PHYSICS

1) A screw gauge gives the following reading when used to measure the diameter of of a wire.
   Main scale reading : 0 mm
   Circular scale reading : 52 divisions
   Given that 1 mm on main scale corrosponds to 100 divisions of the circular scale. The diameter of wire from the above data is :
   a) 0.052 cm
   b) 0.026 cm
   c) 0.005 cm
   d) 0.52 cm

2) If n^{th} divisions of main scale coincides with $(n+1)^{th}$ divisions of vernier scale. Given one main scale divisions is equal to main 'a' units. Find the least count of the vernier.
   a) a/n+2
   b) a/n+1.5
   c) a/n+3
   d) a/n+1

3) A body falling freely froma given height 'H' hits an inclined plane in its path at a height 'h'. As a result of this impact the direction of the velocity of the body becomes horizontal. For what value of (h/H) the body will take maximum time to reach the ground ?
   a) h/H=1.5/2
   b) h/H=1/2
   c) h/H=2/1
   d) h/H=2/3

4) An automobile travelling with a speed of 60 km/h, can break to stop within a distance of 20 m. If the car is going twice as fast i.e., 120 km/h, the stopping distance will be :
   a) 60m
   b) 40m
   c) 20m
   d) 80m

5) A mass of M kg is suspended by a weightless string. The horizonatal force that is required to displace it untill the string makes an angle of 45° with initial vertical direction is :
   a) $Mg(\sqrt{2}+1)$
   b) $Mg\sqrt{2}$
   c) $\dfrac{Mg}{\sqrt{2}}$
   d) $Mg(\sqrt{2}-1)$

6) A partical of mass 10^{-2} kg is moving along the positive x axis under the influence of a force $F(x) = -K/(2x^2)$ where $K = 10^{-2}$ N m^2. At time t = 0 it is at x = 1.0 m and its velocity is v = 0. Find the velocity when its reaches x = 0.50 m.
   a) –2 m/s
   b) –1 m/s
   c) –1.5 m/s
   d) –2.5 m/s

7) A body of mass 2 kg is being dragged with a uniform velocity of 2 m/sec on a rough horizontal plane. The coefficient of friction between the body and the surface is 0.20, J = 4.2 J/cal and g = 9.8 m/sec^2. Calculate the amount of head generated in 5 sec.
   a) 7.35 cal
   b) 9.33 cal
   c) 8.35 cal
   d) 6.33 cal

8) A spring of spring constant 5×10^3 N/m is stretched initially by 5cm from the unstretched position. Then the work required to stretches the wire by 1 mm. then the elastic energy stored in the wire is :
   a) 12.50 N-m
   b) 18.75 N-m
   c) 25.00 N-m
   d) 6.25 N-m

9) A mass of M kg is suspended by a weightless string. The horizontal force that is required to displace it until the string makes an angle of 45° with the initial vertical direction is
   a) $Mg(\sqrt{2}+1)$
   b) $Mg\sqrt{2}$
   c) $Mg/\sqrt{2}$
   d) $Mg(\sqrt{2}-1)$

10) A bomb of mass 30 kg at rest explodes into two pieces of masses 18 kg and 12 kg. The velocity of 18 kg mass is 6 ms^{-1} coral. The KE of the other mass is
   a) 256 J
   b) 486 J
   c) 524 J
   d) 324 J

Space for Rough Work

11) A rod of weight w is supported by two parallel knifes edges A and B and is in equilibrium in a horizontal position. The knives are at a distance d from each other. The center of the mass of the rod is at distance x from A. The normal reaction on A is… and on B is…
a) $(1 – 2x/W)d$, $dW/2x$
b) $(2d – x/d)$ W, $2xW/d$
c) $(1 – x/W)d$, dW/x
d) $(1 – x/d)W$, xW/d

12) A cylinder rolls up an inclined plane, reaches some height, and then rolls down (without slipping throughout these motions). The directions of the frictional force acting on the cylinder are
a) Up the incline while ascending and down the incline descending
b) Up the incline while ascending as well as descending
c) Down the incline while ascending and up the incline while descending
d) Down the incline while ascending as wel as descending.

13) A solid sphere of mass M and radius R having moment of inertia I about its diameter is recast into a solid disc of radius r and thickness t. The moment of inertia of the disc about an axis passing the edge and perpendicular to the plane remains I. Then R and r are related as.
a) $r = \sqrt{\dfrac{2}{15}}R$
b) $r = \dfrac{2}{\sqrt{15}}R$
c) $r = \dfrac{2}{15}R$
d) $r = \dfrac{\sqrt{2}}{15}R$

14) Four point massas, each of value m, are placed at the corners of a square ABCD of side l . The moment of inertia of this system about an axis passing through A and parallel to BD is
a) $2\,ml^2$
b) $\sqrt{3}ml^2$
c) $3ml^2$
d) ml^2

15) Distance between the centers of two stars in 10a. The masses of these stars are M and 16M and their radii a and 2a, respectivel. A body of mass m is fired straight from the surface of the large star towards the smaller star. What should be its minimum initial speed to reach the surface of the smaller star? The expression in term of G, M and a.
a) $3/2\sqrt{5GM/a}$
b) $5/2\sqrt{3GM/a}$
c) $2/3\sqrt{5GM/a}$
d) $5/2\sqrt{GM/3a}$

16) What rises in a glass capillary tube due to
a) surface tension of water
b) cohesive force of glass molecules
c) temperature of water
d) adhesive force between water molecules and the walls of the glass tube

17) A sphere of radius R and density ρ_1 is dropped in a liquid of density σ. Its terminal velocity is v_1. If another sphere of radius R and density ρ_2 is dropped in the same liquid, its terminal velocity will be
a) $\left(\dfrac{\rho_2 - \sigma}{\rho_1 - \sigma}\right)v_1$
b) $\left(\dfrac{\rho_1 - \sigma}{\rho_2 - \sigma}\right)v_1$
c) $\left(\dfrac{\rho_1}{\rho_2}\right)v_1$
d) $\left(\dfrac{\rho_2}{\rho_1}\right)v_1$

