PEDAGOGY & EVALUATION

1. The main purpose of teaching process is
   a) Impart information to the learner
   b) Making learner know basic life skills
   c) Change learner's behaviour
   d) Enable the learner to read and write

2. The actual job of a teacher in the classroom is to:
   a) Ensure proper discipline
   b) Exercise control over the class
   c) Create conditions for learning
   d) Monitor learner's behaviour

3. Which of the following theorists defined teaching as client counselling?
   a) Carl Rogers
   b) Jean Piaget
   c) John Dewey
   d) J S Bruner

4. The assessment for learning is typically done:
   a) In the beginning of the course
   b) At the end of the course
   c) During teaching-learning process
   d) Any time of the program

5. Which of the following methods of teaching does not follow constructivist theory?
   a) Problem solving method
   b) Cooperative method
   c) Project method
   d) Lecture Method

6. A series of situations placed before learners for eliciting specific type of behaviour is known as:
   a) Examination
   b) Report Card
   c) A test
   d) A portfolio

7. As the child grows up, there is visible increase in height and weight. This process is called:
   a) Development
   b) Growth
   c) Maturation
   d) Transformation

8. Which of the following is not used as an assessment tool in constructivist learning process?
   a) Standardised test
   b) Rubric
   c) Portfolio
   d) Concept map

9. Which of the following is least important while addressing individual differences in the classroom?
   a) Need-based learning opportunity
   b) Presenting diversified learning tasks
   c) Improved ventilation and bright light
   d) Ability-based grouping of learners

10. Continuous and comprehensive internal evaluation (CCIE) that goes on during the entire academic session is mainly based on:
    a) Summative evaluation
    b) Formative evaluation
    c) Norm-referenced evaluation
    d) Criterion-referenced evaluation

11. Personal growth and self-actualization were the basic elements of learning theory given by:
    a) J B Watson
    b) J S Bruner
    c) R M Gagne
    d) Carl Rogers

12. Which of the following terms is not associated with constructivist approach to learning?
    a) Exploration
    b) Interaction
    c) Exposition
    d) Collaboration

13. Which of the following depends entirely on biological factors?
    a) Growth
    b) Maturation
    c) Socialisation
    d) Enculturation

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14. A student compares his test score with his own score which he obtained one year ago. It is an example of:
a) Peer assessment
b) Self-assessment
c) Internal assessment
d) Formative assessment

15. Which of the following characteristics of a test is more important than all others?
a) Objectivity
b) Reliability
c) Useability
d) Validity

16. Which of the following is not true for summative assessment?
a) Conducted at the end of the course
b) Feedback provided to students and teachers
c) Results in award of grades
d) Focus is on final product of learning

17. The main function of TLMs as used in the classroom is:
a) Attracting learner's attention
b) Improving classroom discipline
c) Improving teacher's competence
d) Enriching learning experience of learners

18. Which of the following approaches provides for better learning conditions?
a) Teacher-centric
b) Learner-centric
c) Subject-centric
d) Library-centric

19. Diagnostic assessment of students is conducted by the teacher:
a) At the end of the lesson
b) During teaching-learning process
c) At the beginning of the lesson
d) At the end of academic session

20. The interaction among physical, mental, and emotional development is called the process of:
a) Socialization
b) Motivation
c) Sanskritization
d) Maturation

21. If a body is in equilibrium under a set of non-collinear forces, then the minimum number of forces has to be:
a) Four
b) Three
c) Two
d) Five

22. A body A is thrown up vertically from the ground with a velocity 'V'. Another body B is simultaneously dropped from a height 'H'. They meet at height $\frac{H}{2}$ if V is equal to:
a) $\sqrt{2gH}$
b) $\sqrt{gH}$
c) $\frac{1}{2}\sqrt{gH}$
d) $\sqrt{\frac{2g}{H}}$

