450125

Paper Code No. : M 45

M 45

Question Booklet No. : .....

ENTRANCE EXAMINATION – 2020

SET - A

ROLL NO : [redacted]

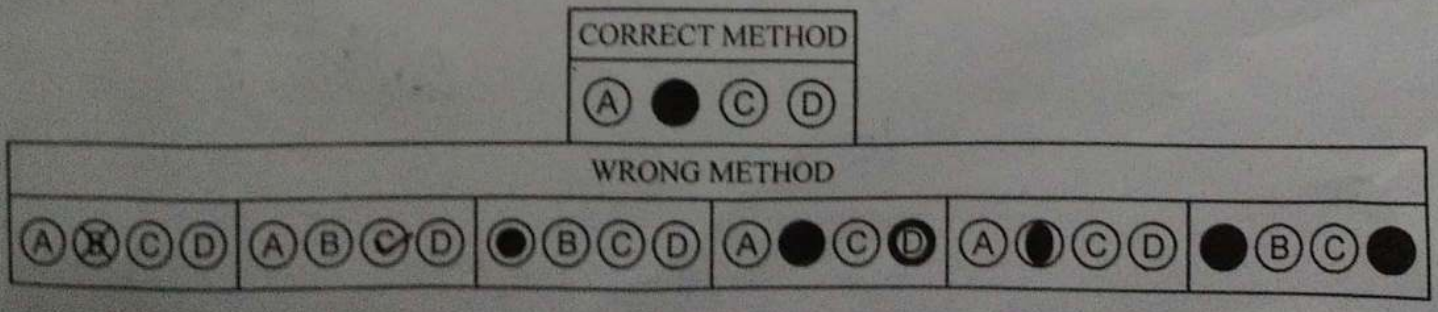
Signature of Invigilator

Time : 1 HOUR 30 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.



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SET - A

1. A series of number follows some rule and the series is 1, 5, 10,16, 23, 31, ...? The missing number of the series is

   A. 38 B. 39

   C. 40 D. 42

2. Identify the wrong number in the series : 5, 8, 20, 42, 124, 244, 736

   A. 42 B. 20

   C. 8 D. 124

3. In the series of DKM, FJP, HIS, JHV .....?. The missing segment will be

   A. HGY B. IGY

   C. IGZ D. LGY

4. In the series of JKL, LKJ, JKLM, MLKJ, JKLMN, ...?. The missing segment will be

   A. NMLKJ B. LMJKN

   C. LMNKJ D. KLMNJ

5. If the letters in the word UNDERTAKING are rearranged in alphabetical order, which one will be in the middle in order after rearrangement?

   A. G B. I

   C. K D. N

6. Identify the next alphabet in the series: DMP, FLN, HKL, JJJ, ...?

   A. LIH B. MII

   C. III D. MIF

7. Doctor is related to patient in the same way as consultant is related to

   A. customer B. accused

   C. magistrate D. client

8. In the following question, select the related word from the given options :

Square : Cube :: Circle : .....?

A. Ellipse
B. Parabola
C. Sphere
D. Cone

9. Pointing to a photograph Raveena says, 'He is the son of the only son of my grandfather'. How is the man in the photograph related to Raveena?

A. brother
B. uncle
C. cousin
D. none of these

10. The relationship between premises and conclusion in a deductive argument is basically of

A. cause effect
B. analytic synthetic
C. implication entailment
D. none of these

11. Statement: "Necessity is the mother of all inventions".

Conclusions

(i) There can be no invention without there being mother.

(ii) Mother is a necessity.

A. Only conclusion (i) is implied
B. Only conclusion (ii) is implied
C. Both (i) and (ii) are implied
D. Either (i) or (ii) is implied

12. Statements : The new education policy envisages major modification in the educational system.

Assumptions

(i) The present education system needs improvement

(ii) The present education system is inconsistent with the national needs.

A. Only assumption (i) is implicit
B. Only assumption (ii) is implicit
C. Both (i) and (ii) are implicit
D. Either (i) or (ii) is implicit

13. Statement : Should the education be given by the Government to the people free of charge?
Arguments

(i) Yes, it will help in universalization of education in the country.

