Paper Code No. B-07 Question Booklet No.....

202019

ENTRANCE EXAMINATION – 2019

SET – C

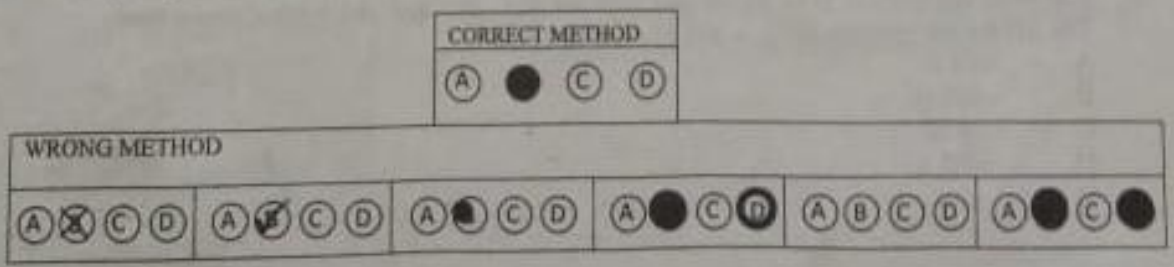
ROLL NO. | B | 0 | 7 | 1 | 5 | 3 | 3 | 9 |

Signature of Invigilator

TIME :1 HOUR 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 Response Sheet. **IF ANY MARK OF IDENTIFICATIONS IS DISCOVERED ANYWHERE IN OMR RESPONSE SHEET, the OMR sheet will be cancelled, and will not be evaluated.**
2. This Question Booklet contains the cover page and a total of **100 Multiple Choice Questions of 1 mark each**
3. Space for rough work has been provided at the beginning and end. Available space on each page may also be used for rough work.
4. There is negative marking in Multiple Choice Questions. For each wrong answer, 0.25 marks will be deducted.
5. USE/POSSESSION OF ELECTRONIC GADGETS LIKE MOBILE PHONE, iPhone, iPad, page ETC. is strictly **PROHIBITED.**
6. 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.
7. Answers must be marked in the OMR response sheet which is provided separately. OMR Response sheet must be handed over to the invigilator before you leave the seat.
8. The OMR response sheet should not be folded or wrinkled. The folded or wrinkled OMR/Response Sheet will not be evaluated.
9. Write your Roll Number in the appropriate space (above) and on the OMR Response Sheet. Any other details, if asked for, should be written only in the space provided.
10. There are four options to each question marked A, B, C and D. Select one of the most appropriate options and fill up the corresponding oval/circle in the OMR Response Sheet provided to you. The correct procedure for filling up the OMR Response Sheet is mentioned below.
11. Use Black or Blue Ball Pen only for filling the ovals/circles in OMR Response Sheet. Darken the selected oval/circle completely. If the correct answer is 'B', the corresponding oval/circle should be completely filled and darkened as shown below.



SET – C

1. A compound XY is formed by element X which is highly electropositive and Y which is highly electronegative. What type of bond is present between XY?
   A. Ionic bond
   B. Covalent bond
   C. Metallic bond
   D. Co-ordinate bond

2. Number of NaCl molecules present in the per unit cell of rock-salt is
   A. 4
   B. 6
   C. 2
   D. 1

3. The molecular formula of cyclohexane is
   A. C_6H_{12}
   B. C_6H_{14}
   C. C_6H_{10}
   D. C_6H_{15}

4. Which of the following solutions is most basic in nature?
   A. Solution A with pH = 8
   B. Solution B with pH = 9
   C. Solution C with pH = 10
   D. Solution D with pH = 6

5. Hybridisation of N in NH_3 is
   A. sp^3
   B. sp^2
   C. sp
   D. Both sp^3 and sp^2

6. Total number of spectral lines present in visible region during transition from 2nd excited state to 5th excited state in hydrogen atom is
   A. 2
   B. 6
   C. 0
   D. 1

