101 Test in Physics Chemistry and Mathematics (Shift 3)

1. When there is an electric current through a conducting wire along its length, then an electric field must exist

    (A) outside the wire but normal to it
    (B) outside the wire but parallel to it
    (C) inside the wire but normal to it
    (D) inside the wire but parallel to it

2. A moving charge produces electric field along *x*-direction and magnetic field along *y*-direction. Then what is the direction of its velocity?

    (A) *x* direction
    (B) *y* direction
    (C) *z* direction
    (D) Can be in any direction

3. Phase difference between voltage and current of a purely inductive circuit is

    (A) $\dfrac{\pi}{4}$

    (B) $\dfrac{\pi}{12}$

    (C) $\dfrac{\pi}{8}$

    (D) $\dfrac{\pi}{2}$

4. When two coherent sources of same intensity interfere, the resultant intensity will be

    (A) 4 times of the initial intensity
    (B) 8 times of the initial intensity
    (C) 2 times of the initial intensity
    (D) Equal to initial intensity

5. Wavelength of source is 6000 Å and the diameter of object is 100 inch, so the limit of resolution is

   (A) 2.9×10^{-7} radians

   (B) 2.8×10^{-7} radians

   (C) 2.5×10^{-7} radians

   (D) 2.8×10^{-5} radians

6. The SI units of radioactivity is

   (A) Curie
   (B) Fermi
   (C) Becquerel
   (D) Joule

7. The mean life for particle decay is

   (A) 1.145 times greater than half life
   (B) 1.445 times greater than half life
   (C) 1.465 times greater than half life
   (D) 1.345 times greater than half life

8. Which of the following electromagnetic waves have lowest wavelength?

   (A) Green light
   (B) X-rays
   (C) Gamma rays
   (D) Ultraviolet rays

9. Fermi energy level of the intrinsic semiconductor is located

   (A) just below the valence band
   (B) just above the conduction band
   (C) either below or above the conduction band
   (D) half way between the valence and conduction band

10. Zener diode is always used in the

   (A) Forward bias condition
   (B) Reverse bias condition
   (C) Zero bias condition
   (D) All the above

11. At room temperature, the n-type semiconductor will have

   (A) more of electrons
   (B) more of ions
   (C) more of holes
   (D) equal number of electrons and holes

12. The SI base unit for forces is

   (A) $mkgs^{-2}$

   (B) N

   (C) $mkgs^{2}$

   (D) $m^{2}kgs^{-2}$

13. When light rays enter into a medium having different optical density, there will be change in

   (A) its speed and frequency
   (B) its speed and wavelength
   (C) its frequency and wavelength
   (D) its speed, frequency and wavelength

14. An electric dipole placed in a non uniform electric field experiences

   (A) no force and no torque
   (B) a force and a torque
   (C) no force but a torque
   (D) a force but no torque

15. Which of this experiment proves that particle has wave nature?

   (A) Davisson-Germer experiment
   (B) Millikan experiment
   (C) Faraday's experiment
   (D) Newton rings experiment

16. A proton and an alpha particle are accelerated by a constant electric field. Their acceleration will be in the ratio of

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

17. Superconductor exhibits

   (A) paramagnetism
   (B) ferromagnetism
   (C) diamagnetism
   (D) ferrimagnetism

18. At what distance from the point of equilibrium, the kinetic energy equals the potential energy for a simple harmonic oscillator of amplitude A?

   (A) $\dfrac{A}{4}$

   (B) $\dfrac{A^2}{4}$

   (C) $\dfrac{A}{\sqrt{2}}$

   (D) $\dfrac{A}{2}$

19. For a given material, the Young's modulus is 6 times its rigidity modulus. Its Poisson's ratio is

   (A) 0.2
   (B) 2
   (C) 4
   (D) 0.4

20. The gravitational potential of a solid sphere is minimum

   (A) at the surface of the sphere
   (B) at a point outside the sphere
   (C) at midpoint between the centre and surface of the sphere
   (D) at the centre of the sphere

21. Adding detergent to the water, increases its

   (A) surface tension
   (B) viscosity
   (C) wetting action
   (D) angle of contact

22. A 2 kg box sits on a 3 kg box which sits on a 5 kg box. The 5 kg box rests on a table top. What is the normal force exerted on the 5 kg box by the table top?

    (A) 29.4 N
    (B) 49 N
    (C) 98 N
    (D) 19.6 N

23. A Decoration of mass M is suspended by a string from the ceiling inside an elevator. The elevator is travelling upward with a constant speed. The tension in the string is

    (A) equal to Mg
    (B) less than Mg
    (C) greater than Mg
    (D) impossible to tell without knowing the speed

24. If the pressure of an ideal gas in a closed chamber is doubled, then the volume of the gas

    (A) become two times
    (B) becomes half
    (C) remain constant
    (D) become four times

25. The work done by pseudo forces is

    (A) Positive
    (B) Negative
    (C) Zero
    (D) Infinite

26. In an isothermal process, the specific heat of the gas is

    (A) finite
    (B) one
    (C) zero
    (D) infinite

27. Which theory explains that every point on a wavefront may be considered as a source of secondary spherical wavelets?

    (A) Huygen's wave theory
    (B) Corpuscular theory
    (C) Electromagnetic theory
    (D) Quantum theory

28. Which light source is used in long distance optical fiber communication?

(A) Metal Halide light
(B) Incandescent light
(C) LED source
(D) Laser

29. The NAND gate output will be low if the two inputs are

(A) 01
(B) 00
(C) 10
(D) 11

30. C_p and C_v are specific heats at constant pressure and constant volume respectively. It is observed that $C_p - C_v = a$ for oxygen gas and $C_p - C_v = b$ for nitrogen gas. The correct relation between a and b is

(A) $8a = 7b$
(B) $7a = 8b$
(C) $a = b$
(D) $a = -b$

31. The temperature of a body falls from 40°C to 36°C in 5 minutes when placed in a surrounding of constant temperature 16°C. The time taken by the body temperature to fall from 36°C to 32°C is

(A) 8 min
(B) 6.1 min
(C) 4.2 min
(D) 5 min

32. 2 kg ice at –20°C is mixed with 5 kg water at 20°C, then final amount of water in the mixture will be (specific heat of ice is = 0.5 cal/gm°C; specific heat of water is = 1 cal/gm°C; latent heat of fusion is 80 cal/gm)

(A) 6 kg
(B) 7 kg
(C) 3.5 kg
(D) 5 kg

33. The minimum orbital angular momentum of an electron in hydrogen atom is

   (A) h

   (B) $\dfrac{h}{2}$

   (C) $\dfrac{h}{2\pi}$

   (D) $\dfrac{h}{\lambda}$

34. Cooking gas containers are kept in a lorry moving with uniform speed.
   The temperature of the gas molecules inside will be