23. A particle moves under a force $F = Kx$ from $x = 0$ to $x = x_1$. The work done is:
a) Kx_1^3
b) Kx_1^2
c) $\frac{1}{2}Kx_1^3$
d) $\frac{1}{2}Kx_1^2$

24. If momentum of a body is increased by 20%, its kinetic energy is increased by:
a) 48%
b) 44%
c) 40%
d) 36%

25. Dimension of impulse is same as that of:
a) Momentum
b) Force
c) Energy
d) Acceleration

26. The mass of moon is 1% mass of earth. The ratio of gravitational pull of earth on moon and that of moon on earth will be:
a) 1:1
b) 1:10
c) 1:100
d) 100:1

27. If the radius of earth shrinks by 2%, its mass remains the same. The acceleration due to gravity on the earth surface will approximately:
a) Decrease by 2%
b) Increase by 2%
c) Decrease by 4%
d) Increase by 4%

28. If M is the mass of earth and R its radius, the ratio of the gravitational acceleration and the gravitational constant is:
a) R^2/M
b) M/R^2
c) MR^2
d) M/R

29. The escape velocity of a body depends upon mass (m) as:
a) m^0
b) m^1
c) m^2
d) m^3

30. The value of escape velocity on a certain planet is 2 km/s. Then the value of orbital speed for a satellite orbiting close to its surface is:
a) 11.2 km/s
b) 8.2 km/s
c) $2\sqrt{2}$ km/s
d) $\sqrt{2}$ km/s

31. Two projectiles of same mass and with same velocity are thrown at an angle 60^0 and 30^0 with the horizontal. Then which of the following will remain same?
a) Time of flight
b) Range of projectile
c) Maximum height
d) All of them

32. The work done per unit volume in deforming a body is given by:
a) Stress × Strain
b) 1/2 (Stress × Strain)
c) 1/2 × Y × $(\text{Stress})^2$
d) None of these

33. The value of Poisson's ratio for a metal lies between:
a) -1 to +1
b) -1 to 0
c) 0 to 1
d) 0 to 0.5

34. According to Hooke's law of elasticity, if stress is increased, the ratio of stress to strain:
a) Remains same
b) Increases
c) Decreases
d) Becomes Zero

35. An open tank filled with water has a narrow orifice at a depth 'h' below the water surface. The velocity of water flowing out does not depend on:
a) Height of liquid
b) Acceleration due to gravity
c) Size of orifice
d) None of these

36. The number of beats formed when two tuning forks of frequencies 282Hz and 286Hz sounds together is:
a) 2
b) 3
c) 4
d) 12

37. The same musical note sounds different when played on various instruments because of different:
a) Intensities
b) Frequencies
c) Wave lengths
d) Harmonic overtones

38. At what temperature will the speed of sound double its value at 273K?
a) 300K
b) 546K
c) 819K
d) 1092K

39. An observer is moving towards a stationary source of frequency 250Hz with a velocity of 40 m/s. If the velocity of sound is 330 m/s, the apparent frequency heard by the observer will be:

a) 280Hz
b) 300Hz
c) 320Hz
d) 500Hz

40. When sound travels from air to water, which parameter does not change?
a) Wave length
b) Frequency
c) Velocity
d) All of these

41. For a real object, the virtual image can be formed by:
a) Plane mirror
b) Convex mirror
c) Concave mirror
d) All of these

42. The time taken by light to cross a 4mm glass slab with a refractive index of 1.5 is:
a) 20 picoseconds
b) 40 picoseconds
c) 50 picoseconds
d) 60 picoseconds

43. An air bubble in water behaves as:
a) Convex lens
b) Concave lens
c) Plane refractive surface
d) None of these

44. The color seen in the reflected white light from a soap bubble is due to:
a) Dispersion
b) Diffraction
c) Refraction
d) Interference

45. If I_0 is the intensity of the principal maximum in the single slit diffraction pattern, then what will be its intensity when the slit width is doubled?
a) $4I_0$
b) $2I_0$
c) $3I_0$
d) $I_0/2$

