1. The electrostatic potential at a point in an electrostatic field is equal to :
   (A) The work necessary to bring any positive charge from infinity to the point of consideration
   (B) The work necessary to bring any positive charge from point of consideration to infinity
   (C) The work necessary to bring unit positive charge from infinity to point of consideration
   (D) The work necessary to bring unit positive charge from origin to the point of consideration

2. Two long parallel wires carry identical electric currents in the same direction. Then they will :
   (A) Repel each other
   (B) Attract each other
   (C) Experience no attraction or repulsion
   (D) Get inclined with respect to each other

3. A cylindrical bar magnet is kept along the axis of a circular coil. If the magnet is rotated about its axis, then :
   (A) A current will be induced in the coil
   (B) No current will be induced in the coil
   (C) An emf will be induced in the coil
   (D) Both an emf and a current will be induced in the coil

4. The speed of sound in a gas at NTP is 300 m/s. If the pressure increases four times without change of temperature, the velocity of sound will be :
   (A) 300 m/s
   (B) 150 m/s
   (C) 600 m/s
   (D) 1200 m/s

5. Two black bodies are maintained at $27^{\circ}C$ and $927^{\circ}C$ respectively. What will be the ratio of the radiation emitted by them ?
   (A) 1 : 4
   (B) 1 : 16
   (C) 1 : 64
   (D) 1 : 256

6. A plane is flying horizontally at 98 m/s and releases an object which reaches the ground in 10 sec. Acceleration due to gravity of the earth is $9.8\ m/s^2$. The angle made by the object while hitting the ground is :
   (A) 55°
   (B) 45°
   (C) 60°
   (D) 0°

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7. A body dropped from the top of a tower covers a distance 7h in the last second of its journey where h is the distance covered in the first second. How much time does it take to reach the ground from the top of the tower ?
   (A) 3s
   (B) 4s
   (C) 5s
   (D) 6s

8. When a body moves in a circular path, no work is done by the centripetal force since :
   (A) There is no net force
   (B) There is no displacement
   (C) Force is always away from the centre
   (D) Force and displacement are perpendicular to each other

9. Light year is the unit of :
   (A) Distance
   (B) Time
   (C) Frequency
   (D) Velocity

10. When light travels from glass to air, there will be no charge in its :
   (A) Wavelength
   (B) Frequency
   (C) Velocity
   (D) Amplitude

11. What is the name of the species with electronic configuration $1s^2, 2s^2\ 2p^6, 3s^2\ 3p^6\ 3d^9$?
   (A) Metallic cation
   (B) Metal
   (C) Non Metal
   (D) Non Metal anion

12. The number of neutrons in dipositive zinc ion (Zn^{2+}) with mass number 70 is :
   (A) 30
   (B) 35
   (C) 40
   (D) 45

13. How many electrons can fit in an orbital for which n = 3 and $\ell = 1$?
   (A) 4
   (B) 6
   (C) 8
   (D) 10

14. How many grams of oxygen gas will be needed for complete combustion of 2 moles of acetylene ?
   (A) 80 gram
   (B) 40 gram
   (C) 160 gram
   (D) 320 gram

15. A bivalent metal has equivalent mass 12. Molecular mass of its oxide will be :
   (A) 24
   (B) 32
   (C) 36
   (D) 40