   (A) increase
   (B) decrease
   (C) remain same
   (D) increases for some while decreases for others

35. An electric dipole is placed at an angle of 30° in a non-uniform electric field. The dipole will experience

   (A) a translational force only in the direction of the field
   (B) a translational force only in a direction normal to the direction of the field
   (C) a torque as well as a translational force
   (D) a torque only

36. Which of the following phenomena is **NOT** common to sound and light waves?

   (A) Interference
   (B) Diffraction
   (C) Coherence
   (D) Polarization

37. If the binding energy of the electron in a hydrogen atom is 13.6 eV, the energy required to remove the electron from the first excited state of Li^{2+} is

   (A) 30.6 eV
   (B) 13.6 eV
   (C) 3.4 eV
   (D) 122.4 eV

38. Heat transfer in air occurs mainly due to

    (A) Conduction
    (B) Convection
    (C) Radiation
    (D) Radiation and Conduction

39. A body weighs 40 g in air. If its volume is 10 cc, then in water it will weigh

    (A) 30 g
    (B) 40 g
    (C) 50 g
    (D) 33 g

40. The strength of the magnetic field around a straight wire is

    (A) Same everywhere around the wire
    (B) Obeys inverse square law
    (C) Directly proportional to square of the distance from the wire
    (D) Directly proportional to the distance from the wire

41. The electrostatic pressure on a charged surface having a surface charge density σ is

    (A) $\sigma/2\varepsilon_0$

    (B) $\sigma^2/2\varepsilon_0$

    (C) σ/ε_0

    (D) σ^2/ε_0

42. According to Joule's law, if the potential difference across a conductor having a material of specific resistance 'ρ' remains constant, then heat produced in the conductor is directly proportional to

    (A) ρ

    (B) ρ^2

    (C) $1/\rho$

    (D) $1/\sqrt{\sigma}$

43. A circular coil of radius R carries a current I, for which the magnetic field at its centre is B. At what distance x from the centre on the axis of the coil, the magnetic field will be $B/8$

(A) $\sqrt{2}\,R$
(B) $\sqrt{3}\,R$
(C) $2R$
(D) $3R$

44. If a magnet is enclosed in a box made up of iron, then the magnetic field outside the box will be

(A) very high but finite
(B) infinity
(C) low value but finite
(D) zero

45. A bar magnet is dropped vertically down through a wire loop held horizontally. The magnet will fall

(A) with acceleration 'g'
(B) with acceleration greater than 'g'
(C) with uniform acceleration less than 'g'
(D) with non-uniform acceleration less than 'g'

46. The mutual inductance between a pair of coils does not depend on

(A) number of turns in the coil
(B) separation between the coils
(C) relative orientation of the coil
(D) rate of change of current with coils

47. Which of the following statement is **NOT** correct?

(A) The magnification produced by a convex mirror is always less than one
(B) A virtual, erect, same-sized image can be obtained using a plane mirror
(C) A virtual, erect, magnified image can be formed using a concave mirror
(D) A real, inverted, same-sized image can be formed using a convex mirror

48. A beam of light consisting of red, green and blue colours is incident on AB of a right angled prism. The refractive index of the material of the prism for red, green and blue are 1.39, 1.44 and 1.47 respectively. The prism will
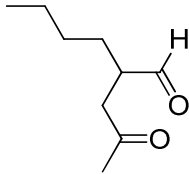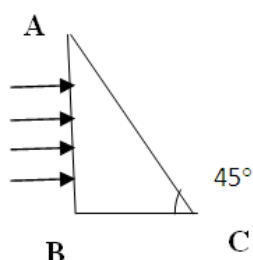

(A) separate red colour from the green and blue colour
(B) separate blue colour from the red and green colour
(C) separate all the colours from one another
(D) all colours propagate along same path

49. Light from the constellation Virgo is observed to increase in wavelength by 0.4%. With respect to the earth the constellation is

(A) moving away with velocity 1.2×10^6 m/s

(B) coming close with velocity 1.2×10^6 m/s

(C) moving away with velocity 4×10^6 m/s

(D) coming close with velocity 4×10^6 m/s

50. When light passes from one medium into another medium, which of the physical property does not change?

(A) Velocity
(B) Wavelength
(C) Frequency
(D) Refractive index

51. In hydrogen atom, if the difference in the energy of the electron in $n = 2$ and $n = 3$ orbits is E, the ionization energy of hydrogen atom is

(A) 13.2 E
(B) 7.2 E
(C) 5.6 E
(D) 3.2 E

52. Nucleus with same neutron number but different atomic number is called as

    (A) isobars
    (B) isotones
    (C) isotopes
    (D) isotherm

53. The mass of one Curie of U^{234} is

    (A) 3.7×10^{10} gm

    (B) 2.348×10^{23} gm

    (C) 1.48×10^{-11} gm

    (D) 6.25×10^{-24} gm

54. A voltmeter with resistance 150 Ω is connected across a 150 V source having an internal resistance of 0.8 Ω, then the voltmeter will read

    (A) 100.4
    (B) 149.2
    (C) 120
    (D) 178.6

55. Electrical conductivity of a semiconductor

    (A) decreases with the rise in its temperature
    (B) increases with the rise in its temperature
    (C) does not change with the rise in its temperature
    (D) first increases and then decreases with the rise in its temperature

56. In an insulator, the energy gap between the valance band and conduction band is of the order of

    (A) > 5 eV
    (B) 2 eV
    (C) 3.6 eV
    (D) 4.1 eV

57. Three small spheres, each carrying a positive charge Q, are placed on the circumference of a circle of radius 'r' to form an equilateral triangle. The electric field intensity at the center of the circle will be

(A) $3Q/r$

(B) $3Q/r^2$

(C) $Q/2r^2$

(D) zero

58. In an LCR series a.c circuit, the voltage across each of the components, L, C, and R is 50 V. The voltage across the LC combination will be

(A) 100 V
(B) $50\sqrt{2}$ V
(C) 50 V
(D) 0 V (zero)

59. A telescope has a magnifying power of 10. If one looks at a tree of height 15 meters through the telescope, then the tree appears

(A) 10 times taller
(B) 10 times farther
(C) 10 times nearer
(D) 15 times nearer

60. If the radius of the Earth's orbit is made one-fourth, the duration of one year will become

(A) 8 times

(B) 4 times

(C) $\frac{1}{4}$ times

(D) $\frac{1}{8}$ times

61. In which of the following thermodynamic processes, there is no flow of heat between the system and the surroundings?

(A) Isobaric
(B) Isochoric
(C) Adiabatic
(D) Isothermal

62. Entropy remains constant in

   (A) isothermal process
   (B) adiabatic process
   (C) cyclic process
   (D) isobaric process