18) The phase difference between the instantaneous velocity and acceleration of a particle executing simple harmonic motion is
a) $0.5\,\pi$
b) π
c) $0.707\,\pi$
d) zero

19) The resistance of a metal increase with the increase of temperature due to increase in the
a) number of electrons
b) velocity of electrons
c) scattering of electrons with core ions
d) thermal motion of core ions

20) A sphere of radius R is half submerged in liquid of density ρ. If the sphere is slightly pushed down and released, find the frequency of oscilliation

   a) $\frac{1}{2\pi}\sqrt{\frac{3g}{5R}}$ b) $\frac{1}{2\pi}\sqrt{\frac{3g}{2R}}$

   c) $\frac{1}{2\pi}\sqrt{\frac{g}{R}}$ d) $\frac{1}{2\pi}\sqrt{\frac{2g}{3R}}$

21) What causes chromatic aberration?
   a) Non-paraxial rays
   b) Paraxial rays
   c) Variation of focal length with colour
   d) Difference in radii of curvature of the bounding surfaces of the lens

22) If the torque acting on a rigid body, under the application of a force, is zero then it's
   a) linear momentum is conserved
   b) angular momentum is not conserved
   c) energy is conserved
   d) angular momentum is conserved

23) A hollow double concave lens is made of very thin transparent material. It can be filled with air or either of two liquid L_1 or L_2 having refractive indices μ_1 and μ_2 respectively ($\mu_2 > \mu_1 > 1$). The lens will diverge a parallel beam of light if it is filled with
   a) Air and placed in air
   b) Air and immersed in L_1
   c) L_1 and immersed in L_2
   d) L_2 and immersed in L_1

24) A parallel plate condenser with a dielectric of dielectric constant K between the plate has a capacity C and is charged to a potential V volt the diameter slab is slowly remove from between the plates and then reinserted. The net work done by the system in this process is
   a) zero   b) $\frac{1}{2}(K-1)CV^2$

   c) $\frac{CV^2(K-1)}{K}$ d) $(K-1)CV^2$

25) A fully charged capicitor has a capacitance 'C'. It is discharged through a small coil of resistance wire embedded in a thermally insulted block of specific heat capacity 's' and mass 'm'. If the temperature of the block is raised by 'ΔT', the potential difference 'V' across the capicitance is

   a) $\frac{mC\Delta T}{s}$ b) $\sqrt{\frac{2mC\Delta T}{s}}$

   c) $\sqrt{\frac{2ms\Delta T}{C}}$ d) $\frac{ms\Delta T}{C}$

26) The dimensions of capacitance are
   a) $[ML^{-2}Q^{-2}T^2]$ b) $[M^{-1}L^2T^{-2}Q^{-2}]$
   c) $[M^{-1}L^2T^{-2}Q^2]$ d) $[M^{-1}L^{-2}T^2Q^2]$

27) A wire is stretched as to change its diameter by 0.25%. The percentage change in resistance is
   a) 4.0%   b) 2.0%
   c) 1.0%   d) 0.5%

28) An ideal gas is filled in a closed rigid and thermally insulated container. A coil of 100Ω resistor carrying current 1A for 5 minutes supplies heat to the gas. The change in internal energy of the gas is
   a) 10 kJ   b) 30 kJ
   c) 20 kJ   d) 0 kJ

29) A 25 watt and a 100 watt bulb are joined in series and connected to the mains. Which bulb will glow brighter.
   a) 25 watt   b) 100 watt
   c) both   d) none of the above

30) When a battery connected across a resistor of 16 Ω, voltage across the resistor is 12 V. When the same battery is connected across a resistor of 10 Ω, voltage across it is 11 V. The internal resistance of the battery is (in ohm) is
   a) 10/7   b) 20/7
   c) 25/7   d) 30/7

31) A proton and an α-partical are acclerated with Samepotential difference and they enter in the region of constant magnetic field B perpendicular to the velocity of particals. Find the ratio of radius of curvature of proton to the radius of curvature of α-particals.

a) $\sqrt{2}$　　　　　b) $\sqrt{3}$

c) $1/\sqrt{2}$　　　　d) $1/\sqrt{3}$

32) A pair of stationary and infinitely long bent wires are placed in the XY plane as shown in fig. The wires carry currents of i = 10 amperes each as shown. The segment L and M are along the X-axis. The segement P and Q are paralle to the Y- axis such that OS = OR = 0.02 m . find the magnitude of the magnetic induction at the origin O.
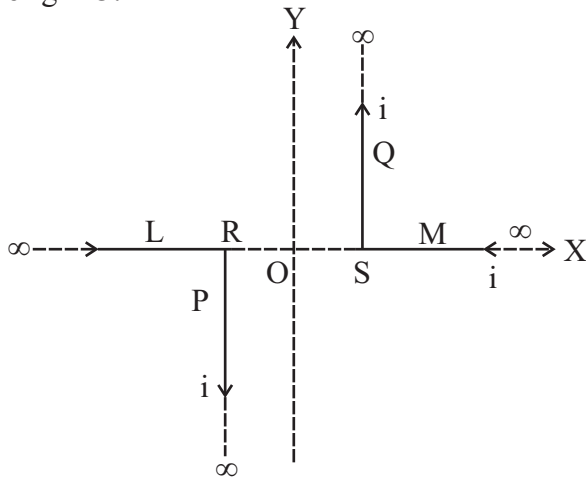
a) 10^{-2} tesla　　　b) 10^{-1} tesla

c) 10^{-4} tesla　　　d) 10^{-3} tesla

33) The cyclotron frequency of an electron grating in a magnetic field of 1 T is approximately

a) 28 MHz　　　　b) 280 MHz

c) 2.8 GHz　　　　d) 28 GHz

34) Two concentric coils of 10 turns each are placed in the same plane. Their redii are 20 cm and 40 cm and carry 0.2 A and 0.3A. current respectively in opposite directions. The magnetic induction (in tesla) at the centre is