7. The bond energies of H-H, Br-Br and HBr are 433, 192 and 365 kJ/mol respectively. The ΔH for the reaction $H_2(g) + Br_2(g) \rightarrow 2HBr(g)$ is
   A. +26 kJ
   B. -105 kJ
   C. -26 kJ
   D. +105 kJ

8. The molarity of solution obtained by mixing 750ml of 0.5M HCl with 250ml of 2M HCl will be
   A. 0.875 M
   B. 1.0 M
   C. 1.75 M
   D. 0.975 M

9. In 'EcoRI', what does 'R' stand for?
   A. Bacterial strain
   B. Restriction endonuclease enzyme
   C. Replication site
   D. Recombinant DNA

10. Which of the following will be expressed only in homozygous condition ?
   A. Phenyl ketonuria
   B. Thalassemia
   C. Yellow colour of pod
   D. All of these

11. Which of the following molecule will not be produced during fermentation ?
   A. H_2O
   B. CO_2
   C. Ethanol
   D. Lactic acid

12. An example of multiple gene is
   A. Human blood group
   B. Human skin colour
   C. Phenyl ketonuria
   D. Albinism

13. How many nullisomy are possible if an organism has 24 chromosomes in somatic cell ?
   A. 24
   B. 12
   C. 6
   D. 3

14. Select the odd one out w.r.t. nitrogen fixation.
   A. Nostoc, Anabaena
   B. Rhizobium, Azotobacter
   C. Agrobacterium, Pseudomonas
   D. Clostridium, Rhizobium

15. In skeletal muscle, each thick myofilament is surrounded by _____ thin myofilaments while each thin myofilament is surrounded by _____ thick myofilaments.
   A. Two, four
   B. Six, three
   C. Three, six
   D. Four, two

16. Free-central placentation is found in
A. Dianthus
B. Argemone
C. Brassica
D. Citrus

17. Which of the following rRNAs acts as structural RNA as well as ribozyme in bacteria?
A. 5S rRNA
B. 18S rRNA
C. 23S rRNA
D. 5.8S rRNA

18. Which kind of therapy was given in 1990 to a four-year-old girl with adenosine deaminase (ADA) deficiency?
A. Gene therapy
B. Chemotherapy
C. Immunotherapy
D. Radiation therapy

19. Which of the following is a sexually transmitted bacterial disease?
A. Syphilis
B. Warts
C. AIDS
D. Typhoid

20. Phytoplankton → Snail → Tuna → Dolphin In the above food chain, if 1 J of energy is available to the secondary consumer then, how much energy was assimilated by the producers?
A. 100 J
B. 10 J
C. 1000 J
D. 0.1 J

21. Enzymes which catalyse linking of C–O, C–S, C–N, P–O etc bonds, belong to which of the following category?
A. Isomerase
B. Ligases
C. Lyases
D. Transferases

22. During urine formation, in which part of nephron, maximum reabsorption of water takes place?
A. DCT
B. PCT
C. Glomerulus
D. Loop of Henle

23. Number of meiotic divisions required to produce 500 pollen grains is
A. 100
B. 125
C. 500
D. 1000

24. In genetic finger printing, the probe refers to
A. A radioactively labelled single stranded RNA molecule
B. A radioactively labelled single stranded DNA molecule
C. A radioactively labelled double stranded RNA molecule
D. A radioactively labelled double stranded DNA molecule

25. In crop improvement programmes, virus free clones can be obtained through
A. Hybridization
B. Embryo culture
C. Grafting
D. Shoot tip culture

26. Pyruvate dehydrogenase complex, needed for the conversion of pyruvic acid to acetyl-CoA is located in
A. Intermembrane space of mitochondria
B. Matrix of mitochondria
C. Cytoplasm
D. Grana of chloroplast

27. During nerve impulse conduction, hyperpolarisation occurs due to
A. Influx of Ca^{++} and efflux of Na^{+}
B. Influx of Na^{+}
C. Efflux of K^{+}
D. Efflux of Na^{+}