16. Which of the non-metals does not react with oxygen ?

(A) Sulphur

(B) Iodine

(C) Carbon

(D) Phosphorous

17. The correct order of electron affinities of halogens is :

(A) F > Cl > Br > I

(B) I > Br > Cl > F

(C) Cl > F > I > Br

(D) Cl > F > Br > I

18. Which one of the following is a chemical change ?

(A) Change of water to ice

(B) Increase of height of a tree

(C) Rusting of Iron

(D) Mixture of iron dust and sand

19. Which of the following reactions is called displacement reaction ?

(A) $C + O_2 \longrightarrow CO_2$

(B) $CaCO_3 \xrightarrow{\Delta} CaO + CO_2$

(C) $2SO_2 + O_2 \longrightarrow 2SO_3$

(D) $CuSO_4 + Fe \longrightarrow FeSO_4 + Cu$

20. Which one of the following hydrocarbons gives addition reaction ?

(A) CH_4

(B) C_2H_6

(C) C_3H_6

(D) C_3H_8

21. The organelle that protects the cell from oxyen toxicity is :

(A) Lysosome

(B) Peroxisome

(C) Quantasome

(D) Oxysome

22. Mitoribosome belongs to :

(A) 70 S

(B) 60 S

(C) 55 S

(D) 28 S

23. Smallest freeliving organism is :

(A) Virus

(B) Micoplasma

(C) Diatom

(D) Sporozoans

24. The correct order of increasing molecular weight of cell components is :

(A) Adenine · ATP · NAD · DNA

(B) ATP · Adenine · NAD · DNA

(C) DNA · NAD · ATP · Adenine

(D) NAD · DNA · ATP · Adenine

25. The term 'New Systematics' was given by :
(A) C. Linnaeus
(B) C. Darwin
(C) J. Huxley
(D) John Ray

26. Riccia is a type of :
(A) Algae
(B) Fungi
(C) Bryophyta
(D) Pteridophyta

27. Which is not a true fish ?
(A) Silver fish
(B) Dog fish
(C) Sea horse
(D) Mosquito fish

28. An example of lotic water body is :
(A) Pond
(B) River
(C) Lake
(D) Reservoir

29. First international conference on environment was held at :
(A) Rio de Jeneiro
(B) Stockholm
(C) Johannesberg
(D) Berlin

30. World Water Resource Day is celebrated on :
(A) January 26
(B) April 26
(C) February 22
(D) March 22

31. What percentage of energy is passed on to each trophic level ?
(A) 10%
(B) 50%
(C) 90%
(D) 100%

32. Blue baby syndrome disease is caused due to :
(A) Phosphate pollution
(B) Sulphate pollution
(C) Chloride pollution
(D) Nitrate pollution

33. Which of the following is a non-symbiotic aerobic nitrogen fixer ?
(A) Azotobacter
(B) Clostridium
(C) Rhizobium
(D) Azolla

34. When the pollen tube enters through the micropyle of the ovule, the fertilization is said to be :
(A) Porogamous
(B) Chalazogamous
(C) Mesogamous
(D) Embryogamous

35. Heart rot disease in plants is caused due to the deficiency of :
(A) Calcium
(B) Iron
(C) Boron
(D) Magnesium

36. The Vitamin having Cobalt-Cyanide linkage is :
(A) Vitamin B_1
(B) Vitamin B_2
(C) Vitamin B_6
(D) Vitamin B_{12}

37. Sodium reabsorption in the DCT and in the cortical portions of collecting system is accelerated by the secretion of :
(A) ADH
(B) Renin
(C) Aldosterone
(D) Adrenalin

38. The medullary inspiratory centre is always under direct :
(A) Chemical Control
(B) Physical Control
(C) Nervous Control
(D) Mechanical Control

39. The wavelength of light least effective in Photosynthesis is :
(A) Red
(B) Blue
(C) Yellow
(D) Green

40. Which of the following is not a part of Photochemical Smog ?
(A) SPM
(B) PAN
(C) O_3
(D) NO_2

41. Pick out the correct option with regard to the following statements for the real numbers p and q :
(I) If pq is an irrational number, then at least one of p or q is an irrational number
(II) If p + q is an irrational number, then at least one of p or q is an irrational number
(A) Only (I) is true
(B) Only (II) is true
(C) Both (I) and (II) are true
(D) Both (I) and (II) are false

42. While counting the number of pages of a book, the digit 1 occurs 136 times. Then, the number of pages in the book is _____.
(A) 193
(B) 195
(C) 197
(D) 201

43. Ankit gives 60% of his salary to his wife and she spends 40% of the amount on food. Out of the remaining amount, respective ratio between the amount she spends on children's education and the amount she keeps as saving is 4 : 11. If she spends Rs. 2, 880.00 on children's education, then Ankit's salary is _____.