46. Two-point charges placed in a medium of dielectric constant 5 are at a certain distance 'r' between them, experience an electrostatic force 'F'. The electrostatic force between them in vacuum at the same distance 'r' will be:
a) 5F
b) F/5
c) F/2
d) 10F

47. At a point A, there is an electric field of 500 Vm^{-1} and potential difference of 3000V. The distance between the point charge and A is:
a) 36m
b) 16.6m
c) 12m
d) 6m

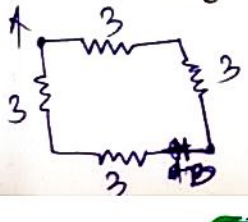
48. Which of the following is a vector quantity?
a) Electric flux
b) Electric charge
c) Electric potential gradient
d) Electric potential

49. The electric potential on the axis of an electric dipole at a distance 'r' from its center is V. Then the potential at a point at the same distance on its equatorial line will be:
a) 2V
b) -V
c) V/2
d) Zero

50. A capacitor of capacitance C has charge Q and stored energy W. If the charge is increased to 2Q, the stored energy will be:
a) 4W
b) 2W
c) W
d) W/2

51. Conductance is expressed in:
a) ohm/m
b) mho/m
c) mho
d) m/ohm

52. A metallic wire of resistance of 12 ohm is bent in the form of a square. The resistance between two diagonal points would be:



a) 12 Ω
b) 24 Ω
c) 6 Ω
d) 3 Ω

53. A battery of emf 10V and internal resistance 3 ohm is connected to an external resistor. If the current flowing is 0.5A, what is the value of external resistance?
a) 13 Ω
b) 17 Ω
c) 15 Ω
d) 19 Ω

54. Two circular coils of diameter 10 cm and 20 cm have same number of turns. The ratio of the magnetic field inductions produced at the center of coils when connected in series is:
a) 1:2
b) 3:2
c) 2:1
d) 2:3

55. Cathode rays enter a magnetic field making oblique angle with the lines of magnetic induction. What will be the nature of the path followed?
a) Parabola
b) Circle
c) Helix
d) Straight line

56. The SI unit of magnetic field is:
a) Tesla
b) Gauss
c) Oersted
d) Weber

57. The magnetic flux linked to a circular coil of radius R is $\phi = (2t^3 + 4t^2 + 2t + 5)$ Wb. The magnitude of induced emf in the coil at t = 5 second is:
a) 108 V
b) 197 V
c) 150 V
d) 192 V

58. The laminated cores are used in transformers to reduce:
a) Hysteresis loss
b) Eddy current loss
c) Copper loss
d) Loss due to flux leakage

59. The peak value of 220 V AC mains is:
a) 250 V
b) 311 V
c) 330 V
d) 440 V

60. If rotational velocity of dynamo armature is doubled, the induced emf will be:
a) Unchanged
b) Halved
c) Two times
d) Four times

CHEMISTRY

61. Dissolving 120 g of urea (mol.wt. = 60) in 1000 g of water gave a solution of density 1.15 g mL^{-1}. The molarity of the solution is:
a) 1.78 M
b) 2.00 M
c) 2.05 M
d) 2.22 M

62. Which of the following species is most stable due to the +I effect of alkyl groups?
a) CH_3^-
b) $(CH_3)_3C^-$
c) $CH_2{=}CH{-}CH_2^-$
d) $CH_3CH_2CH_2^-$

63. In the standardisation of $Na_2S_2O_3$ using $K_2Cr_2O_7$ by iodometry, the equivalent weight of $K_2Cr_2O_7$ is:
a) (Molecular weight)/2
b) (Molecular weight)/6
c) (Molecular weight)/3
d) Same as molecular weight

64. For an electron whose x-positional uncertainty is 1×10^{-20} m, the uncertainty in the x-component of the velocity in ms^{-1} will be of the order of:

