
- A. Co-enzyme A
 - B. Flavin co-factor
 - C. Pyridoxal phosphate
 - D. Tetrahydrofolate

64. What is the site of synthesis for Chymotrypsin –
- A. Liver
 - B. Pancreas
 - C. Stomach
 - D. Intestine

65. Matrix-assisted laser desorption ionization time of flight (MALDI-TOF) spectrometry is most useful for predicting which of the following?
- A. Molecular mass
 - B. Isoelectric point
 - C. Bonding patterns
 - D. Secondary structure

66. The 'Uvr ABC' repair mechanism is involved in repairing –
- A. Missing bases
 - B. Strand break
 - C. Crossed linked strands
 - D. DNA damaged caused by 'bulky' chemical adducts

67. During DNA replication, events at the replication fork require different types of enzyme specialized functions except –
- A. DNA polymerase III
 - B. DNA gyrase
 - C. DNA ligase
 - D. DNA glycosylase

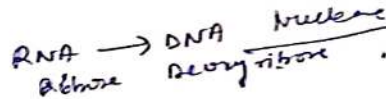
B-2017

68. An antibiotic Rifampicin –

- A. Inhibits RNA polymerase and activates PXR
- B. Activates RNA polymerase and PXR
- C. Inhibits PXR and activates RNA polymerase
- D. Inhibits PXR and RNA polymerase

69. Reverse transcriptase has both ribonuclease and polymerase activities. Ribonuclease activity is required for –

- A. The synthesis of new RNA strand.
- B. The degradation of RNA strand
- C. The synthesis of new DNA strand
- D. The degradation of DNA strand



70. Small nucleolar RNAs used to process and chemically modify rRNAs are called –

- A. scaRNAs
- B. siRNAs
- C. snoRNAs
- D. snRNAs

snRNA

snRNPs

71. During replication, the RNA primer is degraded by the 5'-3' exonuclease activity of –

- A. RNase H1 (ribonuclease H1)
- B. FEN-1 (flap endonuclease 1)
- C. Topoisomerase II B
- D. DNA polymerase V



72. Site-specific recombination results in precise DNA rearrangement, which is limited to specific sequences. The enzymes that are important to carry out the process are –

- A. Restriction endonuclease and DNA polymerase
- B. Nuclease and ligase
- C. DNA polymerase and ligase
- D. DNA polymerase and DNA gyrase

73. Which one of the statement is true regarding quaternary structure of proteins –

- A. Refers to the organization and spatial arrangements of amino acid within a polypeptide chain
- B. Refers to the organization and spatial arrangements of amino acid with many polypeptide chains
- C. Chain of 19 amino acid during their synthesis on ribosomes
- D. None of these

74. All of the following are categorized as secondary lymphoid organs except –

- A. Lymphnode
- B. Spleen
- C. Subepithelial collections of lymphocytes
- D. Thymus

75. The volume of air breathed in and breathed out during effortless respiration is referred to as –

- A. Tidal volume
- B. Vital volume
- C. Vital capacity
- D. Tidal capacity

76. The yellow pigment derived from heme breakdown and excreted by kidney is –
 A. Uric acid
 B. Cholestrol
 C. Urochrome
 D. Melanin

77. Which of the following is not involved in the stimulation of release of pancreatic juice –
 A. Trypsinogen *Sec*
 B. Secretin
 C. gastrin *Stim*
 D. Cholecystokinin

Tyr → Trypsin

78. After ovulation Graffian follicle regresses into –
 A. Corpus artesia
 B. Corpus albicans
 C. Corpus callosum
 D. Corpus luteum

79. Which of the following pair is not correctly matched?
 A. Vitamin B4 – Pellagra
 B. Vitamin B12 – Pernicious anaemia
 C. Vitamin C – Scurvy
 D. Vitamin B6 - Beriberi

80. Which of the following disease is not caused by the bacteria –
 A. Plague
 B. Yellow fever *Pneumonia, Heart myoma*
 C. Typhoid
 D. Cholera

81. Which of the following virus establishes latent infection in neuronal cells –
 A. Polio virus
 B. Herpes simplex virus
 C. Dengue virus
 D. Japanese encephalitis

82. Major stimulus for spore formation in bacteria is –
 A. Cold stress
 B. pH stress
 C. Heat stress
 D. Nutrition limitation

83. Paralysis-causing botulinum toxin takes its action by blocking of –
 A. Clathrin coat formation
 B. Synaptic vesicle formation
 C. Synaptotagmin recruitment
 D. Acetylcholine release