(A) Rs. 22,500.00

(B) Rs. 24,200.00

(C) Rs. 27,600.00

(D) Rs. 30,000.00

44. If $R = \{(x, y) \in \mathbb{R}^2 : x^2 + 9y^2 = 144\}$ and $S = \{(x, y) \in \mathbb{R}^2 : y = \frac{4}{9}x^2\}$, then which one of the following is true ?

(A) $R \cap S$ is an empty set

(B) $R \cap S$ is a singleton set

(C) $R \cap S$ contains two points

(D) $R \cap S$ contains four points

45. Consider the relation R = {(a, b), (b, c)} on the set X = {a, b, c}. What is the minimum number of ordered pairs to be added on R so as to make it an equivalence relation ?

(A) 8

(B) 7

(C) 6

(D) 5

46. On the sets X = [– 1, 1], Y = [0, 1] and Z = [– 1, 0], consider the following relations :

$S_1 = \{(x, y) \in X \times X : x^2 + y^2 = 1\}$

$S_2 = \{(x, y) \in X \times Y : x^2 + y^2 = 1\}$

$S_3 = \{(x, y) \in X \times Z : x^2 + y^2 = 1\}$

$S_4 = \{(x, y) \in Y \times Z : x^2 + y^2 = 1\}$

Then, which one of the following is correct ?

(A) Only S_1 is a function

(B) Only S_1 and S_3 are functions

(C) Only S_2, S_3 and S_4 are functions

(D) S_1, S_2, S_3 and S_4 are functions

47. Which one of the following is true for $0^\circ < \theta < 90^\circ$?

(A) $\cos(\theta) < \cos^2(\theta)$

(B) $\cos(\theta) > \cos^2(\theta)$

(C) $\cos(\theta) \leq \cos^2(\theta)$

(D) $\cos(\theta) \geq \cos^2(\theta)$

48. For what value of p, the following system of linear equations $(2p - 1)x + (p - 1)y = 2p + 1$; $3x + y - 1 = 0$ have no solution ?

(A) $p = 2$

(B) $p \neq 2$

(C) $p = 4$

(D) $p \neq 4$

49. The quadratic equations $x^2 - 6x + a = 0$ and $x^2 - bx + 6 = 0$ have one root in common. The other roots of the first and the second equation are integers in the ratio 4 : 3. Then, the common root of the pair of equations is _____.

(A) 1
(B) 2
(C) 3
(D) 4

50. The remainder, when the polynomial $p(x) = x^5$ is divided by the polynomial $q(x) = x^2 - 3x + 2$ is _____.

(A) $31x - 30$
(B) $31x + 30$
(C) $30x + 31$
(D) $30x - 31$

51. If x, y, z are positive integers such that $2^x > 4^z$ and $3^y > 9^x$, then which one of the following is correct ?

(A) $x < y < z$
(B) $y < z < x$
(C) $z < y < x$
(D) $z < x < y$

52. Which one of the following is the correct value of $\log_2 [\log_2 \{\log_3 (\log_3 27^3)\}]$?

(A) 0
(B) 1
(C) 2
(D) 3

53. Which one of the following is false ?

(A) $\log_2 3$ is an irrational number
(B) $\log_4 18$ is an irrational number
(C) $\log_5 (0.2)$ is a real number
(D) $\left(\sqrt{2}\right)^{2\log_2 3}$ is a rational number

54. If $\alpha + \beta + \gamma = \pi$ and $\cos \alpha = \cos \beta . \cos \gamma$, then the value of $\tan \beta . \tan \gamma$ is _____.

(A) $-\frac{1}{2}$
(B) $\frac{1}{2}$
(C) $\frac{3}{2}$
(D) 2

55. What is the angle of elevation of the Sun, when the length of the shadow of a tree is $\sqrt{3}$ times the height of the tree ?