(Data: $m_e = 9 \times 10^{-31}$ kg and $h = 6.6 \times 10^{-34}$ Js)

a) 10^2
b) 10^5
c) 10^9
d) 10^{15}

65. If electrons were spin 3/2 particles instead of spin 1/2, then the number of electrons that can be accommodated in a level are:
a) 2
b) 3
c) 4
d) 5

66. The most probable oxidation states for both Cr and Mo are:
a) +2, +3, +4
b) +2, +3, +5
c) +2, +3, +6
d) +3, +4, +5

67. The kinetic energy of an electron in the second Bohr orbit of a hydrogen atom is: [a_0 is Bohr radius]
a) $h^2/4\pi^2ma_o^2$
b) $h^2/16\pi^2ma_o^2$
c) $h^2/32\pi^2ma_o^2$
d) $h^2/64\pi^2ma_o^2$

68. The degree of hydration is expected to be maximum for:
a) Na^+
b) Mg^{2+}
c) Ba^{2+}
d) K^+

69. The decreasing order of ionization energy of the following elements is:
a) Be > B > H > He
b) H > He > Be > B
c) B > Be > He > H
d) He > H > Be > B

70. The correct order of acidic character is :
a) $Al_2O_3 > MgO > SiO_2 > P_4O_{10}$
b) $P_4O_{10} > Al_2O_3 > MgO > SiO_2$
c) $P_4O_{10} > SiO_2 > Al_2O_3 > MgO$
d) $SiO_2 > P_4O_{10} > Al_2O_3 > MgO$

71. The pH of an aqueous solution of Al^{3+} is likely to be:
a) Neutral
b) Acidic
c) Slightly acidic
d) Highly basic

72. The number of σ and π bonds between two carbon atoms in CaC_2 are:
a) Three σ bonds and no π bond
b) Two π bonds and one σ bond
c) Two σ bonds and one π bond
d) One π bond and one σ bond

73. In which of the following C-H bond has the highest s-character?
a) Acetylene
b) Ethylene
c) Methane
d) CH radical

74. The Shape of SF_4 is:
a) Octahedral
b) Tetrahedral
c) Square planar
d) Trigonal bipyramidal

75. Which among the following compounds has the highest melting point?
a) LiF
b) LiCl
c) LiI
d) LiBr

76. The pH of a solution prepared by dissolving 0.0005 moles of $Ba(OH)_2$ in 100ml of water is:
a) 10
b) 12
c) 11
d) 13

77. An aqueous solution containing 0.01 M $FeCl_3$ and 0.06M $HClO_4$ has the same ionic strength as a solution of:
a) 0.09 M NaCl
b) 0.04 M Na_2SO_4
c) 0.06 M $CuSO_4$
d) 0.03 M H_3PO_4

78. Which of the following species is the conjugate base of the hydroxide ion (OH^-)?
a) H_2O

b) O^{2-}
c) O_2^-
d) O_2^{2-}

79. Which of the following reaction intermediates is most stable?

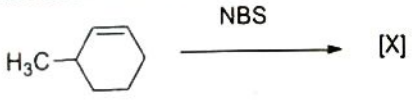
a) CH_3^+
b) $CH_3CH_2^+$
c) $(CH_3)_3C^+$
d) $CH_2=CH-CH_2^+$

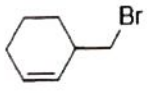
80. In the extraction of iron from its ore in a blast furnace, which of the following acts as the reducing agent?
a) Oxygen
b) Carbon monoxide
c) Limestone
d) Silica

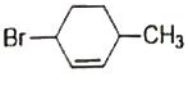
81. The reduction of Fe_2O_3 in a blast furnace is a multi-step process. Which of the following represents the final step in the reduction sequence?
a) $Fe_2O_3 + CO \rightarrow 2FeO + CO_2$
b) $FeO + CO \rightarrow Fe + CO_2$
c) $Fe_2O_3 + 3C \rightarrow 2Fe + 3CO$
d) $Fe_2O_3 \rightarrow Fe + O_2$