63. While charging the lead storage battery

   (A) $PbSO_4$ at cathode is reduced to Pb

   (B) $PbSO_4$ at anode is reduced to Pb

   (C) $PbSO_4$ at cathode is oxidised to Pb

   (D) $PbSO_4$ at anode is oxidised to Pb

64. Axial ratios of hexagonal will be

   (A) $a = b = c$
   (B) $a = b \neq c$
   (C) $a \neq b \neq c$
   (D) $a = 2b = 3c$

65. Structure of cesium chloride crystal is

   (A) face centred cubic
   (B) body centred cubic
   (C) simple cubic
   (D) hexagonal close packing

66. What type of stoichiometric defect is shown by ZnS?

(A) Schottky defect
(B) Frenkel defect
(C) Both Frenkel and Schottky defects
(D) Plane defect

67. Which one of the following is **NOT** applicable to catalytic action?

(A) Catalyst reduces energy of activation
(B) Catalyst will be most effective in the finely divided state
(C) Catalyst can alter the position of equilibrium of reversible reactions
(D) Catalyst cannot initiate a reaction

68. If dispersed phase and dispersion medium are gas and liquid, respectively, then the name of the colloidal system is

(A) aerosol
(B) solid foam
(C) foam
(D) emulsion

69. The electric charge on a colloidal particle is observed by

(A) Brownian movement
(B) Electrolysis
(C) Electrodialysis
(D) Electrophoresis

70. 'All four quantum numbers cannot be the same for any two electrons in an atom'. This principle is known as

(A) Aufbau principle
(B) Hund's rule
(C) Pauli's Exclusion principle
(D) Plank's rule

71. 50 ml of 0.1 M acetic acid is mixed with 50 ml 0.1 M sodium acetate. The pH of the solution is (pK_a of acetic acid is 4.26)

(A) 13.0
(B) 7.0
(C) 4.26
(D) 1.0

72. One mole of an ideal gas undergoes expansion from 24.6 l to 246.0 l against a constant pressure of 1 atmosphere at 300 K. The work done is

(A) 221.4 l atm
(B) 24.6 l atm
(C) 9.0 l atm
(D) 0.082 l atm

73. Aqueous solution of $CuSO_4$ is electrolyzed between the Pt electrodes. At anode

(A) Cu is oxidized to Cu^{2+}
(B) Cu^{2+} is reduced to Cu
(C) H_2 gas is evolved
(D) O_2 gas is evolved

74. IUPAC name of the following compound is

(A) 4-formyloctan-2-one
(B) 2-(2-oxopropyl)hexanal
(C) 2-butyl-4-oxopentanal
(D) 2-butyl-4-ketopentanal

75. Carbon monoxide (CO) acts as a

(A) strong π-donor and weak π-acceptor
(B) weak π-donor and strong π-acceptor
(C) weak σ-donor and strong π-acceptor
(D) strong σ-donor and good π-acceptor

76. Methoxypropane and Ethoxyethane constitute a pair of

(A) functional group isomers
(B) metamers
(C) position isomers
(D) regioisomers

77. The stability order of methyl, ethyl, isopropyl and *tert*-butyl carbocations is

(A) methyl > ethyl > isopropyl > *tert*-butyl
(B) methyl < ethyl < isopropyl < *tert*-butyl
(C) methyl ≈ ethyl > isopropyl > *tert*-butyl
(D) methyl < ethyl ≈ isopropyl < *tert*-butyl

78. Compare the steam volatility of 2-hydroxybenzaldehyde with that of 4-hydroxybenzaldehyde.
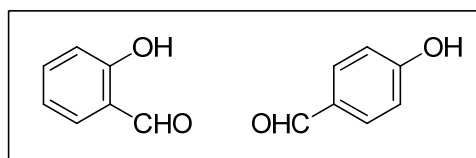
(A) both are equally steam volatile
(B) both are not steam volatile
(C) 2-hydroxybenzaldehyde is much more steam volatile than 4-hydroxybenzaldehyde
(D) 4-hydroxybenzaldehyde is much more steam volatile than 2-hydroxybenzaldehyde

79. The active stationary phase in Partition chromatography over chromatographic paper is

(A) cellulose
(B) starch
(C) hemicellulose
(D) water trapped in chromatographic paper

80. Kolbe's electrolytic method is suitable for the generation of which among the following gases in the pure form?

(A) Methane
(B) Ethane
(C) Propane
(D) Isobutane (2-methylpropane)

81. But-2-yne is converted to (*E*)-but-2-ene by
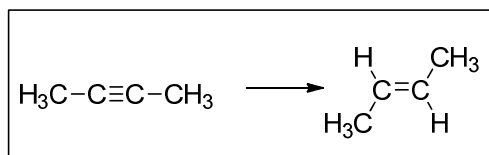
(A) catalytic hydrogenation using Lindlar's catalyst
(B) using Raney nickel
(C) copper catalyzed partition reaction with *n*-butane
(D) reduction using controlled amount of sodium in liquid ammonia

82.   Cyclic compounds with alternating single and double bonds can be

   (A)   aromatic or antiaromatic
   (B)   aromatic or nonaromatic
   (C)   antiaromatic or nonaromatic
   (D)   aromatic, antiaromatic or nonaromatic

83.   Which among the following methods is **NOT** a suitable one for the preparation of benzene?

   (A)   Passing ethyne under pressure through an iron tube heated up to 873 K
   (B)   Soda lime distillation of benzoic acid
   (C)   Treatment of chlorobenzene with sodium metal in dry ether
   (D)   Passing phenol in the gaseous state over a heated bed of zinc dust

84.   Which among the following halides will undergo fastest SN1 solvolysis in water?

   (A)   2-fluoro-2-methylpropane
   (B)   2-chloro-2-methylpropane
   (C)   2-bromo-2-methylpropane
   (D)   2-iodo-2-methylpropane

85.   Which among the following methods is **NOT** suitable for selective generation of butan-1-ol?

   (A)   Reaction of butylmagnesium bromide with water
   (B)   Reaction of propylmagnesium bromide with formaldehyde
   (C)   Reaction of ethylmagesium bromide with ethylene oxide
   (D)   Hydroboration of but-1-ene followed by oxidation with hydrogen peroxide in the presence of aqueous sodium hydroxide

86. Predict the major products formed in the acidic hydrolysis of cumene hydroperoxide.
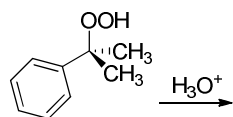
 (A) Phenol and acetone
 (B) Benzoic acid and methanol
 (C) Acetophenone and ethanol
 (D) Phenol and propan-2-ol

87. Which of the following nuclides is most radioactive?

 (A) $_{47}^{108}\text{Ag}$

 (B) $_{30}^{66}\text{Zn}$

 (C) $_{17}^{37}\text{Cl}$

 (D) $_{15}^{31}\text{P}$

88. Which radical can be tested with Nessler's reagent?

 (A) K

 (B) NH_4^+

 (C) Na^+

 (D) Fe^{3+}

89. The observed mass of $_{26}\text{Fe}^{56}$ is 55.9375 amu. Using the mass of proton and neutron = 1.00732 amu and 1.00866 amu respectively, calculate the mass defect?