28. Which of the following factors can affect the enzymatic activity? A. Change in temperature B. Change in pH C. Change in substrate concentration D. Binding of specific chemical to enzyme
A. A, B, C, D
B. A, B, D
C. A, B
D. B, C, D

29. For its activity, carboxypeptidase requires
A. Zinc
B. Iron
C. Niacin
D. Copper

30. How many organisms in the list given below are autotrophs? *Lactobacillus, Nostoc, Chara, Nitrosomonas, Nitrobacter, Streptomyces, Sacharomyces, Trypansoma, Porphyra, Wolfia*
A. Four
B. Five
C. Six
D. Three

31. Which one of the following pairs of chemical substances, is correctly categorised?
A. Calcitonin and thymosin – Thyroid hormones
B. Pepsin and prolactin – Two digestive enzymes secreted in stomach
C. Troponin and myosin – Complex proteins in striated muscles
D. Secretin and rhodopsin – polypeptide hormones

32. The domestic sewage in large cities
A. Has a high BOD as it containing both aerobic and anaerobic bacteria
B. Is processed by aerobic and then anaerobic bacteria in the secondary treatment in Sewage Treatment Plants (STPs)
C. When treated in STPs does not really require the aeration step as the sewage contains adequate oxygen
D. Has very high amounts of suspended solids and dissolved salts

33. Name the blood cells, whose reduction in number can cause clotting disorder, leading to excessive loss of blood from the body.
A. Erythrocytes
B. Leucocytes
C. Neutrophils
D. Thrombocytes

34. DNA-dependent RNA polymerase catalyses transcription on one strand of the DNA which is called the
A. Template strand
B. Coding strand
C. Alpha strand
D. Anti strand

35. During cell growth, DNA synthesis takes place in
A. S phase
B. G1 phase
C. G, phase
D. M phase

36. Choose the correct statement.
A. All mammals are viviparous.
B. All cyclostomes do not possess jaws and paired fins.
C. All reptiles have a three-chambered heart.
D. All Pisces have gills covered by an operculum

37. The half-life of a radioactive substance is 30 minutes. The time (in minutes) taken between 40% decay and 85% decay of the same radioactive substance is
A. 15
B. 30
C. 45
D. 60

38. A person can see clearly objects only when they lie between 50 cm and 400 cm from his eyes. In order to increase the maximum distance of distinct vision to infinity, the type and power of the correcting lens, the person has to use, will be
A. Convex, +2.25 diopter
B. Concave, -0.25 diopter
C. Concave, -0.2 diopter
D. Convex, +0.15 diopter

39. A filament bulb (5O0 W,100 V) is to be used in a 230 V main supply. When a resistance-R is connected in series, it works perfectly and the bulb consumes 500 W. The value of R in ohms is
A. 230
B. 26
C. 46
D. 13

40. Potentiometer is an accurate and versatile device to make electrical measurements of E.M.F, because the method involves :
A. Cells
B. Potential gradients
C. A condition of no current flow through the galvanometer
D. A combination of cells, galvanometer and resistances

41. The Magnetic Susceptibility is negative for
A. Ferromagnetic material only
B. Paramagnetic and Ferromagnetic materials
C. Diamagnetic material only
D. Paramagnetic material only

42. A Refrigerator works between4°C and 30°C. It is required to remove 600 calories of heat every second in order to keep the temperature of refrigerated space constant, the power required is
A. 236.5 W
B. 2365 W
C. 2.365 W
D. 23.65 W

43. When 1 Kg of ice at 0°C melts, the resulting change in its entropy be, taking latent heat of ice to be 80 cal/°C
A. 273 cal/K
B. $8x10^4$ cal/K
C. 80 cal/K
D. 293 cal/K

44. A current of 2 A flows through a 2 Ω resistor when connected across a battery. The same battery supplies a current of 0.5 A when connected across a 9 Ω resistor. The internal resistance of the battery is
A. 0.5 Ω
B. 1/3 Ω
C. 1/4 Ω
D. 1 Ω