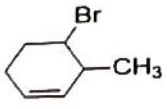
82. What is the name of the compound formed when elemental gold dissolves in aqua-regia?
a) AuCl
b) $AuNO_3$
c) $HAuCl_4$
d) $HAu(NO_3)_4$

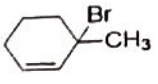
83. The major product [X] of the following monobromination reaction is:



a) 

b) 

c) 

d) 

84. Which of the following is the correct IUPAC name of the compound shown below?

$CH_3-CH_2-CH(CH_3)-CH_2-CH_2-CH_3$

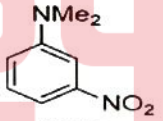
a) 3-Methylhexane
b) 2- Methylhexane
c) 4- Methylhexane
d) 2-Ethylpentane

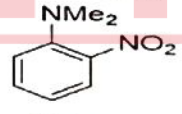
85. Which of the following statements about hyperconjugation is correct?

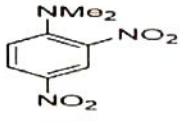
a) It involves delocalization of π electrons only.
b) It stabilizes carbocations via overlap of σ- CH orbitals with an adjacent empty p-orbital.
c) It decreases the electron density on adjacent carbocations.
d) It is a type of inductive effect.

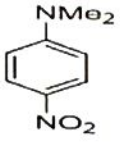
86. The decreasing order of nucleophilicity for the following anions is:
$CH_3CO_2^-$, CH_3O^-, $C_6H_5O^-$, NO_3^-
a) $CH_3CO_2^- > CH_3O^- > C_6H_5O^- > NO_3^-$
b) $CH_3O^- > NO_3^- > C_6H_5O^- > CH_3CO_2^-$
c) $CH_3O^- > C_6H_5O^- > CH_3CO_2^- > NO_3^-$
d) $C_6H_5O^- > CH_3O^- > NO_3^- > CH_3CO_2^-$

87. The major product formed on nitration of N, N-dimethylaniline with conc. H_2SO_4, HNO_3 mixture is:

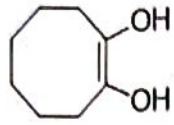
a) 

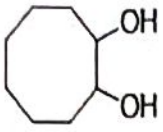
b) 

c) 

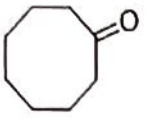
d) 

88. The reaction of cyclooctyne with $HgSO_4$ in the presence of aqueous H_2SO_4 gives:

a) 

b) 

c) 

d) 

89. During smelting of a sulphide ore, SiO_2 is added as a flux. It combines with:
a) Sulphur to form FeS
b) Metal oxide to form slag
c) Unreacted ore to form matte
d) Metal sulphide to form slag

90. Surface tension is highest in:
a) Acetone
b) Diethyl ether
c) Water
d) Benzene

91. A gas is compressed isothermally to half of its original volume. The final pressure is:
a) Halved
b) Doubled
c) Tripled
d) Quadrupled

92. At 25°C, the vapor pressure of pure water is 23.8 mm Hg. A solution is prepared by adding 1 mole of a non-volatile solute to 9 moles of water. The vapor pressure of the solution is:
a) 21.4 mm Hg
b) 23.8 mm Hg
c) 22.5 mm Hg
d) 2.38 mm Hg

93. Which of the following liquids has the highest viscosity?
a) CH_4
b) H_2O
c) CCl_4
d) NH_3

94. A mixture of N_2 and O_2 exerts a total pressure of 800 mm Hg. If partial pressure of N_2 is 600 mm Hg, what is the mole fraction of O_2?
a) 0.25
b) 0.30
c) 0.40
d) 0.75