(ii) No, there will be budgetary pressure creating some new problems.

A. Only (i) is strong
B. Only (ii) is strong
C. Both are strong
D. neither (i) nor (ii) is strong

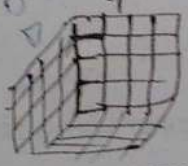
14. If a rectangle is called a circle, a circle a point, a point a triangle and triangle a square, the shape of a wheel is

A. rectangle
B. circle
C. point
D. triangle

15. The sum of three numbers is 102. If the ratio between first and second be 2:3 and that between second and third be 5:3, then the second number is

A. 30
B. 27
C. 48
D. 45

16. A 4 cm cube is cut into 1 cm cubes. What is the percentage increase in the surface area after such cutting?



A. 300%
B. 25%
C. 75%
D. 400%

17. A car takes 6 hours to cover a journey at a speed of 45 km/h. At what speed must it travel in order to complete the journey in 5 hours?

A. 55 km/h
B. 54 km/h
C. 52 km/h
D. 51 km/h

18. In a certain code SUNDAY is coded as YADNUS. How could CREATION be written in that code

A. NOITAERC
B. INOTAERL
C. IONTEARC
D. ERCITANO

19. A train passes through a telegraph post in 9 seconds moving with a speed of 54 km/h. the length of the train is

A. 125
B. 135
C. 145
D. none of these

20. Assertion (A) : Carbon monoxide when inhaled causes death.

Reason (R) : Carbon monoxide combines with haemoglobin.

A. A is true but R is false

B. A is false but R is true

C. Both A and R are true but R is not a correct explanation of A.

D. Both A and R are true but R is a correct explanation of A

21. The pyramid of energy indicates the amount of energy that flows into each trophic level in a given time and it is expressed in

A. $KJ/m^2/year$

B. $KJ/m^2/month$

C. $KJ/m^2/day$

D. none of these

22. The organisms which can eat both plants and animals are called

A. detrivores

B. omnivores

C. carnivores

D. none of these

23. The anaerobic conversion of nitrate into molecular nitrogen (N_2) is called

A. Nitrogen fixation

B. nitrification

C. denitrification

D. none of these

24. The deep layer which comprises of upper warm circulating surface water layer is termed as

A epilimnion

B. hypolimnion

C. thermocline

D. none of these

25. During the transfer of organic food from one traphic level to the next, the percentage of organic matter stored is about

A. 20%

B. 15%

C. 10%

D. none of these

26. The cyclic transfer of chemical elements of the biosphere between organisms and environment are called

A. biological cycles

B. biogeochemical cycle

C. chemical transfer cycle

D. none of these

27. The atmospheric concentration of carbon dioxide in pre-industrial revolution era was

A. 320 ppm
B. 200 ppm
C 278 ppm
D. none of these

28. The stratospheric ozone is measured in Dobson Unit (DU) and DU is equal to

A. 0.01 mm
B. 0.10 mm
C. 1.00 mm
D. none of these

29. The rain is termed as acid rain when the pH of rain water equals to or less than

A. 7.00
B. 6.00
C. 5.60
D. none of these

30. Which category of UV radiations reaching the earth surface due to depletion of ozone layer?

A. UV—A
B. UV—B
C. UV—C
D. none of these

31. The turbidity meter works on the principle of

A. scattering of light
B. adsorption of light
C. reflection of light
D. none of these

32. The color of water is measured in terms of Color Unit (CU) which is equivalent to

A. 1.0 mg/l potassium iodate solution
B. 1.0 mg/l orthotolidin solution
C. 1.0 mg/l platinum cobalt solution
D. none of these

33. Which one of the following practices causes reduction in the per capita demand

A. good water quality
B. hotter climate
C. metering system
D. none of these

34. The design period for water supply projects under normal circumstances is

A. 20 years
B. 30 years
C. 15 years
D. none of these

35. An approximate analysis for TDS is often madeby determining the electrical conductivity o water and expressed in terms of millisiemens per meter. The factor used to conver millisiemens to mg/l is