 (A) 0.6234
 (B) 0.6753
 (C) 0.5678
 (D) 0.5126

90. The thermal stability of hydrides is in the order of

 (A) HF > HCl > HBr > HI
 (B) HF > HI > HCl > HBr
 (C) HF > HBr > HI > HCl
 (D) HF < HI < HBr > HCl

91. Which complex is called as outer orbital complex?

    (A) $[Fe(CO)_5]$

    (B) $[Fe(H_2O)_6]^{2+}$

    (C) $[Ni(CO)_4]$

    (D) $[Fe(CN)_6]^{2-}$

92. How many atoms are present in a FCC unit cell?

    (A) 3
    (B) 4
    (C) 2
    (D) 6

93. How many elements are present in the sixth period of the modern periodic table?

    (A) 18
    (B) 22
    (C) 36
    (D) 32

94. In which of the following pairs, Dipole-induced dipole interaction is present?

    (A) HCl and He atoms

    (B) Cl_2 and CCl_4

    (C) SiF_4 and He atoms

    (D) H_2O and alcohol

95. In which of the following compounds, the maximum covalent character is shown?

    (A) $MgCl_2$

    (B) $FeCl_2$

    (C) $SnCl_2$

    (D) $AlCl_3$

96. Which of the following is Paramagnetic?

(A) CO

(B) CN^-

(C) NO^+

(D) O_2

97. Choose the correct formula for borax.

(A) $Na_2B_4O_7.5H_2O$

(B) $Na_2B_4O_7.10H_2O$

(C) $Na_2B_4O_7.3H_2O$

(D) $Na_2B_4O_7.H_2O$

98. Diagonal relationship between beryllium and aluminium is due to the fact that

(A) the ionic radius and charge/radius ratio of Be^{2+} is nearly the same as that of Al^{3+} ion.

(B) like aluminium, beryllium is readily attacked by acids

(C) the chlorides of beryllium and aluminium are not soluble in organic solvents and are strong Lewis bases

(D) beryllium and aluminium ions have no tendency to form complexes

99. Identify the **CORRECT** statement

(A) Sodium carbonate is also called as baking soda

(B) Sodium carbonate is a white crystalline solid which exists as a decahydrate, $Na_2CO_3.10H_2O$

(C) Sodium carbonate is generally prepared by Castner-Kellner process

(D) Anhydrous sodium carbonate is called as soda lime

100. Considering the elements F, Cl, O and N, the correct order of their chemical reactivity in terms of oxidizing property is

(A) F > Cl > O > N

(B) F > O > Cl > N

(C) Cl > F > O > N

(D) O > F > N > Cl

101. If the value of $\lim\limits_{x \to 0} \dfrac{(1-x)^n - 1}{x}$ is 100, then n is equal to

   (A) 100
   (B) −100
   (C) 99
   (D) −99

102. Let $f(x)$ be a polynomial of degree 2 satisfying $f(0) = 1$, $f'(0) = -2$ and $f''(0) = 6$.
    Then $\int\limits_{-1}^{2} f(x)\,dx$ is equal to

   (A) 6
   (B) 0
   (C) 9
   (D) 3

103. The domain of the derivative of the function $f(x) = \tan^{-1} x$, if $|x| \le 1$ and

    $f(x) = \dfrac{1}{2}(|x| - 1)$, if $|x| > 1$, is

   (A) $\Box - \{0\}$
   (B) $\Box - \{1\}$
   (C) $\Box - \{-1\}$
   (D) $\Box - \{-1, 1\}$

104. The function $f : \Box - \{0\} \to \Box$ given by $f(x) = \dfrac{1}{x} - \dfrac{2}{e^{2x} - 1}$ can be made continuous at
    $x = 0$ by defining $f(0)$ as

   (A) 0
   (B) 1
   (C) 2
   (D) −1

105. Rolle's theorem is applicable to the function

   (A) $f(x) = |x|, \ -1 \le x \le 1$
   (B) $f(x) = \tan x, \ 0 \le x \le \pi$
   (C) $f(x) = \sin^2 x, \ 0 \le x \le \pi$
   (D) $f(x) = x^3 - 3x + 3, \ 0 \le x \le 1$

106. If $\sin^{-1} x + \sin^{-1} y = \dfrac{\pi}{2}$, then the value of $\cos^{-1} x + \cos^{-1} y$ is

   (A) $\dfrac{\pi}{3}$

   (B) $\dfrac{\pi}{2}$

   (C) π

   (D) $\dfrac{2\pi}{3}$

107. The number of different salads that can be made from cucumber, tomatoes, onions, beetroot and carrots is

   (A) 16
   (B) 28
   (C) 31
   (D) 32

108. The total number of subsets of a finite set A has 56 more elements than the total number of subsets of another finite set B. The number of elements in the set A is

   (A) 5
   (B) 6
   (C) 7
   (D) 8

109. If $\sqrt{5}$ and $-\sqrt{5}$ are two roots of the polynomial $x^3 + 3x^2 - 5x - 15,$ then its third root is

   (A) 3
   (B) −3
   (C) 5
   (D) −5

110. The value(s) of p such that the lines, represented by the pair of linear equations $3x - y - 5 = 0$ and $6x - 2y - p = 0$, be parallel is

(A) all real values except 10

(B) 10

(C) $\dfrac{5}{2}$

(D) $\dfrac{1}{2}$

111. If $A = [a_{ij}]$ is a symmetric matrix of order 2×2 such that $|A| = -15$ and c_{ij} represents the cofactor of a_{ij} then the value of $a_{21}c_{12} + a_{22}c_{22}$ is

(A) 17
(B) 18
(C) 19
(D) -15

112. One ticket is selected at random from 50 tickets numbered 00, 01, 02, . . . 49. Then the probability that the sum of the digits on the selected ticket is 8, given that the product of these digits is zero, equals

(A) $\dfrac{5}{14}$

(B) $\dfrac{1}{50}$

(C) $\dfrac{1}{7}$

(D) $\dfrac{1}{14}$

113. Let $x + 8y - 22 = 0$, $5x + 2y - 34 = 0$, $2x - 3y + 13 = 0$ be the three sides of a triangle. Then the area of the triangle is

(A) 19 square unit
(B) 36 square unit
(C) 42 square unit
(D) 72 square unit

114. For any two real numbers θ and ϕ, we define $\theta R \phi$ if and only if $\sec^2 \theta - \tan^2 \theta = 1$. The relation R is