a) $\frac{3}{4}\mu_0$　　　　　b) $\frac{5}{4}\mu_0$

c) $\frac{7}{4}\mu_0$　　　　　d) $\frac{9}{4}\mu_0$

35) The magnetic moment of an electron in an atom arises due to

a) orbital motion of the electron around the nucleus

b) Intrinsic motion of electron around its own axis

c) motion of protons in the nucleus

d) motion of neutrons in the necleus

36) A closed surface S encloses a magnet of magnetic moment 2 ml. The magnetic flux emerging from the surface is

a) $\mu_0 m$　　　　　b) Zero

c) $2\mu_0 m$　　　　d) $2m/\mu_0$

37) Figure represents two bulbs B_1 and B_2, resistor R and an inductor L. When the switch S is turned off
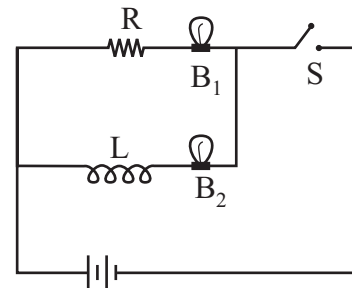
a) Both B_1 and B_2 die out promptly

b) both B_1 and B_2 die out with some delay

c) B_1 dies out promptly but B_2 with some delay

d) B_2 dies out promptly but B_1 with some delay

38) If a semiconductor has an intrinsic carrier concentration $1.41 \times 10^{16}/m^3$, when doped with $10^{21}/m^3$ phosphorous atoms, then the concentration of holes/m^3 at room temperature will be

a) 2×10^{21}　　　　b) 2×10^{11}

c) 1.41×10^{10}　　　d) 1.41×10^{16}

39) A lens made of glass whose index of refraction is 1.60 has focal length of +20 cm in air. Its focal length in water, whose refractive index is 1.33, will be
a) three times longer than in air
b) two times longer than in aire
c) same as in air
d) None of the above

40) A string tied between x = 0 and x = l viberates in fundamental mode. The amplitude A, tension T and mass per unit length μ is given. Find the total energy of the string.

X = 0   X = l

a) $\pi ta^2/4l$
b) $\pi^2 ta/4l$
c) $\pi^2 ta^2/8l$
d) $\pi^2 ta^2/4l$

41) A tuning fork of frequency 480 Hz resonates with a tube closed at one end of length 16 cm and diameter 5 cm in fundamental mode. Calculate velocity of sound in air.
a) 336 m/s
b) 335 m/s
c) 334 m/s
d) 333 m/s

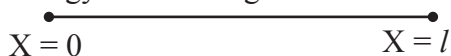42) An observer moves towards a stationary source of sound, with a velocity one fifth of the velocity of sound. What is the percentage increase in the apparent frequency ?
a) 0.5%
b) zero
c) 20%
d) 5%

43) Three sound waves of equal amplitude have frequency (v – 1), v, (v + 1). They superpose to given beat. The number of beats produced per second will be :
a) 3
b) 2
c) 1
d) 4

44) Consider a hydrogen atom with its electron in the nth orbital. An electromagnetic radiation of wavelength 90 nm is used to ionize the atom. If the kinetics energy of the ejected electron is 10.4 eV, then the value of n is (hc = 1242 eV nm)
a) 2
b) 1
c) 3
d) 5

45) In the ideal double-slit experiment, when a glass-plate (refractive index 1.5) of thickness t is introduced in the path of one of the interfering beams (wave- length λ), the intensity at the position where the central maximum occurred previously remains unchanged. The minimum thickness of the glass-plate is
a) 2 λ
b) 2 $\lambda/3$
c) $\lambda/3$
d) λ

46) In young's double slit experiment intensity at a point is (1/4) of the maximum intensity. Angular position of this point is
a) $\sin^{-1}(\lambda/d)$
b) $\sin^{-1}(\lambda/2d)$
c) $\sin^{-1}(\lambda/3d)$
d) $\sin^{-1}(\lambda/4d)$

47) X-rays of wavelength 0.140 n-m are scattered from a block of carbon. What will be the wavelength of X-rays scattered at 90° ?
a) 0.140 n–m
b) 0.142 n–m
c) 0.144 n–m
d) 0.146 n–m

48) A radioactive sample emits n β-particles in 2 sec. In next 2 sec it emits 0.75 n β-particle, what is the mean life of the sample?
a) $2/\log_{10}(4/3)$
b) $3/\log_e(4/3)$
c) $2/\log_e(3/3)$
d) $2/\log_e(4/3)$

49) When the two imputs of a NAND gate are shorted, the resulting gate is
a) NOR
b) OR
c) NOT
d) AND

50) A laser device produces amplification in the
a) microwave region
b) ultraviolet or visible region
c) infrared region
d) None of the above

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51) A compound contains 28 % of nitrogen and 72 % of metal by weight. 3 atoms of metal combine with 2 atoms of N. Find the atomic weight of metal.
a) 20
b) 18
c) 24
d) 23.8

52) 2.76g of silver carbonate on being strongly heated yield a residue weighing
a) 2.16g
b) 2.48g
c) 2.64g
d) 2.32g

53) A certain gas takes three times as long to effuse out as helium. Its molecular mass will:
a) 27 u
b) 36u
c) 64u
d) 9u

54) If 10^{-4} dm^3 of water is introduced into a 1 dm^3 flask at 300 K, how many flask moles of water are in the vapour phase when equilibrium is established (given vapour pressure of H_2O at 300 K is 3170 Pa; R = 8.314 JK^{-1} mol^{-1})
a) 5.56×10^{-6} mol^{-1}
b) 1.53×10^{-2} mol
c) 4.46×10^{-2} mol
d) 1.27×10^{-3} mol

55) The energy of the electron in the second and the third Bohr's orbits of the hydrogen atom is -5.42×10^{-12} erg and -2.41×10^{-12} erg respectively. Calculate the wavelength of the emitted radiation when the electron drops from the third to the second orbit.
a) 6.603 A°
b) 6.613 A°
c) 5.603 A°
d) 5.613 A°

56) The number of radial nodes of 3s and 2P-orbitals are respectively
a) 2,0
b) 0,2
c) 1,2
d) 2,11

57) Which of the following is the correct order of interactions?
a) covalent < hydrogen bonding < vander waals < dipole-dipole
b) vander waals < hydrogen bonding < dipole-dipole < covalent
c) vander waals < dipole-dipole < hydrogen bonding < covalent
d) dipole-dipole < vander waals < hydrogen bonding < covalent

58) A coordinate bond is a dative covalent bond. Which of the below is true?
a) Three atom form bond by sharing their electrons
b) Two atoms form bond and one of them provides both electrons.
c) two atoms form bond by sharing their electrons
d) Two atoms form bond by sharing electrons obtained from third atom.