(A) 25°
(B) 30°
(C) 45°
(D) 60°

56. In a ΔABC, if $\sin^2 A + \sin^2 B = \sin(A + B)$, then the triangle is _____.

(A) Obtuse angled
(B) Equilateral
(C) Isosceles
(D) Right angled

57. How many lines can be drawn through 4 non-collinear points on a plane ?

(A) Six

(B) Five

(C) Four

(D) Three

58. The perimeter of a rhombus is 148 cm. and the length of one of its diagonal is 24 cm. Then, the area of the rhombus is _____.

(A) 700 cm^2

(B) 770 cm^2

(C) 840 cm^2

(D) 875 cm^2

59. In a trapezium ABCD, the side AB is parallel to the side CD and AD = BC. Then, which one of the following is correct ?

(A) $2\angle A = \angle B$

(B) $\angle A = \angle B$

(C) $\angle A < \angle B$

(D) $\angle A = 2\angle B$

60. Which one of the following is false ?

(A) A point is a zero-dimensional object

(B) A line segment is a one-dimensional object

(C) A circle is a two-dimensional object

(D) A polygon is a three-dimensional object

Read the passage carefully and answer the questions (Q. No. 61 to 70) by choosing the most appropriate alternative :

In the past, coffee was generally regarded as being detrimental to heart health. Researchers believed that regularly drinking very strong coffee could increase blood pressure, increase cholesterol levels, and increase the risk of heart attack and cardiac arrhythmias. They even isolated fat like chemicals, 'cafestol' and 'kahwoel', responsible for the rise of cholesterol levels. It turned out that the European brewing method – boiling water sits on the coffee grounds for several minutes before straining – produces high concentrations of cafestol and kahweol. By contrast, the filter and percolation methods remove all but a trace of these chemicals. Moreover, the studies involved large amounts of coffee – five to six cups a day. Moderate coffee drinkers drink only two cups.

Research has also shown that regular, moderate coffee drinking does not dangerously raise blood pressure. And studies have failed to substantiate fears that coffee might trigger abnormal heart rhythms (arrhythmias) in healthy people.

Evidence suggests that coffee may help fend off Parkinson's disease. A 30-year study of 8000 Japanese-American men found that avid coffee drinkers had one-fifth the risk of those who didn't drink the brew.

Scientists at Massachusetts General Hospital, USA, found indirect evidence that caffeine – the habit forming stimulant in coffee – may actually **combat** Parkinson's disease. The caffeine seemed to protect mice brain cells from depletion of the nerve chemical dopamine the problem underlying Parkinson's disease in humans. Studies have now consistently supported caffeine's protective role.

The studies on coffee and cancer have focused on these organs – and are reassuring. You may remember a brief coffee scare in the early 1980s when a single study linked coffee with pancreatic cancer. A false alarm ! Many studies since then have shown that the association is either extremely weak or non-existent.

If there's a connection between coffee and bladder cancer, it possibly applies just to **coffee junkies**. A reanalysis of ten European studies found an increased risk only among people who drank ten or more cups a day. Studies show that coffee seems to have no adverse influence on the risk of colon cancer.

Caffeine is such a powerful stimulant that the International Olympic Committee has set limits on how much can remain in the blood during competition. In addition to boosting physical endurance, caffeine increases alertness and improves mood. People who drink more than they're used to may become restless and unable to sleep. Moreover, it's possible to become physically dependent on caffeine in days.

The question now arises how much to drink ? Those with heart burn and anxiety may want to see if cutting back coffee improves their condition. For most people, however, there's virtually no risk in consuming up to three normal cups a day. Harvard's famous epidemiologist, Meir Stampfer tries to keep his coffee drinking irregular enough to avoid habituation.