   (A) reflexive but not transitive
   (B) symmetric but not reflexive
   (C) both reflexive and symmetric but not transitive
   (D) an equivalence relation

115. Let $f : R \to R$ be a positive increasing function with $\lim_{x \to \infty} \dfrac{f(3x)}{f(x)} = 1$. Then

   $\lim_{x \to \infty} \dfrac{f(2x)}{f(x)} =$

   (A) $\dfrac{3}{2}$

   (B) 3

   (C) 1

   (D) $\dfrac{2}{3}$

116. From 6 different novels and 3 different dictionaries, 4 novels and 1 dictionary are to be selected and arranged in a row on a shelf so that the dictionary is always in the middle. Then the number of such arrangement is

   (A) at least 750 but less than 1000
   (B) at least 1000
   (C) at least 500 but less than 750
   (D) less than 500

117. If the imaginary part of $\dfrac{2z+1}{iz+1}$ is -1, then the locus of the point representing z in the complex plane is

   (A) a straight line
   (B) a parabola
   (C) a circle
   (D) an ellipse

118. The minimum value of $27 \tan^2 \theta + 3 \cot^2 \theta$

    (A) lies between 1 and 17
    (B) greater than or equal to 18
    (C) less than 18
    (D) lies between 2 and 12

119. If $\sin^{-1} x + \sin^{-1} y + \sin^{-1} z = \dfrac{3\pi}{2}$, then the value of

$$x^{100} + y^{100} + z^{100} - \frac{9}{x^{101} + y^{101} + z^{101}} \text{ is}$$

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

120. Let x be an integer such that $x^2 - 3x < 4$. Then the number of possible values of x is

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

121. The product of all solutions of the equation $(x-2)^2 - 3|x-2| + 2 = 0$ is

    (A) 0
    (B) -2
    (C) 2
    (D) -4

122. If $\log_{0.5} \sin x = 1 - \log_{0.5} \cot x,$ then the number of solutions of $x \in [-2\pi, 2\pi]$ is

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

123. The value of $\sqrt{3}.\operatorname{cosec} 20° - \sec 20°$ is equal to

    (A) 1
    (B) $3\sin 20°$
    (C) 4
    (D) $4\cos 40°$

124. If $5\sin \alpha = 7\sin \beta,$ then $\dfrac{\tan\left(\dfrac{\alpha+\beta}{2}\right)}{\tan\left(\dfrac{\alpha-\beta}{2}\right)}$ is equal to

    (A) 6
    (B) 8
    (C) 10
    (D) 12

125. The minimum value of $P = bcx + cay + abz$, when $xyz = abc$ is

    (A) abc
    (B) $2abc$
    (C) $3abc$
    (D) $6abc$

126. If $\sqrt{3} + i = (a + ib)(c + id)$, then $\tan^{-1}\dfrac{b}{a} + \tan^{-1}\dfrac{d}{c}$ is equal to

    (A) $\dfrac{\pi}{2} + 2n\pi$ for some integer n

    (B) $-\dfrac{\pi}{3} + n\pi$ for some integer n

    (C) $-\dfrac{\pi}{6} + 2n\pi$ for some integer n

    (D) $\dfrac{\pi}{6} + n\pi$ for some integer n

127. If three positive unequal numbers x, y, z are in Harmonic Progression, then

   (A) $x^2 + y^2 > z^2$

   (B) $x - y > z$

   (C) $x^2 + z^2 > 2y^2$

   (D) $x^2 + y^2 + z^2 > 1$

128. Let a be positive and let M and N be the arithmetic and geometric means of the roots of $x^2 - 2ax + a^2$ respectively. Then

   (A) $M = 2N$
   (B) $M = -N$
   (C) $M = N$
   (D) $M = -2N$

129. Let $y = f\left(x^3\right)$, $z = g\left(x^5\right)$, $f'(x) = \tan x$ and $g'(x) = \sec x$. Then $\dfrac{dy}{dz}$ is equal to

   (A) $\dfrac{3}{5x^2} \cdot \dfrac{\tan x^3}{\sec x^5}$

   (B) $\dfrac{5x^2}{3} \cdot \dfrac{\sec x^5}{\tan x^3}$

   (C) $\dfrac{3x^2}{5} \cdot \dfrac{\tan x^3}{\sec x^5}$

   (D) $\dfrac{5}{3x^2} \cdot \dfrac{\sec x^5}{\tan x^3}$

130. Let $y = \sin^{-1}\left(\sqrt{x - ax} - \sqrt{a - ax}\right)$. Then $\dfrac{dy}{dx}$ is equal to

   (A) $\dfrac{1}{\sin\sqrt{a - ax}}$

   (B) $\sin\sqrt{x} . \sin\sqrt{a}$

   (C) $\dfrac{1}{2\sqrt{x}\sqrt{1 - x}}$

   (D) 0

131. If $3^x + 3^y = 3^{x+y}$, then $\dfrac{dy}{dx}$ equals

    (A) $\dfrac{3^x + 3^y}{3^x - 3^y}$

    (B) $\dfrac{3^x + 3^y}{1 + 3^{x+y}}$

    (C) $\dfrac{3^{x+y} - 3^y}{3^y}$

    (D) $3^{x-y}\left(\dfrac{3^y - 1}{1 - 3^x}\right)$

132. If $P(1, 2)$, $Q(4, 6)$, $R(5, 7)$ and $S(a, b)$ are the vertices of a parallelogram $PQRS$, then

    (A) $a = 2, b = 4$
    (B) $a = 3, b = 4$
    (C) $a = 2, b = 3$
    (D) $a = 3, b = 5$

133. The area of the triangle formed by joining the origin to the points of intersection of the line $\sqrt{5}x + 2y = 3\sqrt{5}$ and the circle $x^2 + y^2 = 10$, is

    (A) 6 sq units
    (B) 5 sq units
    (C) 4 sq units
    (D) 3 sq units

134. The lines $x - y - 2 = 0$, $x + y - 4 = 0$ and $x + 3y = 6$ meet at the common point

    (A) $(1, 2)$
    (B) $(2, 2)$
    (C) $(3, 1)$
    (D) $(1, 1)$

135. The equation of the chord of the circle $x^2 + y^2 - 4x = 0$, whose mid point is $(1, 0)$, is

    (A) $y = 2$
    (B) $y = 1$
    (C) $x = 2$
    (D) $x = 1$

136. One of the diametrical chord of the circle $x^2 + y^2 - 12x + 4y + 6 = 0$ is

(A) $x + y = 0$
(B) $x + 3y = 0$
(C) $x = y$
(D) $3x + 2y = 0$

137. The equation of the line which is tangent to both the circle $x^2 + y^2 = 5$ and the parabola $y^2 = 40x$ is

(A) $2x - y \pm 5 = 0$
(B) $2x \pm y + 5 = 0$
(C) $2x \pm y - 5 = 0$
(D) $2x + y \pm 5 = 0$