59) A gas mixture of 3.67 liters of ethylene and methane on complete combustion at 25ºC produces 6.11 liters of CO_2. Find out the amount of heat evolved on burning one liter of the gas mixture. The heats of combustion of ethylene and methane are −1423 and −891 kj mol^{-1} at 25ºC.
a) 50.00 kj
b) 50.90 kj
c) 55.55 kj
d) 65.90kj

60) For the process H_2O (l) (1 bar, 373K) $\longrightarrow$ H_2O (g) (1 bar, 373K), the correct set of thermodynamics parameter is
a) $\Delta G = 0$, $\Delta S = +ve$
b) $\Delta G = +ve$, $\Delta S = 0$
c) $\Delta G = 0$, $\Delta S = -ve$
d) $\Delta G = -ve$, $\Delta S = +ve$

61) 0.5 gm of fuming H_2SO_4 (Oleum) is diluted with water. This solution is completely neutralized by 26.7 ml of 0.4 N NaOH. Find the percentage of free SO_3 in the sample of oleum.
a) 2.84%
b) 3.84 %
c) 5.84%
d) 0.84%

62) When 20g of naphthoic acid ($C_{11}H_8O_2$) is dissolved in 50g of benzene (Kf = 1.72 K Kg mol^{-1}), a freezing point depression of 2K is observed. The van't Hoff factor (i) is
a) 0.5
b) 1
c) 2
d) 3

63) Addition of 0.643 g of a compound to 50 ml of benzene (density: 0.879 g/ml.) lowers the freezing point from 5.51ºC to 5.03ºC. If K_f for benzene is 5.12 K kg mol^{-1}, calculate the molecular weight of the compound.
a) 155.055
b) 156.056
c) 165.065
d) 175.075

64) What weight of the non-volatile solute, urea (NH_2–CO–NH_2) needs to be dissolved in 100g of water, in order to decrease the vapour pressure of water by 25%? What will be the molality of the solution?
a) 81.52
b) 16.52
c) 10.52
d) 17.52

65) The solubility of $Mg(OH)_2$ in pure water is 9.75×10^{-3} g/litre. Calculate its solubility (in g/litre) in 0.02 M Mg $(NO_3)_2$ solution.
a) 8.7×10^{-4} g/litre
b) 8.7×10^{-5} g/litre
c) 6.7×10^{-3} g/litre
d) 6.7×10^{-5} g/litre

66) The reaction 2A(g) + B(g) = 3C(g) + D(g) is begun with the concentrations of A and B both at an initial value of 1.00M. when equilibrium is reached, the concentration of D is measured and found to be 0.25M. the value for the equilibrium constant for this reaction is given by the expression
a) $[(0.75)^3(0.25)]/[(0.75)^2(0.25)]$
b) $[(0.75)^3(0.25)]/[(1.00)^2(1.00)]$
c) $[(0.75)^3(0.25)]/[(0.50)^2(0.75)]$
d) $[(0.75)^3(0.25)]/[(0.50)^2(0.25)]$

67) The oxidation states of iodine in HIO_4, H_3IO_5 and H_5IO_6 respectively, are
a) +1, +3, +7
b) +7, +7, +3
c) +7, +7, +7
d) +7, +5, +3

68) White phosphorous reacts with caustic soda, the products are PH_3 and NaH_2PO_2. This reaction is an example of
a) oxidation
b) reduction
c) disproportionation
d) neutralization

69) The decomposition of N_2O_5 according to the equation: $2N_2O_5$ (g) $\longrightarrow$ $4NO_2$ (g) + O_2 (g) is a first order reaction. After 30 min. from the start of the decomposition in a closed vessel, the total pressure developed is found to be 284.5 mm of Hg and on complete decomposition, the total pressure is 584.5 mm of Hg. Calculate the rate constant of the reaction.
a) 3.2×10^{-3} min^{-1}
b) 2.2×10^{-3} min^{-1}
c) 5.2×10^{-3} min^{-1}
d) 4.2×10^{-2} min^{-1}

70) During the kinetic study of the reaction 2A + B $\longrightarrow$ C + D, following results were obtained

Run	[A]/mol L^{-1}	[B]/mol L^{-1}	Initial rate of formation of D/ mol L^{-1} min^{-1}
I	0.1	0.1	6.0×10^{-3}
II	0.3	0.2	7.2×10^{-2}
III	0.3	0.4	2.88×10^{-1}
IV	0.4	0.1	2.40×10^{-2}

Based on the above data which one of the following is correct?
a) rate = $k[A][B]^2$
b) rate = $k[A]^2[B]$
c) rate = $k[A][B]$
d) rate = $k[A]^2[B]^2$

71) For the reaction,
$$N_2 + 3H_2 \rightleftharpoons 2NH_3$$
The rate of change of concentration for hydrogen is 0.3×10^{-4} Ms^{-1}. The rate of change of concentration of ammonia is
a) -0.2×10^{-4}
b) 0.2×10^{-4}
c) 0.1×10^{-4}
d) 0.3×10^{-4}

72) Lyophilic sols are
a) irreversible sols
b) they are prepared from inorganic compounds
c) coagulated by adding electrolytes
d) self-stabilising

73) Freundlich equation for adsorption of gases (in amount of Xg) on a solid (in amount of mg) at a constant temperature can be expressed as

a) $\log \dfrac{X}{m} = \log p + \dfrac{1}{n}\log k$

b) $\log \dfrac{X}{m} = \log k + \dfrac{1}{n}\log p$

c) $\dfrac{X}{m} \propto p^n$

d) $\dfrac{X}{m} = \log p + \dfrac{1}{n}\log k$

74) The correct order of electron gain enthalpy with negative sign of F, Cl, Br and I, having atomic number 9, 17, 35 and 53 respectively, is
a) $Cl > F > Br > I$ b) $F > Cl > Br > I$
c) $I > Br > Cl > F$ d) $I > Br > F > Cl$