61. Initial paragraph mainly deals with the :
    (A) Causes of heart attack in humans
    (B) Ill effects of drinking too much strong coffee
    (C) Benefits of drinking strong coffee
    (D) Beliefs and superstitions related to drinking coffee

62. Which of the following methods leaves only a bit of 'cafestol' and 'kahweol' ?
    (A) Filter and percolation method
    (B) Instant method
    (C) European brewing method
    (D) Boiling method

63. "Caffeine may actually **combat** Parkinson's disease." Pick the option in which the meaning of combat is NOT the same as it is in the passage :

(A) There was a fierce combat between the two sides

(B) A vaccine has been developed to combat the spread of corona virus

(C) The Government is taking strict measures to combat terrorism in the country

(D) We must combat extravagance and waste

64. The consumption of caffeine present in coffee _____ Parkinson's disease.

(A) fully cures

(B) causes

(C) fends off

(D) spreads

65. A study of 8000 Japanese-American men found that men who drank coffee had _____ chance of getting Parkinson's disease than those who did not consume coffee.

(A) 25% more

(B) 20% more

(C) 25% less

(D) 20% less

66. What **'false alarm'** about coffee does the author talk about ?

(A) That drinking coffee in moderation prevents pancreatic cancer

(B) That drinking coffee in moderation increases the risk of bladder cancer

(C) That drinking excessive coffee increases the risk of pancreatic cancer

(D) That drinking excessive coffee prevents pancreatic cancer

67. The author has used the expression **'coffee junkies'** to refer to people who _____.

(A) Produce or sell coffee

(B) Drink coffee in moderation

(C) Do not drink coffee at all

(D) Are crazy about consuming coffee

68. Which of the following statements is **NOT TRUE** about caffeine ?

(A) It is a powerful stimulant and extremely addictive

(B) It decreases anxiety and helps sleep better

(C) It increases alertness and improves mood

(D) It boosts our physical endurance

69. Researchers believe that it is safe to consume upto _____ normal cups of coffee a day.
(A) Two
(B) Three
(C) Four
(D) Ten

70. Stampfer avoids drinking coffee regularly because he _____.
(A) Knows it is very addictive
(B) Is not very fond of it
(C) Cannot afford it
(D) Is unaware of its health benefits

71. Which gas is an effective extinguisher for confined fires ?
(A) Nitrogen dioxide
(B) Carbon dioxide
(C) Sulphur dioxide
(D) Nitrous oxide

72. Deficiency of Vitamin-A results in which of the following problems ?
(A) Night blindness
(B) Rickets
(C) Scurvy
(D) Hairfall

73. What kind of political system exists in India ?
(A) Presidential system
(B) Parliamentary system
(C) Unitary system
(D) Theocratic system

74. Which political party of India has ruled for maximum number of years at the centre since independence ?
(A) Bharatiya Janata Party
(B) Indian National Congress
(C) Janata Dal
(D) Communist Party of India

75. Who was the Chairman of the Drafting Committee of the Constituent Assembly of India ?
(A) Jawaharlal Nehru
(B) K. M. Munshi
(C) Dr. B. R. Ambedkar
(D) Sardar Vallabh Bhai Patel

76. In the context of UN 2030 Agenda, SDG stands for _____.
(A) Specific Direct Goals
(B) Sustainable Development Goals
(C) Special Development Goals
(D) Standard Development Goals

77. The Chairman of the Committee on Coordination of Physical Education (1959-64) was :
(A) Dr. Hriday Nath Kunjru
(B) Shri Ved Prakash
(C) Prof. Yash Pal
(D) Dr. D. S. Kothari

78. In which year was the Constitution of India amended to incorporate the Rigth to Education as a fundamental right ?
(A) 2000
(B) 2002
(C) 2005
(D) 2009

79. In the new school education structure proposed by the NEP 2020, the Foundational stage comprises the preschool years and the first _____ year(s) of elementary school.

(A) 2

(B) 3

(C) 4

(D) 1

80. Prof. Yash Pal Committee Report (1993) is known as :

(A) Happy Learning

(B) Learning without Burden

(C) Education for All

(D) Education for Environment Protection

81. For every correct answer a student scores one mark, but for every incorrect answer he losses $\frac{1}{3}$ mark. He answered 108 questions but scored zero. How many questions he answerd incorrectly ?