138. Let the points $(1, 2)$ and $(k, -1)$ be conjugate points with respect to the ellipse $2x^2 + 3y^2 = 6$. Then the value of k is

(A) 2
(B) 4
(C) 6
(D) 8

139. If $f(x + y, x - y) = xy$, then the arithmetic mean of $f(x, y)$ and $f(y, x)$ is

(A) y
(B) x
(C) 0
(D) xy

140. If $f(x)$ is an odd periodic function with period 2, then $f(4)$ equals

(A) -4
(B) 4
(C) 2
(D) 0

141. $\lim\limits_{x\to 2}\dfrac{2^x - x^2}{x^x - 2^2}$ is equal to

    (A) $\dfrac{\log 2 - 1}{\log 2 + 1}$

    (B) $\dfrac{\log 2 + 1}{\log 2 - 1}$

    (C) 1

    (D) -1

142. If $f(x) = \sum\limits_{n=0}^{\infty} \dfrac{x^n}{n!}(\log a)^n$, then at $x = 0$, $f(x)$

    (A) has no limit
    (B) is discontinuous
    (C) is continuous but not differentiable
    (D) is differentiable

143. Let $f(x + y) = f(x)f(y)$ and $f(x) = 1 + \sin 2x.g(x)$, where $g(x)$ is continuous. Then $f'(x)$ equals

    (A) $f(x)\, g(0)$

    (B) $2f(x)\, g(0)$

    (C) $2g(0)$

    (D) $g(0)$

144. The area of the triangle formed by a tangent to the curve $2xy = a^2$ and the coordinate axes is

    (A) $2a^2$

    (B) a^2

    (C) $3a^2$

    (D) $4a^2$

145. $\int \sin^3 x \cdot \cos^2 x \, dx$ is equal to

(A) $\dfrac{\sin^5 x}{5} - \dfrac{\sin^3 x}{3} + c$

(B) $\dfrac{\sin^5 x}{5} + \dfrac{\sin^3 x}{3} + c$

(C) $\dfrac{\cos^5 x}{5} - \dfrac{\cos^3 x}{3} + c$

(D) $\dfrac{\cos^5 x}{5} + \dfrac{\cos^3 x}{3} + c$

146. $\int \dfrac{\sin(2x)}{1+\cos^2 x} \, dx$ is equal to

(A) $-\dfrac{1}{2}\log\left(1+\cos^2 x\right) + c$

(B) $2\log\left(1+\cos^2 x\right) + c$

(C) $\dfrac{1}{2}\log\left(1+\cos 2x\right) + c$

(D) $c - \log\left(1+\cos^2 x\right)$

147. $\int \dfrac{x^3 + 3x^2 + 3x + 1}{(x+1)^5} \, dx$ is equal to

(A) $-\dfrac{1}{x+1} + c$

(B) $\dfrac{1}{5}\log(x+1) + c$

(C) $\log(x+1) + c$

(D) $\tan^{-1} x + c$

148. The solution of the differential equation $\dfrac{dy}{dx} = \dfrac{x(2\log x + 1)}{\sin y + y\cos y}$ is

(A) $y\sin y = x^2 \log x + \dfrac{x^2}{2} + c$

(B) $y\cos y = x^2(\log x + 1) + c$

(C) $y\cos y = x^2 \log x + \dfrac{x^2}{2} + c$

(D) $y\sin y = x^2 \log x + c$

149. The solution of the differential equation $ydx + \left(x - y^3\right)dy = 0$ is

(A) $xy = \dfrac{1}{3}y^3 + c$

(B) $xy = y^4 + c$

(C) $y^4 = 4xy + c$

(D) $4y = y^3 + c$

150. The ratio in which $\hat{i} + 2\hat{j} + 3\hat{k}$ divides the join of $-2\hat{i} + 3\hat{j} + 5\hat{k}$ and $7\hat{i} - \hat{k}$ is

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

151. A vector perpendicular to the plane containing the points
$A(1, -1, 2)$, $B(2, 0, -1)$ and $C(0, 2, 1)$ is

(A) $4\hat{i} + 8\hat{j} - 4\hat{k}$
(B) $8\hat{i} + 4\hat{j} + 4\hat{k}$
(C) $3\hat{i} + \hat{j} + 2\hat{k}$
(D) $\hat{i} + \hat{j} - \hat{k}$

152. Let the angle θ between the line $\dfrac{x+1}{1} = \dfrac{y-1}{2} = \dfrac{z-2}{2}$ and the plane

$2x - y + \sqrt{\lambda}z + 4 = 0$ be such that $\sin\theta = \dfrac{1}{3}$. Then the value of λ is

(A) $-\dfrac{4}{3}$

(B) $\dfrac{3}{4}$

(C) $-\dfrac{3}{5}$

(D) $\dfrac{5}{3}$

153. The order of the element $\overline{4}$ in the group $\left(\square^{*}_{11}, \square_{11}\right)$ is

(A) 1
(B) 3
(C) 10
(D) 11

154. Let a, b, c be the lth m^{th} and n^{th} powers of a GP and all are positive.

Then $\begin{vmatrix} \log a & l & 1 \\ \log b & m & 1 \\ \log c & n & 1 \end{vmatrix}$ equals

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

155. The torque about the point $3\vec{i} - \vec{j} + 3\vec{k}$ of a force $4\vec{i} + 2\vec{j} + \vec{k}$ through the point $5\vec{i} + 2\vec{j} + 4\vec{k}$, is

(A) $\vec{i} + 2\vec{j} - 8\vec{k}$

(B) $\vec{i} + 2\vec{j} + 8\vec{k}$

(C) $\vec{i} - 2\vec{j} - 8\vec{k}$

(D) $\dfrac{\vec{i} + 2\vec{j} - \vec{k}}{3}$

156. If $i = \sqrt{-1}$, then the value of $i + i^{22} + i^{23} + i^{24} + i^{25}$ is

(A) i
(B) -1
(C) 1
(D) $-i$

157. If $f'(x) = x$ and $f(1) = 2$, then $f(x)$ is

(A) $-\dfrac{2}{3}\left(x\sqrt{x} + 2\right)$

(B) $\dfrac{2}{3}\left(x\sqrt{x} + 2\right)$

(C) $-\dfrac{1}{2}\left(x^2 + 3\right)$

(D) $\dfrac{1}{2}\left(x^2 + 3\right)$

158. If $f(x) = x^2$ and $g(x) = \sqrt{x}$, then

(A) $(g \circ f)(-2) = 2$
(B) $(f \circ g)(2) = 4$
(C) $(g \circ f)(2) = 4$
(D) $(f \circ g)(3) = 6$

159. The value of k, such that the function $f(x) = \begin{cases} kx^2, & x \le 2 \\ 3, & x > 2 \end{cases}$ is continuous at $x = 2$, is