A. 0.55 to 0.90
B. 0.055 to 0.09
C. 0.55 to 09
D. None of these

36. The discoloration of teeth takes place when fluoride concentration in drinking water exceed

A. 2.0 mg/l
B. 1.0 mg/l
C. 0.5 mg/l
D. none of these

37. Depending on the nature of the organics the numerical values of reaction rate constant, range

A. 0.2 to 0.4 d^{-1}
B. 0.1 to 1.0d^{-1}
C. 0.1 to 0.5 d^{-1}
D. none of these

38. The gastrointestinal disorders, high fever, ulceration of the intestines and possible nerv damage is caused by

A. vibrio comma
B. salmonella typhosa
C. giardia lamblia
D. none of these

39. The liquid and gas contact systems are designed to drive the water gas mixture towar equilibrium as quickly as possible for

A. oxidation
B. reduction
C. degasification
D. none of these

40. The suspensions in which the concentration of particles is not sufficient to cause significan displacement of water as they settle are called

A. concentrated suspensions
B. dilute suspensions
C. floc suspensions
D. none of these

41. The velocity gradient in terms of power dissipation per volume is given by

A. $G = (P / V \mu)^2$
B. $G = (P / V \mu)^{1/2}$
C. $G = (P / V \mu)^{1/3}$
D $G = (P V / \mu)^{1/2}$

42. In recarbonation process, the insoluble carbonates combine with the carbon dioxide to form

A. white precipitates
B. insoluble bicarbonate
C. soluble bicarbonates
D. none of these

43. In slow sand filter, the gelatinous slimes of bacterial growth is formed on the surface and the upper sand layer, which is called

A. biological slime layer
B. filtered slime layer
C. schmutzdecke
D. none of these

44. In chlorination process, the amount of ammonia used generally varies from

A. 1/ 3 to 1/ 4 of the amount of chlorine
B. 1 / 3 to 3 / 4 of the amount of chlorine
C. 1 / 2 to 1 of the amount of chlorine
D. none of these

45. The point at which chlorine that is added to water appears as a residual chlorine, is known as

A. end chlorination point
B. desired chlorination point
C. break point chlorination
D. none of these

46. The coefficient of uniformity of sand to be used in filter is defined as

A. D_{60} / D_{10}
B. D_{10} / D_{60}
C. $D_{60} * D_{10}$
D. none of these

47. Water with high magnesium hardness is softened by the process, called

A. recarbonation
B. split treatment
C. zeolite process
D. none of these

48. The pump suitable for lifting water from very deep tubewells of the order of 100 – 150 m deep, is

A. jet pump
B. submersible pump
C. air lift pump
D. none of these

49. Which one is the most appropriate formula used for the design of pressure pipes?

A. Mannings formula
B. Darcy Weisbach formula
C. Chezy's formula
D. none of these

50. The water hammer pressure can be reduced by using

A. fast closing valves
B. slow closing valves
C. critically closing time, valves
D. none of these

51. A sewer pipe carrying sewage from a building to the point of its immediate disposal is said to be

A. lateral sewer
B. house sewer
C. intercepting sewer
D. none of these

52. The ratio of maximum sewage flow to the average flow for branch sewer up to diameter 500 mm is

A. 2.25
B. 2.50
C. 3.00
D. none of these

53. The sewer piper of diameter less than 400 mm are designed at maximum discharge to be running at

A. 1/2 full depth
B. 2/3 full depth
C. 3/4 full depth
D. None of these

54. A half proportional flow weir cut symmetrically and centrally along the vertical axis is called

A. Proportional flow weir
B. Sutro weir
C. Parshall flume
D. none of these

55. The recommended minimum size of grit to be removed in grit chamber is

A. 0.50 mm
B. 0.25 mm
C. 0.15 mm
D. none of these

56. If the depth of circular manhole is 2.0 m, the corresponding diameter of manhole should be

A. 900 mm
B. 1200 mm
C. 1500 mm
D. 1800 mm

57. Which type of pump is required to break the solids during pumping of sewage?

A. air pressure pump
B. centrifugal pump
C. reciprocating pump
D. none of these

58. The gradient required to generate self cleansing velocity in a circular sewer of 150 mm diameter is

A. 1 in100
B. 1 in 150
C. 1 in 200
D. none of these

59. The appropriate percentage of water content in sewage is

A. 92.0%
B. 99.9%
C. 90.0%
D. none of these

60. The minimum dissolved oxygen content prescribed in river stream to survive fish or other aquatic life should be atleast