95. Oxidation number of Mn in $KMnO_4$ is:
a) +4
b) +7
c) +6
d) +2

96. Which of the following is not a redox reaction?
a) $Cu + 2AgNO_3 \rightarrow Cu(NO_3)_2 + 2Ag$
b) $Zn + CuSO_4 \rightarrow ZnSO_4 + Cu$
c) $NaOH + HCl \rightarrow NaCl + H_2O$
d) $2H_2 + O_2 \rightarrow 2H_2O$

97. In the reaction: $Cr_2O_7^{2-} + 6Fe^{2+} + 14H^+ \rightarrow 2Cr^{3+} + 6Fe^{3+} + 7H_2O$, which is the reducing agent?
a) Fe^{2+}
b) Cr^{3+}
c) H^+
d) $Cr_2O_7^{2-}$

98. Which compound acts as both oxidizing and reducing agent?
a) HNO_3
b) H_2O_2
c) HCl
d) NaOH

99. Which metal is most conveniently extracted by the aluminothermic (thermite) process?
a) Iron
b) Aluminium
c) Magnesium

d) Chromium

100. The molarity of H_2SO_4 is 18 M. Its density is 1.8 g mL^{-1}. Hence, molality is:
a) 36 mol/kg
b) 200 mol/kg
c) 500 mol/kg
d) 18 mol/kg

MATHEMATICS

101. In a university, 100 students are enrolled. If 60 study Mathematics, 50 study Physics, and 20 study both, how many of them study neither Mathematics nor Physics?
a) 10
b) 20
c) 40
d) 50

102. Let U={a,b,c,d}, A={a,b},B={b,c}. What is $(A-B)\cup B^c$?
a) {a,d}
b) {a,c,d}
c) {a,b,d}
d) {a,d}∪{c}

103. What is the total number of subsets of S that contain at least two elements if the power set of a set S contains 256 elements ?
a) 248
b) 256
c) 247
d) None of these

104. If $A \subseteq B$, which of the following is always true about B−A?
a) B−A=A
b) B−A=B
c) (B−A)∩A=∅
d) B−A=∅

105. Let R be a relation on A={1,2,3,4} defined by R={(x,y) | x+y is even}. Which of the following is true about R?
a) R is reflexive and transitive but not symmetric
b) R is symmetric and transitive but not reflexive
c) R is reflexive, symmetric, and transitive
d) R is neither reflexive nor symmetric

106. Given that $f:R \to R$ defined by $f(x)=x^3-3x$, which of the following is true about f ?
a) f is injective but not surjective
b) f is surjective but not injective
c) f is neither injective nor surjective
d) f is both injective and surjective

107. What is the Domain(Df) and Range(Rf) of the function f(x)=(3x+1)/(x−2) where the inverse function exists?
a) Df= (−∞,2)∪(2,∞), Rf =(−∞,3)∪(3,∞)
b) Df=(−∞,3)∪(3,∞), Df = (−∞,2)∪(2,∞)
c) Df= (−∞,2)∪(2,∞), Rf = (−∞,2)∪(2,∞)
d) None of these

108. The congruence modulo relation ≡ is an equivalence relation on which of the following sets?
a) Set N
b) Set Q
c) Set R
d) None of these

109. Which of the following formula gives the sum of the first n odd natural numbers?
a) n(n+1)/2
b) n(n−1)/2
c) n^2
d) n(n+2)/2

110. The smallest positive integer n such that n! is divisible by 1000 is:
a) 12
b) 15
c) 14
d) 10

111. What is the solution set of |x−3| ≥4 ?
a) (−∞,−1]∪[7,∞)
b) (−∞,−1]∪[7,∞]
c) (−∞,−11)∪(7,∞)
d) None of the above

112. If x is a rational number and y is an irrational number, then which of the following combinations is always true?
a) x^y is irrational
b) y^x is irrational
c) x+y is irrational
d) All of these

113. For the quadratic equation $2x^2+3x+c=0$, $c<0$, the discriminant is:
   a) Always positive
   b) Always zero
   c) May be positive, negative, or zero depending on c
   d) Always negative