75) Which of the following statement is true?
a) Silicon exhibits 4 coordination number in its compound
b) Bond energy of F_2 is less than Cl_2
c) Mn(III) oxidation state is more stable than Mn(II) in aqueous state
d) Elements of 15th group shows only +3 and +5 oxidation states

76) The metal oxide which cannot be reduced to metal by carbon is
a) FE_2O_3 b) AL_2O_3
c) PBO   d) ZNO

77) Wolframite ore is separated from tin stone ore by the process of
a) roasting   b) electromagnetic
c) smelting   d) calcination

78) The formula of calgon, used for water softening is
a) $Na_2[Na_4(PO_3)_6]$
b) $Na_4[Na_2(PO_3)_6]$
c) $Na_2[Na_4(PO_4)_5]$
d) $Na_4[Na_4(PO_4)_6]$

79) How many 'mL' of perhydrol is required to produce sufficient oxygen which can be used to completely convert 2L of SO_2 gas to SO_3 gas?
a) 10 mL   b) 5 mL
c) 20 mL   d) 30 mL

80) Beryllium and aluminium exhibit many properties which are similar.But, the two element differ in
a) exhibiting maximum covalency in compounds
b) forming polymeric hydrides
c) forming covalent halides
d) exhibiting amphoteric nature in their oxide

81) The pair of compound s which cannot exist together in solution is:
a) $NaHCO_3$ and NaOH
b) Na_2CO_3 and $NaHCO_3$
c) Na_2CO_3 and NaOH
d) $NaHCO_3$ and NaCl

82) In diborane, the two H—B—H angles are nearly
a) 60°, 120°   b) 95°, 120°
c) 95°,150°   d) 120°,180°

83) Sodium thiosulphate is prepared by
a) Reducing Na_2SO_4 solution with H_2S
b) Boiling Na_2SO_3 solution with S in alkaline medium
c) Neutralizing $H_2S_2O_3$ solution with NaOH
d) Boiling Na_2SO_3 solution with S in acidic medium

84) The oxidation number of Mn in the product of alkaline oxidative fusion of MnO_2 is
a) 2   b) 3
c) 4   d) 6

85) General electronic configuration of lanthanides is
a) $(n-2)f^{1-14}(n-1)\,s^2p^6d^{0-1}ns^2$
b) $(n-2)f^{10-14}(n-1)d^{0-1}ns^2$
c) $(n-2)f^{0-14}(n-1)d^{10}ns^2$
d) $(n-2)d^{0-1}(n-1)f^{1-14}ns^2$

86) The volume (in mL) of 0.1 M $AgNO_3$ required for complete precipitation of chloride ions present in 30 mL of 0.01 M solution of $[Cr(H_2O)_5Cl]Cl_2$, as silver chloride is closed to
a) 3　　　　　　b) 4
c) 5　　　　　　d) 6

87) Among the following complexes, optical activity is possible in
a) $[Co(NH_3)_6]^{3+}$
b) $[Co(H_2O)_2(NH_3)_2Cl_2]^+$
c) $[Cr(H_2O)_2Cl_2]^+$
d) $[Co(CN)_5NC]$

88) Ozone in stratosphere is depleted by
a) CF_2CL_2　　　b) C_7F_{16}
c) $C_6H_6CL_6$　　d) C_6F_6

89) Identify the incorrect statement from the following
a) oxides of nitrogen in the atmosphere can cause the depletion of ozone layer
b) ozone obsorbs the intense ultraviolet radiation of the sun
c) depletion of ozone layer is because of its chemical reactions with chlorofluoro alkanes
d) ozone absorbs infrared radiation

90) A certain hydrocarbon A was found to contain 85.7 percent carbon and 14.3 percent hydrogen. This compound consume 1 molar equivalent of hydrogen to give a saturated hydrocarbon B. 1.00 g of hydrocarbon A just decolorized 38.05 g of a 5% solution (by weight) of Br_2 in CCl_4. Compound A, on oxidation with concentrated $KMnO_4$, gave compound C (molecular formula C_4H_8O) and acetic acid. Compound C could easily be prepared by the action of acidic aqueous mercuric sulphate on 2-butyne. Determine the molecular formula of A and deduce the structure of A, B and C.
a) C_6H_{12}　　　b) C_8H_8
c) C_6H_6　　　d) C_4H_6

91) Acetylene reacts with hypochlorous acid to form
a) Cl_2CHCHO　　b) $ClCH_2COOH$
c) Cl_3COCl　　d) $ClCH_2CHO$

92) Consider the reactions :
(i) $(CH_3)_2CH-CH_2Br \xrightarrow{C_2H_5OH}$
$(CH_3)_2CH-CH_2OC_2H_5 + HBr$
(ii) $(CH_3)_2CH-CH_2Br \xrightarrow{C_2H_5O^-}$
$(CH_3)_2CH-CH_2OC_2H_5 + Br^-$
The mechanisms of reactions (i) and (ii) are respectively :
a) S_N1 and S_N2　　b) S_N1 and S_N1
c) S_N2 and S_N2　　d) S_N2 and S_N1

93) An aromatic compound contains 69.4% carbon and 5.8% hydrogen. A sample of 0.303 g of this compound was analysed for nitrogen by Kjeldahl's method. The ammonia evolved was absorbed in 50 ml. of 0.05 M sulphuric acid. The excess of acid required 25ml. of 0.1 M sodium hydroxide for neutralization. Determine the molecular formula of the compound of its molecular weight is 121.
a) C_6H_6NO　　b) C_7H_7NO
c) C_8H_8NO　　d) $C_{10}H_8NO$

94) A basic, volatile nitrogen compound gave a foul smelling gas when treated with chloroform and alcoholic potash. A 0.295 g sample of the substance. Dissolved in aq. HCL and treated with $NaNO_2$ solution at 0°C, liberated a colorless, odorless gas whose volume corresponded to 112 ml at STP. After the evolution of the gas was complete, the aqueous solution was distilled to give an organic liquid which did not contain nitrogen and which on warning with alkali and iodine gave a yellow precipitate. Indentify the original substance. Assume that it contains one N atom per molecule.
a) Ethylmethylamine　b) isopropylamine
c) ethylamine　　d) propoylamine

95) Match List I with List II and select the correct answer using the codes given below.