A. 2.0 ppm
B. 3.0 ppm
C. 4.0 ppm
D. none of these

61. Which form of nitrogen is expected in fully oxidized sewage?

A. nitrite
B. nitrate
C. molecular nitrogen
D. none of these

62. The detention time adopted for the design of grit chamber is in the order of

A. 1.0 minute
B. 5.0 minute
C. 10.0 minute
D. none of these

63. Which type of reactor follows a longitudinal mixing regime in conventional activated sludge plant?

A. sequencing batch reactor
B. plug flow reactor
C. arbitrary flow reactor
D. none of these

64. The bulking of sludge in the activated sludge clarifier may be caused by

A. filamentous organisms
B. excessive growth of algae
C. nitrifying bacteria
D. none of these

65. The following steps are involved in sequencing batch reactor systems

1. Idle
2. Fill
3. Settle (sedimentation/clarification)
4. React (aeration)
5. Draw (decant)

The correct sequence of these steps are

A. 1, 2, 3, 4, 5
B. 2, 4, 3, 5, 1
C. 2, 3, 4, 5, 1
D. 2, 5, 3, 4, 1

66. The anaerobic conversion of the organic matter into gaseous form is thought to occur i three steps which are

1. Methanogenesis
2. Hydrolysis
3. Acidogenesis

The correct sequence of these steps is

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

67. Trickling filter designs may be classified on the basis of

A. hydraulic loading rates only
B. organic loading rates only
C. hydraulic or organic loading rates
D. hydraulic retention time

68. In an anaerobic digestion process, a well established digester has a total alkalinity of

A. 2000 to 5000 mg/l
B. 1000 to 3000 mg/1
C. 500 to 1000 mg/l
D. none of these

69. In the upflow anaerobic sludge blanket process, the waste to be treated is introduced from

A. the middle of the reactor
B. the bottom of the reactor
C. the top of the reactor
D. anywhere in the reactor

70. A symbiotic relationship between bacteria and algae occurs in

A. anaerobic zone
B. intermediate zone
C. aerobic zone
D. aerobic and intermediate zone

71. When the temperature of ambient air increases, rather than decreases, with altitude the lapse rate is termed as

A. adiabatic lapse rate
B. negative lapse rate
C. environmental lapse rate
D. none of these

72. When stable atmosphere occurs at a short distance above the top of stack, and the unstable conditions prevails below the stack, then the behavior of plume is said to be

A. fanning plume
B. lofting plume
C. fumigating plume
D. none of these

73. The values of horizontal and vertical dispersion coefficients (σ_1 and σ_2) depend on

A. atmospheric stability and downwind distance
B. altitude and downwind distance
C. cross wind as well as downwind distance
D. none of these

74. The Holland's Equation is often used for computation of plume rise under

A. unstable atmospheric conditions
B. stable atmospheric conditions
C. neutral atmospheric conditions
D. none of these

75. The green house gases are radiatively active gases that absorb wave length longer than

A. 1 μm
B. 2 μm
C. 4 μm
D. none of these

76. The symptoms bronzing, glazing and silvering on the under surface of the leave is caused from the exposure of

A. SO_2
B. PAN
C. NO_2
D. none of these

77. The immediate odor threshold of nitrogen dioxide exposure is

A. 0.12 ppm concentration
B. 0.05 ppm concentration
C. 0.07 ppm concentration
D. none of these

78. The primary pollutant sulphure dioxide remains airborne an average time period of

A. 12 - 24 hours
B. 1- 2 days
C. 2 - 4 days
D. none of these

79. How many times carbon monoxide has more affinity to join with hemoglobin than oxygen?

A. 100 times
B. 200 times
C. 300 times
D. none of these

80. As per National Ambient Air Quality Standards (2009), the 24 hourly average value of $PM_{2.5}$ for industrial, residential, rural and other areas is

A. 60 pg/m^3
B. 80 pg/m^3
C. 40 pg/m^3
D. none of these

81. Three different sources are producing the noise levels of 70 dB, 70 dB and 73 dB respectively. The cumulative noise level is equal to