114. Consider the quadratic equation $x^2-6x+k=0$. If one root is thrice the other, find the value of k.
   a) 12
   b) 9
   c) 18
   d) None of these

115. What is the minimum number of real root(s) in fifth degree polynomial?
   a) 1
   b) 2
   c) 4
   d) 5

116. Which of the following statements contradicts the Fundamental Theorem of Algebra?
   a) Polynomial of degree n always has n roots in the complex plane including multiplicities
   b) A polynomial of degree n always has at least n distinct roots.
   c) A polynomial with real coefficients can have complex roots.
   d) Complex roots of polynomials with real coefficients occur in conjugate pairs.

117. The value of $(1+1/2x)^x$ when $x\to\infty$ is :
   a) e
   b) e^2
   c) ∞
   d) None of these

118. The function $f(x)=x^4-4x^2$ is increasing in which interval ?
   a) $(-\infty,-\sqrt{2})\cup(\sqrt{2},\infty)$
   b) $(-\infty,-0)\cup(0,\infty)$
   c) $(-\sqrt{2},\sqrt{2})$
   d) None of these

119. If $f(x)= e^{\ln x}\, x^{-1}$, what is $f'(x)$?
   a) $-1/x$
   b) $1/x^2$
   c) $-1/x^3$
   d) None of these

120. The equation of the normal to the curve $y=e^x$ at $x=0$ is:
   a) $y = -x -1$
   b) $y = e^x +1$
   c) $y = -x +1$
   d) None of these

121. The sum of the series $3 + 3/2 + 3/4 +\ldots$ is:
   a) 6
   b) 9
   c) 12
   d) None of these

122. The product of three consecutive terms of a geometric progression (GP) is 512, and the middle term is 8. What are the terms?
   a) 2,8,6
   b) 4,8,16
   c) 8,8,8
   d) None of these

123. If $\lim a_n = 0$, then which of the following is true for $\sum a_n$?
   a) Convergent
   b) Divergent
   c) Convergent to 0
   d) None of these

124. What is the Taylor series expansion for $\ln(1+x)$ about $x = 0$?
   a) $\ln(1+x)=x-x^2+x^3-x^4+\ldots$
   b) $\ln(1+x)=x-x^2/2+x^3/3-x^4/4+\ldots$
   c) $\ln(1+x)=1+x+x^2/2+x^3/6+\ldots$
   d) $\ln(1+x)=x+x^2+x^3+x^4+\ldots$

125. The equation of the line passing through the point (3,-4) and having the X-intercept twice the Y-intercept is:
   a) $x+2y=-5$
   b) $x-2y=5$
   c) $x+2y=5$
   d) None of these

126. Which of the following statements is true about the slopes of lines parallel and perpendicular to the Y-axis?
   a) The slope of a line parallel to the Y-axis is 0 and the slope of a line perpendicular to the Y-axis is ∞

b) The slope of a line parallel to the Y-axis is ∞ and the slope of a line perpendicular to the Y-axis is 0
c) Both the slope of a line parallel and perpendicular to the Y-axis are ∞
d) None of these

127. The area of the triangle formed by the X-axis, Y-axis, and the line $x+2y-4=0$ is:
a) 6
b) 2
c) 4
d) None of these

128. What is the eccentricity of a circle?
a) 1
b) <1
c) >1
d) None of these

129. The equation $x^2+y^2+z^2-6x+4y-12z=0$ represents a sphere. Which of the following points lies inside the sphere?
a) (2,−1,4)
b) (0,0,0)
c) (3,2,−1)
d) (−1,−1,−1)

130. Which of the following represents the plane passing through the point (1,2,3) and having a normal vector (2,−3,1)?
a) $x+y+z=0$
b) $x-y-z-1=0$
c) $x-y+z-1=0$
d) None of these