84. _____ creates free radicals in food, which can destroy cell membrane and attack on DNA and proteins, thus preventing growth of microorganism –

- A. Pasteurization
- B. Irradiation
- C. Reduction
- D. All of above

85. Viral genome that can be integrated in the genome of host is called –

- A. Prophage
- B. Temperate phage
- C. Bacteriophage
- D. Metaphage

86. The virulence determining antigens of microorganisms may be –

- A. Proteins and polysaccharides
- B. Carbohydrate-protein complexes
- C. Polysaccharides-phospholipid-protein complexes
- D. All of these

87. Which of the immunoglobulin reaches first at the site of infection –

- A. IgM
- B. IgG
- C. IgA
- D. IgE

88. A graft between members of the same species is termed as –

- A. Allograft
- B. Xenograft
- C. Isograft
- D. Autograft

89. Non-specific suppression of graft rejection can be achieved with –

- A. Anti-IL 5
- B. Anti-NF kappa B
- C. Anti-CD34
- D. Anti-CD3

90. Type I hypersensitivity can be blocked using –

- A. Histamine
- B. IgA myeloma
- C. Sodium cromoglycate
- D. A myeloma protein of mixed antibody class

91. If

$$\begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \\ a_{31} & a_{32} \end{bmatrix} A = \begin{bmatrix} b_{11} & b_{12} & b_{13} \\ b_{21} & b_{22} & b_{23} \\ b_{31} & b_{32} & b_{33} \end{bmatrix}$$

then order of matrix $A = ?$

- A. 2×2
 B. 2×3
 C. 3×2
 D. 3×3

92. If $f: X \rightarrow Y$ and $a, b \subseteq X$, then $f(a \cap b)$ is equal to

- A. $f(a) - f(b)$
 B. $f(a) \cap f(b)$
 C. a proper subset of $f(a) \cap f(b)$
 D. $f(b) - f(a)$

93. Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be defined by

$$f(x) = \begin{cases} x+2 & (x \leq -1) \\ x^2 & (-1 \leq x \leq 1) \\ 2-x & (x \geq 1) \end{cases}$$

Then value of $f(-1.75) + f(0.5) + f(1.5)$ is

- A. 0
 B. 2
 C. -1
 D. 1

94. If the set $G = \{1, w, w^2\}$ is an abelian group w.r.t multiplication, then inverse of w is?

- A. 1
 B. w
 C. w^2
 D. it does not contain an inverse

95. The value of $\lim_{x \rightarrow 0} \left(\frac{1+5x^2}{1+3x^2} \right)^{1/x^2}$

is-

- A. e^2
 B. e^3
 C. e^5
 D. None of these

96. A differential equation is considered to be ordinary if it has -

- A. One dependent variable
 B. More than one dependent variable
 C. One independent variable
 D. more than one independent variable

97. The value of derivative of $f(x) = |x-1| + |x-3|$ at $x=2$ is

- A. -2
B. 0
C. 2
D. Not defined

$$f(x) = |x-1| + |x-3|$$

98. Solve the differential equation: $x(y-1) dx + (x+1) dy = 0$. If $y=2$ when $x=1$.

- A. 1.80
B. 1.48
C. 1.55
D. 1.63

$$(x) = \frac{1}{\log x}$$

$$(2y-1) = y(1-x)$$

99. Solve $xy'(2y-1) = y(1-x)$

- A. $\ln(xy) = 2(x-y) + C$
B. $\ln(xy) = x - 2y + C$
C. $\ln(xy) = 2y - x + C$
D. $\ln(xy) = x + 2y + C$

100. The differential $2 \frac{dy}{dx} + x^2 y = 2x + 3, y(0) = 5$ is -

- A. Nonlinear
B. Linear
C. Linear with fixed constants
D. Undeterminable to be linear or nonlinear

$$2 \frac{dy}{dx} + x^2 y = 2x + 3$$

$$x(y-1) dx + (x+1) dy = 0$$

$$(x+1) dy = -x(y-1) dx$$

$$\frac{dy}{dx} = \frac{-x(y-1)}{(x+1)}$$

$$\frac{dy}{dx} \bigg|_{(1,2)} = \frac{-1(2-1)}{(1+1)} = -\frac{1}{2}$$

$$\frac{-xy + x}{x+1} = -\frac{1}{2}$$

$$\frac{x(1-y)}{x+1}$$