(A) 78

(B) 87

(C) 81

(D) 72

82. If 'sky' is coded as TTMMXX, then 'lie' will be coded as :

(A) MMLLDD

(B) MMKKDD

(C) MNOOCC

(D) NNKKFF

83. A and B play Hockey and Football. B and C play Cricket and Football. C and E play Cricket and Volleyball. D and E play Tennis. A and C play Volleyball and Football. A and D play Hockey and Football. Who plays Hockey, Football and Tennis ?

(A) E

(B) D

(C) C

(D) A

84. A series of numbers is given, where one term is missing. Select the missing term from the given alternatives.

2, 9, 30, 93, 282, ____ ?

(A) 746

(B) 846

(C) 843

(D) 849

85. A, B, C, D and E – all have nine balls. B gives two balls to D, who gives one ball to E. C gives 5 balls to E who gives two balls to A. D gives three balls to A who gives two balls to B. How many balls B has now ?

(A) 12

(B) 7

(C) 9

(D) 13

86. Of the following words, first word is related to the second word. Select from the given alternatives, the fourth word which would be related to the third word in similar way.

Psychology : Mind : : Trigonometry : _____ ?

(A) Mathematics
(B) Geometry
(C) Algebra
(D) Triangles

87. One evening Ram and Sam were talking to each other face to face at a crossing. If Ram's shadow was exactly to the left of Sam, which direction Sam was facing ?

(A) South
(B) North
(C) West
(D) East

88. Pointing to a man in a photograph, women says, "he is the father of my only daughter in law's father-in-law." How is the man related to the woman ?

(A) Brother
(B) Husband
(C) Father-in-law
(D) Father

89. In the following question, find the odd one out :

(A) Milk – Curd
(B) Brick – House
(C) Horse – Stable
(D) Paper – Book

90. If 'family' is coded as 316459 and 'sister' is coded as 747820, then 'Mistress' will be coded as :

(A) 64780277
(B) 64782077
(C) 84870277
(D) 64708727

91. Who was the Chairperson of the National Knowledge Commission (NKC) ?

(A) Nandan Nilekani
(B) Sam Pitroda
(C) Subroto Bagchi
(D) N. R. Narayana Murthy

92. The very first National Policy on Education in independent India was formulated in the year :

(A) 1947
(B) 1950
(C) 1968
(D) 1986

93. Which of the Thorndike's Laws of Learning corroborates the popular saying that 'practice makes a man perfect' ?

(A) Law of Readiness
(B) Law of exercise
(C) Law of effect
(D) Law of disuse

94. Life skills education intends to make adolescents :

(A) Develop positive social skills
(B) Develop work ethics
(C) Become self-confident
(D) All of the above

95. Which of the following statements is true ?

(A) Assessment takes place after completion of the education process
(B) Assessment is independent of the aims of education
(C) Assessment is only quantitative in nature
(D) Assessment is an integral part of the teaching-learning process

96. After independence, literacy rate in India :

(A) is gradually increasing
(B) is gradually decreasing
(C) is mostly remaining the same
(D) is sometimes increasing, sometimes decreasing

97. Identify the national level organiszation working in the field of distance education at school stage :

(A) NIOS
(B) NCERT
(C) CIET
(D) NAAC

98. Which of the following organizations is responsible for developing high school (at lower secondary stage) curriculum/syllabus in Odisha ?

(A) SCERT
(B) CHSE, Odisha
(C) BSE, Odisha
(D) Directorate of Secondary Education, Odisha

99. The centrally sponsored 'Operation Blackboard' programme was intended to ensure that all primary schools have :

(A) Blackboards
(B) Blackboards and other teaching aids
(C) Minimum essential facilities
(D) Operational blackboards

100. Which of the following would affect the learning of a student ?

(A) Student's past experience
(B) Motivation
(C) Attention and interest
(D) All of these