(A) 2
(B) 1.75
(C) 0.75
(D) 2.75

160. The missing vertex of a triangle whose other two vertices

$(-3, -9), (-1, 6)$ and centroid $\left(-\dfrac{1}{3}, 2\right)$ is

(A) (3, 9)
(B) (2, 3)
(C) (3, 4)
(D) (4, 3)

161. The function $f(x) = |x - 1|$ is not differentiable at

(A) 1

(B) $\dfrac{3}{4}$

(C) 2

(D) $\dfrac{1}{3}$

162. If $\omega \, (\neq 1)$ be a cube root of unity, then the value of $\tan\left\{\left(\omega^{10} + \omega^{20}\right)\pi + \dfrac{\pi}{4}\right\}$ is

(A) 1

(B) -1

(C) $\dfrac{1}{\sqrt{3}}$

(D) $-\dfrac{1}{\sqrt{3}}$

163. The two circles $|z - 1 - i| = \sqrt{2}$ and $|z| = \sqrt{2}$ intersect at

(A) no point
(B) one point
(C) two points
(D) four points

164. In the binomial expansion of $(a-b)^n$, $n \geq 5$, the sum of the 5th and 6th terms is zero. Then $\dfrac{a}{b}$ equals

(A) $\dfrac{n-5}{6}$

(B) $\dfrac{n-4}{5}$

(C) $\dfrac{5}{n-4}$

(D) $\dfrac{6}{n-5}$

165. The radius of the circle passing through the foci of the ellipse $\dfrac{x^2}{16}+\dfrac{y^2}{9}=1,$ and having its centre at $(0, 3)$ is

(A) 4

(B) 3

(C) $\sqrt{12}$

(D) $\dfrac{7}{2}$

166. The harmonic mean of the roots of the equation $\left(5+\sqrt{2}\right)x^2-\left(4+\sqrt{5}\right)x+\left(8+2\sqrt{5}\right)=0$ is

(A) 2
(B) 4
(C) 6
(D) 8

167. The point at which the tangent to the curve $y=\sqrt{4x-3}-1$ has its slope $\dfrac{2}{3}$ is

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

168. The solution set of the inequality $\dfrac{x+3}{x-4} \geq 0$ is

    (A) $(-\infty,-3]\cup(4,\infty)$

    (B) $(-\infty,-3]\cup[4,\infty)$

    (C) $(-\infty,-3)\cup(1,\infty)$

    (D) 3 and -4

169. If $f(x) = A\left(2^x\right) + B$, where $f'(1) = 2$ and $\int\limits_0^3 f(x)dx = 7$, then which of the following statements are not correct?

    (i) $A = \dfrac{1}{\log 2}$

    (ii) $B = \dfrac{7}{3(\log 2)^2}\left[(\log 2)^2 - 1\right]$

    (iii) $B = \dfrac{7}{\log 2}$

    (iv) $A = \dfrac{7}{3(\log 2)^2}\left[(\log 2)^2 - 1\right]$

    (A) (i) only
    (B) (i) and (iii)
    (C) All are correct
    (D) (i) and (ii)

170. The area of the portion of the circle $x^2 + y^2 = 64$ which is exterior to the parabola $y^2 = 12x$ is equal to

    (A) $\dfrac{16}{3}(8\pi + \sqrt{3})$

    (B) $\dfrac{8}{3}(8\pi + \sqrt{3})$

    (C) $\dfrac{16}{3}(8\pi - \sqrt{3})$

    (D) $(8\pi + \sqrt{3})$

171. If $\int_{-3}^{2} f(x)dx = 2$ and $\int_{2}^{5} [5 + f(x)]dx = 9$, then the value of the integral $\int_{5}^{-3} f(x)dx$ is

   (A) 3
   (B) 2
   (C) 5
   (D) 4

172. The relation R in the set $A = \{1, 2, 3\}$ is given by
$R = \{(1, 1), (2, 2), (3, 3), (1, 2), (2, 3)\}$ is

   (A) symmetric
   (B) asymmetric
   (C) neither symmetric nor transitive
   (D) either symmetric or reflexive

173. The locus of the poles of the focal chords of a parabola is the

   (A) axis
   (B) directrix
   (C) tangent at the vertex
   (D) circle

174. The eccentricity of the hyperbola $\dfrac{\sqrt{1999}}{3}\left(x^2 - y^2\right) = 1$ is

   (A) $\sqrt{2}$
   (B) 2
   (C) $2\sqrt{2}$
   (D) $\sqrt{3}$

175. The sum of distances of any point on the ellipse $3x^2 + 4y^2 = 24$ from its foci is

   (A) $8\sqrt{2}$
   (B) $4\sqrt{2}$
   (C) $24\sqrt{2}$
   (D) $16\sqrt{2}$

176. Two dice are thrown. The probability that the numbers appeared have a sum 8 if it is known that the second dice always exhibits 4, is

   (A) $\dfrac{5}{6}$

   (B) $\dfrac{6}{5}$

   (C) $\dfrac{1}{6}$

   (D) $\dfrac{2}{3}$

177. Which of the following is not a group?

   (A) $(Z_n, +_n)$

   (B) $(Z, +)$

   (C) $(Z, .)$

   (D) $(R, +)$

178. If the value of mode and mean is 60 and 66 respectively, then the value of median is

   (A) 60
   (B) 64
   (C) 68
   (D) 63

179. The function $f(x) = \dfrac{\log_e(\pi + x)}{\log_e(e + x)}$ is

   (A) increasing on $(0, \infty)$

   (B) decreasing on $\left(0, \dfrac{\pi}{e}\right)$, increasing on $\left(\dfrac{\pi}{e}, \infty\right)$

   (C) decreasing on $(0, \infty)$

   (D) increasing on $\left(0, \dfrac{\pi}{e}\right)$, decreasing on $\left(\dfrac{\pi}{e}, \infty\right)$

180. The integrating factor of the differential equation $\cos x \dfrac{dy}{dx} + y \sin x = 1$ is

 (A) $\sin x$
 (B) $\cos x$
 (C) $\tan x$
 (D) $\sec x$

181. The circles $x^2 + y^2 - 10x + 16 = 0$ and $x^2 - y^2 = r^2$ intersect each other in two distinct points if

 (A) $r < 2$
 (B) $r > 8$
 (C) $2 < r < 8$
 (D) $2 \le r \le 8$

182. Suppose $A_1, A_2, ..., A_{30}$ are thirty sets, each with five elements and $B_1, B_2, ..., B_{30}$ are n sets each with three elements. Let $\bigcup_{i=1}^{30} A_i = \bigcup_{j=1}^{n} B_j = S$. If each element of S belongs to exactly ten of the A_i's and exactly nine of the B_j's then $n =$