131. The d.c.s of the line $(x-1)/2=(y+3)/-1=(z-4)/3$ is given as:
a) $(2/\sqrt{14}, -1/\sqrt{14}, 3/\sqrt{14})$
b) (2,−1,3)
c) $(1/\sqrt{14}, -1/\sqrt{14}, 3/\sqrt{14})$
d) None of these

132. The equation of a sphere is $x^2+y^2+z^2+6x-8y+10z-20=0$. Determine the relationship between plane $x+y+z=4$ and the sphere.
a) The plane is tangent to the sphere
b) The plane is not tangent to the sphere
c) The plane passes through the centre of the sphere
d) None of these

133. What is the probability of getting four sixes and then another number in five random rolls in a balanced die?
a) 1/7776
b) 5/7776
c) 3125/7776
d) None of these

134. What is the probability of getting 5 heads and 7 tails in 12 flips of a balanced coin ?
a) 132/4096
b) 792/4096
c) 252/4096
d) 1/4096

135. A coin is flipped 3 times. The event A represents getting at least one head, and B represents getting an even number of tails. How many outcomes are in the sample space for A∩B?
a) 2
b) 3
c) 4
d) 5

136. If the mean of a binomial distribution is 8 and the probability of success p=0.4, what is the value of n (the number of trials)?
a) 10
b) 15
c) 25
d) 20

137. Two dice are rolled and the outcome is valid only if the sum of the numbers rolled is either an even number or a prime number. What is the total number of outcomes in the sample space?
a) 34
b) 36
c) 33
d) 32

138. For a positively skewed distribution, which of the following is always true?
a) Mean < Median < Mode
b) Mean > Median > Mode
c) Mean = Median = Mode
d) Mode > Median > Mean

139. What is the formula to calculate variance of natural numbers?
a) (Sum of squares of natural numbers)/n−(Mean)^2
b) (Sum of squares of natural numbers)/n + (Mean)^2
c) (Sum of natural numbers)/n−(Mean)^2
d) None of these

140. If mean : median of a certain data is 2:3, what is the ratio of its mode and mean?

a) 3:2
b) 5:2
c) 3:5
d) 2:3

141. The mean of a data set is equal to 10 and its standard deviation is equal to 1. If we add 5 to each data value, then the mean and standard deviation become:

a) Mean=15, Standard deviation=6
b) Mean=10, Standard deviation=6
c) Mean=15, Standard deviation=1
d) Mean=05, Standard deviation=6

142. $\tan 15.\tan 45.\tan 75 =$ _____

a) –1
b) 1/2
c) 1
d) None of these

143. If $\cos^2(720+x)-\sin^2(720+x)=k$, then what is the value of k?

a) 0
b) –1
c) 1
d) cos(2x)

144. What is the value of cos20.cos40.cos80 ?

a) 1/16
b) 1/8
c) 1/4
d) None of these

145. What is the value of $\tan(\sin^{-1}(\cos(\tan^{-1}1)))$?

a) π/3
b) π/2
c) π/4
d) None of these

146. If cos(2B)=cos(A+C)/cos(A-C) then tanA, tanB, tanC are in:

a) Geometric progression
b) Arithmetic progression
c) Harmonic progression
d) None of these

147. The ratio between the curved surface area and the total surface area of a right circular cylinder is 1:2. What is the ratio between height and radius of the cylinder ?

a) 1:1
b) 1:2
c) 2:1
d) None of these

148. The radius and slant height of a cone are in the ratio of 4:7. If its curved surface area is 792 cm^2, then what is its radius?

a) 3cm
b) 12cm
c) 4cm
d) 7cm

149. The radius of a hemispherical balloon increases from 7 cm to 14 cm as air is being pumped into it. What is the ratio of the surface areas of the balloon in these two cases?

a) 1:2
b) 7:14
c) 1:4
d) None of these

150. In a circle of radius 21 cm, an arc subtends an angle of 60° at the center. The area of the sector formed by the arc is:

a) 200 cm^2
b) 220 cm^2
c) 231 cm^2
d) None of these