List I (Polymers)	List II (Monomers)
1. Buna-N	A. Phthalic acid and ethylene glycol
2. Nylon-6 6	B. Terephthalic acid and ethylene glycol
3. Dacron	C. Hexamethylene diamine & adipic acid
4. Glyptal plastic	D. Isobutylene and isoprene
	E. Arylonitrile and butadiene

a) 1-B, 2-A, 3-D, 4-E
b) 1-C, 2-D, 3-A, 4-B
c) 1-D, 2-C, 3-B, 4-A
d) 1-E, 2-C, 3-B, 4-A

96) Acrilan is a hard, horny and a high melting material. Which of the following represents its structure?

a) $\left(-CH_2-CH- \atop \qquad \quad | \atop \qquad \quad Cl \right)_n$

b) $\left(-CH_2-CH- \atop \qquad \quad | \atop \qquad \quad CN \right)_n$

c) $\left(-CH_2-C- \atop \qquad \quad CH_3 \atop \qquad \quad | \atop \qquad \quad COOCH_3 \right)_n$

d) $\left(-CH_2-CH- \atop \qquad \quad | \atop \qquad \quad COOC_2H_5 \right)_n$

97) A decapeptide (mol.wt.796) on complete hydrolysis gives glycine (mol.wt.75), alanine and phenylalanine.glycine contributes 47% to the total weight of the hydrolysed products. The number of glycine units present in the decapeptide is

a) 3   b) 4
c) 5   d) 6

98) During the process of digestion, the proteins present in food materials are hydrolysed to amino acid. The two enzymes A and B involved in the process

Proteins $\xrightarrow{\text{Enzyme (A)}}$ Polypeptides

$\xrightarrow{\text{Enzyme (B)}}$ amino acids,

are respectively
a) amylase and maltase
b) diastase and lipase
c) pepsin and trypsin
d) invertase and zymase

99) The drug [imidazole structure with CH_2, CH_2-NH_2] is used as

a) vasodilator   b) analgesics
c) antacid   d) antiseptic

100) Parkinson's disease is linked to abnormalities in the levels of dopamine in the body.the structure of dopamine is

a) [benzene ring with CH_2NH_2, OH, OH]
b) [benzene ring with $CH_2CH_2CH_2NH_2$, OH, OH]
c) [benzene ring with $CH_2CH_2NH_2$, OH, OH]
d) [benzene ring with CH_2-CHCO_2H, NH_2, OH, OH]

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101) Let $f: (-1, 1) \to B$, be a function defined by $f(x) = \tan^{-1}\left(\dfrac{2x}{1-x^2}\right)$, then f is both one-one and onto when B is in the interval

a) $\left(-\dfrac{\pi}{2}, \dfrac{\pi}{2}\right)$

b) $\left[-\dfrac{\pi}{2}, \dfrac{\pi}{2}\right]$

c) $\left[0, \dfrac{\pi}{2}\right)$

d) $\left(0, \dfrac{\pi}{2}\right)$

102) $3(\sin x - \cos x)^4 + 6(\sin x + \cos x)^2 + 4(\sin^6 x + \cos^6 x) =$

a) 11   b) 12

c) 13   d) 14

103) The real roots of the equation $\cos^7 x + \sin^4 x = 1$ in the interval $(-\pi, \pi)$ are ..., ..., and _____.

a) $\pi/2, -\pi/2, 0$ b) $-\pi/2, \pi/2, 0$

c) $\pi/3, -\pi/3, 0$ d) $-\pi/3, \pi/3, 0$

104) The set of all x in the interval $[0, \pi]$ for which $2\sin^2 x - 3\sin x = 1 \geq 0$, is _____.

a) $[0, \pi/6] \cup \{\pi/2\} \cup [5\pi/6, 2\pi]$

b) $[0, \pi/6] \cup \{\pi/3\} \cup [5\pi/6, 2\pi]$

c) $[0, \pi/3] \cup \{\pi/2\} \cup [5\pi/3, 2\pi]$

d) $[0, \pi/6] \cup \{\pi/2\} \cup [5\pi/6, \pi]$

105) Determine the smallest positive value of x (in degrees) for which
$\tan(x + 100°) = \tan(x + 50°)\tan(x)\tan(x - 50°)$

a) 40°   b) 60°

c) 50°   d) 30°

106) If $|z + 4| \leq 3$, then the maximum value of $|z + 1|$ is

a) 6   b) 0

c) 4   d) 10

107) Find the centre and radius of circle given by $\left|\dfrac{z-\alpha}{z-\beta}\right| = k, k \neq 1$ where, $z = x + iy$, $\alpha = \alpha_1 +$

$i\alpha_2$, $\beta = \beta_1 + i\beta_2$

a) $C = \dfrac{\alpha - k^2\beta}{1-k^2}, R = \dfrac{k}{|1-k^2|}|\alpha - \beta|$

b) $C = \dfrac{\alpha^2 - k\beta}{1-k^2}, R = \dfrac{k}{|1-k^2|}|\alpha - \beta|$

c) $C = \dfrac{\alpha^2 - k\beta}{1-k^2}, R = \dfrac{k^2}{|1-k^2|}|\alpha - \beta|$

d) $C = \dfrac{\alpha - k^2\beta}{1-k^2}, R = \dfrac{k^2}{|1-k^2|}|\alpha - \beta|$