45. An Engine pumps water through a hose pipe. Water passes through a pipe and leaves it with a velocity of 2m/s. The mass per unit length of water in the pipe is 100kg/m. What is the power of the engine?
A. 400 W
B. 200 W
C. 100 W
D. 800 W

46. A common emitter amplifier has a voltage gain of 50, an input impedance of 100 Ω and an output impedance of 200 Ω. The Power gain in the amplifier is
A. 500
B. 1000
C. 1250
D. 50

47. For a Satellite moving in an orbit around the earth, the ratio of kinetic energy to potential energy is
A. 1/2
B. $1/\sqrt{2}$
C. 2
D. $\sqrt{2}$

48. A Car is moving towards a high cliff. The driver sounds a horn of frequency f. The reflected sound heard by the driver has the frequency 2f. If v is the velocity of sound, then the velocity of the car, in the same velocity units will be
A. $v/\sqrt{2}$
B. v/3
C. v/4
D. v/2

49. The earth is Flattened at the poles and bulges at the equator, This is due the fact that
A. The earth revolves around the sun in an elliptical orbit
B. The angular velocity of spinning about its axis is more at the equator
C. The centrifugal force is more at the equator than at the poles
D. None of these

50. Identify the wrong statement
A. For Isothermal process, $\Delta T=0$
B. For Isochoric process, $\Delta V=0$
C. For isobaric process, $\Delta P=0$
D. For cyclic process, $\Delta W=0$

51. A Concave mirror has a focal length of 5cm, when an object is placed at a distance of 15cm from the mirror, where is the image formed?
A. 10 cm in front of the mirror
B. 7.5 cm behind the mirror
C. 2.5 cm in front of the mirror
D. 7.5 cm in front of the mirror

52. A boy multiplies a certain number by 987 and obtains 559981 as his answer. If in the answer all the 9's are wrong but the other digits are correct, then the correct answer is
A. 553681
B. 555181
C. 555681
D. 556581

53. $4^{81} + 4^{82} + 4^{83} + 4^{84}$ is divisible by
A. 3
B. 10
C. 11
D. 13

54. The sum of two numbers is 2000 and their LCM is 21879. The nos. are
A. 1993,7
B. 1991,9
C. 1989,11
D. 1987,13

55. A man plants 15376 apple trees in his garden and arranges them so that there are as many rows as there are apple trees in each row. The number of rows are
A. 124
B. 126
C. 134
D. 144

56. When a ball bounces it rises to $\frac{3}{4}$ of the height from which it fell. If the ball is dropped from 32 m, how high it will rise at the third bounce?
A. 13 m
B. $13\frac{1}{2}$ m
C. $14\frac{1}{2}$ m
D. None of these

57. A tank is $\frac{2}{5}$ full. When 16 litres of water is added to it, it becomes $\frac{6}{7}$ full. The capacity of the tank is
A. 28 litres
B. 32 litres
C. 35 litres
D. 42 litres

58. What is the smallest number by which 3500 should be divided to make it a perfect cube?
A. 9
B. 50
C. 300
D. 450

59. The average age of students of a class is 15.8 years. The average age of boys in the class is 16.4 years and the average age of girls is 15.4. The ratio of number of boys to the number of girls in the class is
A. 1:2
B. 2:3
C. 3:4
D. 3:5

60. A reduction of 21% in the price of wheat enables a person to buy 10.5 kg more for Rs.100. What is the reduced price per kg?
A. Rs. 2
B. Rs. 2.25
C. Rs. 2.30
D. Rs. 2.50

61. 12 men working 8 hours a day complete a piece of work in 10 days. To complete the same work in 8 days working 15 hours a day, the number men required is
A. 4
B. 5
C. 6
D. 8

62. Which of the following statements is incorrect?
A. Rolling Friction is smaller than Sliding Friction
B. Limiting value of static friction is directly proportional to normal reaction
C. Frictional force opposes the relative motion
D. Coefficient of sliding friction has dimensions of length