 (A) 45
 (B) 35
 (C) 40
 (D) 25

183. The function $f(x) = \sec \left[\log \left(x + \sqrt{1 + x^2} \right) \right]$ is

 (A) even
 (B) odd
 (C) constant
 (D) neither even nor odd

184. A solution of the equation $|z| - z = 1 + 2i$ is

(A) $\dfrac{3}{2} - 2i$

(B) $\dfrac{3}{2} + 2i$

(C) $2 - \dfrac{3}{2}i$

(D) $2 + \dfrac{3}{2}i$

185. The equation $|z-1|^2 + |z+1|^2 = 4$ represents on the Argand plane

(A) a straight line
(B) an ellipse
(C) a circle with centre origin and radius 2
(D) a circle with centre origin and radius unity

186. If A is a singular matrix, then $adj\ A$ is

(A) non-singular
(B) singular
(C) symmetric
(D) antisymmetric

187. The determinant $\begin{vmatrix} xp+y & x & y \\ yp+z & y & z \\ 0 & xp+y & yp+z \end{vmatrix} = 0$ if

(A) x, y, z are in A.P
(B) x, y, z are in G.P
(C) x, y, z are in H.P
(D) xy, yz, zx are in A.P

188. A telegraph has 5 arms and each arm is capable of 4 distinct positions, including the position of rest. The total number of signals that can be made is

(A) 473
(B) 1023
(C) 1173
(D) 423

189. A club consists of members whose ages are in A.P, the common difference being 3 months. If the youngest member of the club is just 7 years old and the sum of the ages of all the members is 250 years, then the number of members in the club is

(A) 15
(B) 25
(C) 20
(D) 30

190. $\lim\limits_{x \to 5} \dfrac{x^2 - 9x + 20}{x - [x]}$

(A) is 1
(B) is 0
(C) does not exist
(D) cannot be determined

191. If $f(9) = 0$ and $f'(9) = 1$, then $\lim\limits_{x \to 9} \dfrac{3 - \sqrt{f(x)}}{3 - \sqrt{x}}$ is equal to

(A) 0
(B) 1
(C) −1
(D) 3

192. Let $f(x + y) = f(x) \cdot f(y)$ for all x, y where $f(0) \neq 0$. If $f(5) = 2$ and $f'(0) = 3$, then $f'(5)$ is equal to

(A) 6
(B) 0
(C) 1
(D) −1

193. The shortest distance of the point (0, 0) from the curve $y = \dfrac{1}{2}\left(e^x + e^{-x}\right)$ is

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

194. A determinant is chosen at random from the set of all determinants of order 2 with elements 0 or 1 only. The probability that the value of the determinant chosen is positive is

(A) $\dfrac{16}{81}$

(B) $\dfrac{7}{16}$

(C) $\dfrac{3}{16}$

(D) $\dfrac{16}{3}$

195. If $\vec{a}$ is a unit vector and $(\vec{x}+\vec{a}).(\vec{x}-\vec{a})=24$, the $\left|\vec{x}\right|$ must be

(A) 3
(B) 4
(C) 5
(D) 6

196. The angle between two vectors $\vec{a}$ and $\vec{b}$ with magnitudes $\sqrt{5}$ and 4 respectively and $\vec{a}.\vec{b}=2\sqrt{5}$ is

(A) $\dfrac{\pi}{3}$

(B) $\dfrac{\pi}{6}$

(C) $\dfrac{\pi}{2}$

(D) $\dfrac{5\pi}{12}$

197. The length of perpendicular from the point $\left(1,\dfrac{3}{2},2\right)$ to the plane $2x-2y+4z+5=0$ is

(A) $\sqrt{3}$
(B) $\sqrt{6}$
(C) $\sqrt{5}$
(D) $\sqrt{7}$

198. P is a point on the line segment joining the points $A(3, 2, 1)$ and $B(6, 2, -2)$. If the $x-$ coordinate of P is 5, then the $z-$ coordinate of P is

(A) −2
(B) 1
(C) −1
(D) 2

199. The probability of A and B solving a problem correctly is $\dfrac{1}{3}$ and $\dfrac{1}{4}$ respectively. If the probability of their making a common error is 1/20 and they obtain the same answer, then the probability of their answer to be correct is

(A) $\dfrac{1}{12}$

(B) $\dfrac{1}{40}$

(C) $\dfrac{13}{120}$

(D) $\dfrac{10}{13}$

200. A pair of dice is thrown 4 times. If getting a doublet is considered to be a success, the probability of 2 successes is

(A) $\dfrac{25}{216}$

(B) $\dfrac{29}{216}$

(C) $\dfrac{31}{216}$

(D) $\dfrac{33}{216}$

KEY													
SI No.	Key	SI No.	Key	SI No.	Key	SI No.	Key	SI No.	Key	SI No.	Key	SI No.	Key
1	D	31	B	61	C	91	B	121	A	151	B	181	C
2	C	32	A	62	B	92	B	122	B	152	D	182	A
3	D	33	C	63	A	93	D	123	C	153	C	183	A
4	C	34	C	64	B	94	A	124	A	154	A	184	A
5	A	35	C	65	B	95	D	125	C	155	A	185	D
6	C	36	D	66	B	96	D	126	D	156	A	186	B
7	B	37	A	67	C	97	B	127	C	157	D	187	B
8	C	38	B	68	C	98	A	128	C	158	A	188	B
9	D	39	A	69	D	99	B	129	A	159	C	189	B
10	B	40	A	70	C	100	B	130	C	160	A	190	C
11	A	41	B	71	C	101	B	131	D	161	A	191	B
12	A	42	C	72	A	102	C	132	C	162	A	192	A
13	B	43	B	73	D	103	D	133	B	163	C	193	B
14	B	44	D	74	B	104	B	134	C	164	B	194	C
15	A	45	D	75	D	105	C	135	D	165	A	195	C
16	A	46	D	76	B	106	B	136	B	166	B	196	B
17	C	47	D	77	B	107	C	137	B	167	B	197	C
18	C	48	A	78	C	108	B	138	C	168	A	198	A
19	B	49	A	79	D	109	B	139	C	169	D	199	D
20	D	50	C	80	B	110	A	140	D	170	C	200	A
21	C	51	B	81	D	111	D	141	A	171	D		
22	C	52	B	82	D	112	D	142	D	172	C		
23	A	53	C	83	C	113	A	143	B	173	B		
24	B	54	B	84	D	114	D	144	B	174	A		
25	C	55	B	85	A	115	C	145	C	175	B		
26	D	56	A	86	A	116	B	146	D	176	C		
27	A	57	D	87	A	117	C	147	A	177	C		
28	D	58	D	88	B	118	B	148	D	178	B		
29	D	59	C	89	D	119	B	149	C	179	C		
30	A	60	D	90	A	120	D	150	A	180	D		