108) The value of $\displaystyle\sum_{k=1}^{6}\left(\sin\dfrac{2\pi k}{7} - i\cos\dfrac{2\pi k}{7}\right)$ is

a) -1 b) 0

c) $-i$ d) i

e) none

109) If 'H' is the harmonic mean between P and Q, then $\left(\dfrac{H}{P}\right) + \left(\dfrac{H}{Q}\right)$ is :

a) 2   b) $\dfrac{PQ}{P+Q}$

c) $\dfrac{P+Q}{PQ}$ d) none of these

110) If x is positive, the first negative term in the expansion of $(1 + x)^{27/5}$ is

a) 6th term   b) 7th term

c) 5th term   d) 8th term

111) The real numbers x_1, x_2, x_3 satisfying the equation $x^3 - x^2 + \beta x + \gamma = 0$ are in AP. Find the intervals in which β and γ lie.

a) $\beta \in (-\alpha, 1/3), \gamma \in (-1/27, \alpha)$

b) $\beta \in (-\alpha, 1/3], \gamma \in [-1/27, \alpha)$

c) $\beta \in [-\alpha, 1/3], \gamma \in (-1/27, \alpha)$

d) $\beta \in (-\alpha, 1/3], \gamma \in (-1/27, \alpha]$

112) If in the expansion of $(1+x)^{21}$, the coefficients of x^r and x^{r+1} be equal, then r is equal to :
   a) 9   **b) 10**
   c) 11   d) 12

113) In a binomial distribution, the mean is 4 and variance is 3. Then, its mode is :
   a) 5   b) 6
   c) 4   d) none of these

114) The number of ways in which 6 men and 5 women can dine at a round table, if no two women are to sit together, is given by
   a) 6! × 5!   b) 30
   c) 5! × 4!   d) 7! × 5!

115) A box contains two white balls, three black balls and four red balls. In how many ways can three balls be drawn from the box if at least one black ball is to be included in the draw?
   a) 60   **b) 64**
   c) 50   d) 54

116) One tickets 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) 1/14   b) 1/7
   c) 5/14   d) 1/50

117) A four-digit number is formed by the digits 1, 2, 3, 4 with no repetition. The probability that the number is odd, is :
   a) zero   b) 1/3
   c) 1/4   **d) none of these**

118) Find the value of the determinant
$$\begin{vmatrix} bc & ca & ab \\ p & q & r \\ 1 & 1 & 1 \end{vmatrix}$$ where a, b and c are respectively the pth, q^{th} and r^{th} terms of a harmonic progression.

   a) 0   b) 1
   c) 2   d) 4

119) If $a \neq p, b \neq q, c \neq r$ and $\begin{vmatrix} p & b & c \\ a & q & c \\ a & b & r \end{vmatrix} = 0$.

then find the value of $\dfrac{p}{p-a} + \dfrac{q}{q-b} + \dfrac{r}{r-c}$

   a) 1   b) 3
   c) 5   **d) 2**

120) If A and B are 2 × 2 matrices, then which of the following is true ?
   a) $(A + B)^2 = A^2 + B^2 + 2AB$
   b) $(A - B)^2 = A^2 + B^2 - 2AB$
   c) $(A - B)(A + B) = A^2 + AB - BA - B^2$
   d) $(A + B)(A - B) = A^2 - B^2$

121) Solve for x the following equation :
$\log_{(2x+3)}(6x^2 + 23x + 21) = 4 - \log_{(3x+7)}(4x^2 + 12x + 9)$
   a) −1/4   b) −1/3
   c) −1/2   d) 1/4

122) The value of expression
$1 - \dfrac{\sin^2 y}{1 + \cos y} + \dfrac{1 + \cos y}{\sin y} - \dfrac{\sin y}{1 - \cos y}$ is equal to:
   a) 0   b) 1
   c) − sin y   **d) cos y**

123) If $A + B + C = \pi$, then
   sin 2A + sin 2B + sin 2C is equal to :
   a) 4 sin A sin B sin C
   b) 4 cos A cos B Cos C
   c) 2 cos A cos B cos C
   d) 2 sin A sin B sin C

124) In a ΔABC, $\tan \dfrac{A}{2} = \dfrac{5}{6}$, $\tan \dfrac{C}{2} = \dfrac{2}{5}$, then
   a) a, c, b are in AP   **b) a, b, c are in AP**

c) b, a, c are in AP   d) a, b, c are in GP

125) In a triangle ABC, let $\angle C = \dfrac{\pi}{2}$, if r is the inradius and R is the circumradius of the triangle ABC, then $2(r + R)$ equals
   a) $c + a$ b) $a + b + c$
   c) $a + b$ d) $b + c$

126) The vertices of a triangle are $[at_1t_2, a(t_1 + t_2)]$, $[at_2t_3, a(t_2 + t_3)]$, $[at_3t_1, a(t_3 + t_1)]$, Find the orthocentre of the triangle.
   a) $(-a, a(t_1 + t_2 - t_3) + at_1t_2t_3)$
   b) $(-a, a(t_1 + t_2 + t_3) + at_1t_2t_3)$
   c) $(a, a(t_1 + t_2 - t_3)+at_1t_2t_3)$
   d) $(a, a(t_1 + t_2 + t_3)+at_1t_2t_3)$

127) The sides of a triangle are three consecutive natural numbers and its largest angle is twice the smallest one. Determine the sides of the triangle.
   a) 3, 4, 5   b) 5, 6, 7
   c) 4, 5, 6   d) 2, 3, 4

128) The upper $(3/4)^{th}$ portion of a vertical pole subtends an angle $\tan^{-1}(3/5)$ at a point in the horizontal plane through its foot and at a distance 40 m from the foot. A possible height of the vertical pole is
   a) 20 m   b) 40 m
   c) 60 m   d) 80 m

129) A point on the parabola $y^2 = 18x$ at which the ordinate increases at twice the rate of the abscissa, is
   a) (2, 4)   b) (2, –4)
   c) (–9/8, 9/2)   d) (9/8, 9/2)

130) Use the formula $\displaystyle\lim_{x\to 0}\dfrac{a^x -1}{x} = \ln a$ to find
   $\displaystyle\lim_{x\to 0}\dfrac{2^x -1}{(1+x)^{1/2} -1}$
   a) $\ln 2$ b) $2\ln 2$

c) $\ln 5$ d) $0.5\ln 2$

131) $\dfrac{d}{dx}\left(\tan^{-1}\dfrac{\sqrt{1+x^2}-1}{x}\right)$ is equal to :
   a) $\dfrac{1}{1+x^2}$
   b) $\dfrac{x^2}{2\sqrt{1+x^2}(\sqrt{1+x^2}-1)}$
   c) $\dfrac{2}{1+x^2}$
   d) $\dfrac{1}{2(1+x^2)}$