63. A tuning fork is used to produce resonance in a glass tube, the length of the air column in this tube can be adjusted by a variable piston. At room temperature of 27°C two successive resonances are produced at 20cm and 73cm of column length. If the frequency of the tuning fork is 320Hz, the velocity of sound in air at 27°C is
A. 330 ms^{-1}
B. 339 ms^{-1}
C. 350 ms^{-1}
D. 300 ms^{-1}

64. For a Radioactive material half-life is 10 minutes. If initially there are 600 number of nuclei, the time taken in minutes for the disintegration of 450 nuclei is
A. 20
B. 10
C. 17.5
D. 15

65. If the Mass of the sun were 10 times smaller and the universal Gravitational constant 10 times larger in magnitude, which of the following is not correct?
A. Raindrops will fall faster
B. Walking on the ground will become more difficult
C. Time period of the simple pendulum on the earth would decrease
D. g on the earth will not change

66. The height at which the weight of a body becomes $1/16^{th}$ of its weight on the surface of earth (radius R), is
A. 5 R
B. 15 R
C. 3 R
D. 4 R

67. Which one of the following represents a palindromic sequence in DNA?
A. 5' - GAATTC - 3'
3' - CTTAAG - 5'
B. 5' - CCAATG - 3'
3' - CAATCC - 5'
C. 5' - CATTAG - 3'
3' - GATAAC - 5'
D. 5' - GATACC - 3'
3' - CCTAAG - 5'

68. Which of the following is the correct matching of a vitamin, its nature and its deficiency disease?
B. Vitamin K – Fat Soluble – Beri-Beri
C. Vitamin A – Fat Soluble – Night Blindness
D. Vitamin A – Fat Soluble – Beri-Beri
E. Vitamin K – Water Soluble – Pellagra

69. The Following ratio is generally constant for a given species:
A. A + G / C + T
B. T + C / G + A
C. G + C / A + T
D. A + C / T + G

70. Anthesis is a phenomenon which refers to
A. Reception of Pollen by stigma
B. Formation of Pollen
C. Development of Anther
D. Opening of Flower Bud

71. Which one of the following pairs is wrongly matched?
A. Ginkgo – Archegonia
B. Salvinia – Prothallus
C. Viroids - RNA
D. Mustard –Synergids

72. Which one of the following structures is an organelle within an organelle?
A. Ribosome
B. Peroxisome
C. ER
D. Mesosome

73. For its action, nitrogenase requires
A. High input of energy
B. Light
C. Mn^{2+}
D. Super oxygen radicals

74. *Cuscuta* is an example of
A. Ectoparasitism
B. Brood parasitism
C. Predation
D. Endoparasitism

75. Which of the following activities center is not located in medulla of human brain?
A. Swallowing
B. Vomiting
C. Sneezing
D. Thirst

76. The process that involves the use of a complementary RNA molecule to prevent mRNA molecules from taking part in translation thereby preventing the expression of a gene is
A. ELISA
B. Spooling
C. Elution
D. RNA interference

77. A male bird with copulatory organ is
A. *Struthiocamelus*
B. *Coraciousbengalensis*
C. *Columba livia*
D. *Pavocristatus*

78. Which of the following is not seen in first triploblastic animals?
A. Bilateral symmetry
B. Ladder like nervous system
C. Gut with mouth and anus
D. Moderate cephalization

79. Trypsinogen is converted into trypsin by an enzyme
A. Carboxy peptidase
B. Rennin
C. Enterokinase
D. Chymotrypsinogen

80. A non-proteinaceous enzyme is
A. Lysozyme
B. Ribozyme
C. Ligase
D. Deoxyribonuclease

81. Phytochrome is a
A. Flavoprotein
B. Glycoprotein
C. Lipoprotein
D. Chromoprotein

82. The process which makes major difference between C3 and C4 plants is
A. Glycolysis
B. Calvin cycle
C. Photorespiration
D. Respiration