A. 76 dBA
B. 133 dBA
C. 73 dBA
D. none of these

82. What would be the loudness level, if the magnitude of sound pressure level at 1000 Hz is equal to 40 dBA?

A. 140 phons
B. 40 phons
C. 10 phons
D. none of these

83. As per Noise Pollution (Regulation and Control) Rules, the prescribed noise level for commercial area at day time is

A. 50 dBA
B. 60 dBA
C. 65 dBA
D. 55 dBA

84. The noise level is measured at a distance of 10 m from the source and observed to be 110 dBA. What would be the noise level a distance of 80 m from the source?

A. 92 dBA
B. 98 dBA
C. 104 dBA
D. none of these

85. The maximum sound pressure level which can be tolerated by human is about

A. 120 dBA
B. 140 dBA
C. 180 dBA
D. none of these

86. The municipal solid waste, per capita generation rates in commercial area of small towns as per CPHEEO manual and National Building Code is

A. 0.05 - 0.20 kg/capita/day
B. 0.30 - 0.60 kg/capita/day
C. 0.10 - 0.20 kg/capita/day
D. none of these

87. In all healthcare establishments including hospitals, research facilities and laboratories generates biomedical waste as well as non-risk healthcare waste comparable to domestic waste. The percentage of biomedical waste ranges from

A. 75 - 90% of total waste generated
B. 50 - 60% of total waste generated
C. 10 - 25% of total waste generated
D. none of these

88. The procedure for handling and treatment etc. of solid waste as applicable to the concerne building occupancy is governed with

A. The solid waste management rules, 2016

B. The e-waste management rules, 2016

C. The plastic waste management rules, 2016

D. all the above

89. The calorific value of municipal solid waste ranges between

A. 500 and 700 kcal/kg

B. 800 and 1000 kcal/kg

C. 1000 and 1500 kcal/kg

D. none of these

90. Which one of the following is dry process of solid waste anaerobic digestion

A. Low solids anaerobic digestion

B. medium solids anaerobic digestion

C. high solids anaerobic digestion

D. all the above

91. The time period required to decompose and stabilized the solid waste to compost in manu composting is

A. 4 - 6 months

B. 1 -3 months

C. 2 - 3 months

D. none of these

92. The maximum distance from the place of work of sweepers to depots should not b exceeded from

A. 150m

B. 250 m

C. 200 m

D. none of these

93. The modern incineration can reduce the original volume of combustible municipal solid waste by

A. 97%
B. 70%
C. 60%
D. none of these

94. The pyrolysis is a process in which thermal degradation of solid waste is carried out in the

A. presence of oxygen
B. partial presence of oxygen
C. absence of oxygen
D. none of these

95. Gasification is a process in which partial combustion of municipal solid waste is carried out in the presence of oxygen. The energy content of the fuel gas, if oxygen is used instead of air is

A. about 26000 KJ/m^3
B. about 18000 KJ/m^3
C. about 10000 KJ/m^3
D. none of these

96. The pellets also known as Refuse Derived Fuel (RDF) have the calorific value around

A. 2000 Kcal/kg
B. 2500 Kcal/kg
C. 4000 Kcal/kg
D. none of these

97. The hand carts, used for collection of municipal solid waste have 4 - 6 detachable containers. The capacity of each container ranges from

A. 30 - 40 litres
B. 25 - 50 litres
C. 15 - 20 litres
D. none of these

98. In municipal solid waste, the constituent of construction and demolition waste (excluding large construction projects) is

A. about 40 - 50%
B. about 30 - 60%
C. about 10 - 20%
D. none of these

99. The different categories of radioactive waste are

A. high level waste, intermediate level waste, low level waste

B. very high level waste, high level waste, moderate level waste, low level waste

C. high level waste, moderate level waste, low level waste, very low level waste

D. none of these

100. The Plasma Arch Technology works at extremely high temperature environment. A CPHEEO Manual on Municipal Solid Waste Management, the temperature rang between

A. 3000 to 4000 °C

B. 4000 to 6000 °C

C. 5000 to 14000 °C

D. none of these