83. Which of the following biomolecules is common to respiration-mediated breakdown of fats, carbohydrates and proteins?
A. Glucose-6-phosphate
B. Fructose 1,6-bisphosphate
C. Pyruvic acid
D. Acetyl CoA

84. Taylor conducted the experiments to prove semiconservative mode of chromosome replication on
A. *Vincarosea*
B. *Viciafaba*
C. *Drosophila melanogaster*
D. *E. coli*

85. Read the following sentences carefully and select one of the correct option
X : $FADH_2$ transports only 3 pairs of protons outside the membrane through F0 and F1 complex and produce 3 molecules of ATP.
Y : RQ of tripalmitin is 1
Z : In glycolysis 2 molecules of ATP are produced during substrate based phosphorylation
A. X is correct and Y and Z are incorrect
B. X and Y are correct and Z is incorrect
C. All statements are correct
D. All statements are incorrect

86. Which of the following bone formula is correct for hind limb of human?
A. 2, 3, 3, 3, 3
B. 1, 2, 8, 5, 14
C. 1, 1, 2, 7, 5, 14
D. 7, 3, 2

87. Following statements are major bioethical concerns pertaining to biotechnology, except
A. Use of animals in biotechnology causes great suffering to them.
B. When animals are used for production of certain pharmaceutical proteins, they are treated as factory or machine.
C. Introduction of a transgene from one species into another species maintains the integrity of species.
D. Transfer of human genes into animals or vice versa is great ethic threat for human.

88. Which of the following blood corpuscles have bilobed nucleus and participate in allergic reaction?
A. Neutrophil
B. Monocyte

C. Acidophil
D. Basophil

89. Suppose the elements X and Y combine to form two compounds XY_2 and X_3Y_2. When 0.1 mole of XY_2 weighs 10 g and 0.05 mole of X_3Y_2 weighs 9 g, the atomic weights of X and Y are
A. 40, 30
B. 60, 40
C. 20, 30
D. 30, 20

90. The number of electrons delivered at the cathode during electrolysis by a current of 1 ampere in 60 seconds is (charge on electron = 1.60×10^{-19} C)
A. 6×10^{23}
B. 6×10^{20}
C. 3.75×10^{20}
D. 7.48×10^{23}

91. During the electrolysis of molten sodium chloride, the time required to produce 0.10mol of chlorine gas using a current of 3 amperes is
A. 55 minutes
B. 110 minutes
C. 220 minutes
D. 330 minutes

92. The suspension of slaked lime in water is known as
A. Limewater
B. Quicklime
C. Milk of lime
D. Aqueous solution of slaked lime

93. Bakelite is
A. Thermosetting polymer
B. Thermoplastic polymer
C. Elastomer
D. Fiber

94. The van't Hoff factor (i) for a dilute aqueous solution of the strong electrolyte barium hydroxide is:
A. 0
B. 1
C. 2
D. 3

95. How many structural isomers are possible for C3H6O?
A. 3
B. 5
C. 7
D. 9

96. What do we get when ethyne is passed through red hot iron tube at 873 K?
   A. Benzene
   B. Toluene
   C. Mesitylene
   D. Anthracene

97. Basicity of orthoboric acid is
   A. 1
   B. 2
   C. 3
   D. 4

98. pH of a saturated solution of $Ba(OH)_2$ is 12. The solubility product (Ksp) of $Ba(OH)_2$ is
   A. 4×10^{-6}
   B. 5×10^{-9}
   C. 5×10^{-7}
   D. 2×10^{-4}

99. Oxidation number of oxygen in peroxide is
   A. -1
   B. -1/ 2
   C. -2
   D. 0

100. A certain reaction is endothermic in nature and has a positive entropy change. This reaction is
   A. Spontaneous at all temperatures
   B. Non-spontaneous at all temperatures
   C. Spontaneous at high temperatures, but not at low temperatures
   D. Spontaneous at low temperatures, but not at high temperature

1+1+1+1