132) The area enclosed between the curves $y^2 = x$ and $y = |x|$ is
   a) 2/3 sq unit   b) 1 sq unit
   c) 1/6 sq unit   d) 1/3 sq unit

133) Let $\dfrac{d}{dx}F(x) = \left(\dfrac{e^{\sin x}}{x}\right), x > 0.$
   If $\displaystyle\int_1^4 \dfrac{3}{x} e^{\sin x^3} dx = F(k) - F(1),$ then one of the possible values of k, is
   a) 15   b) 16
   c) 63   d) 64

134) If $y = \tan^{-1}\dfrac{1}{1+x+x^2} + \tan^{-1}\dfrac{1}{x^2+3x+3}$
   $+ \tan^{-1}\dfrac{1}{x^2+5x+7} +...$ upto n terms, then $y'(0)$ is equal to :
   a) $-\dfrac{1}{1+n^2}$ b) $-\dfrac{n^2}{1+n^2}$
   c) $\dfrac{n}{1+n^2}$ d) none of these

135) Find the area bounded by the curves $y = x^3$ and $y = \dfrac{2}{1+x^2}$.

Space for Rough Work

a) $(\pi - 2/3)$ sq. units b) $(2\pi - 2/3)$ sq. units

c) $(\pi + 2/3)$ sq. units d) $(2\pi + 2/3)$ sq. units

136) The solution of primitive integral equation $(x^2 + y^2)\, dy = xy\, dx$ is $y = y(x)$. If $y(1) = 1$ and $(x_0) = e$, then x_0 is equal to

a) $\sqrt{2(e^2 - 1)}$ b) $\sqrt{2(e^2 + 1)}$

c) $\sqrt{3}\, e$ d) $\sqrt{\dfrac{e^2 + 1}{2}}$

137) If the equation of the locus of a point equidistant from the points (a_1, b_1) and (a_2, b_2) is $(a_1 - a_2)x + (b_1 - b_2)y + c = 0$, then the value of '$c$' is

a) $\dfrac{1}{2}(a_2^2 + b_2^2 - a_1^2 - b_1^2)$

b) $a_1^2 - a_2^2 + b_1^2 - b_2^2$

c) $\dfrac{1}{2}(a_1^2 + a_2^2 + b_1^2 + b_2^2)$

d) $\sqrt{a_1^2 + b_1^2 - a_2^2 - b_2^2}$

138) The diagonals of a parallelogram PQRS are along the lines $x + 3y = 4$ and $6x - 2y = 7$. Then PQRS must be a.

a) Rectangle

b) Rhombus

c) Cyclic quadrilateral

d) Square

139) For $a > b > c > 0$, the distance between $(1, 1)$ and the point of intersection of the lines $ax + by + c = 0$ and $bx + ay + c = 0$ is less than $2\sqrt{2}$. Then

a) $a + b - c > 0$ b) $a - b + c < 0$

c) $a - b + c > 0$ d) $a + b - c < 0$

140) If two tangents drawn from a point P to the parabola $y^2 = 4x$ are at right angles, then the locus of P is

a) $x = 1$ b) $2x + 1 = 0$

c) $x = -1$ d) $2x - 1 = 0$

141) If a circle passes through the point (a, b) and cuts the circle $x^2 + y^2 = p^2$ orthogonally, then the equation of the locus of its centre is

a) $2ax + 2by - (a^2 + b^2 + p^2) = 0$

b) $x^2 + y^2 - 2ax - 3by + (a^2 - b^2 - p^2) = 0$

c) $2ax + 2by - (a^2 - b^2 + p^2) = 0$

d) $x^2 + y^2 - 3ax - 4by + (a^2 + b^2 - p^2) = 0$

142) The number of common tangents to the circles $x^2 + y^2 = 4$ and $x^2 + y^2 - 6x - 8y = 24$ is

a) 0   b) 1

c) 3   d) 4

143) Find the equation of circle touching the line $2x + 3y + 1 = 0$ at $(1, -1)$ and cutting orthogonally the circle having line segment joining $(0, 3)$ and $(-2, -1)$ as diameter.

a) $2x^2 + 2y^2 + 10x + 5y + 1 = 0$

b) $2x^2 + 2y^2 - 10x - 5y + 1 = 0$

c) $2x^2 + 2y^2 - 5x - 3y + 1 = 0$

d) $x^2 + y^2 - 10x - 5y + 1 = 0$

144) If all chords of the curve $3x^2 - y^2 - 2x + 4y = 0$, which subtend a right angle at the origin, pass through a fixed point. Find the coordinates of the point.

a) $(1, 2)$ b) $(1, -2)$

c) $(1, 3)$ d) $(1, -3)$

145) The ellipse $x^2 + 4y^2 = 4$ is inscribed in a rectangle aligned with the coordinate axes, which is turn inscribed in another ellipse that passes through the point $(4, 0)$. Then, the equation of the ellipse is

a) $x^2 + 12y^2 = 16$ b) $4x^2 + 48y^2 = 48$

c) $4x^2 + 64y^2 = 48$ d) $x^2 + 16y^2 = 16$

146) If $P = (x, y)$, $F_1 = (3, 0)$, $F_2 = (-3, 0)$ and $16x^2 + 25y^2 = 400$, then $PF_1 + PF_2$ eauals

a) 8   b) 6

c) 10   d) 12

Space for Rough Work

147) Determine the value of 'c' so that for all real x, the vector $c x\hat{i} - 6\hat{j} - 3\hat{k}$ and $x\hat{i} + 2\hat{j} + 2cx\hat{k}$ make an obtuse angle with each other.

a) $-4/3 < c < 0$ b) $-2/3 < c < 0$

c) $4/3 < c < 0$ d) $2/3 < c < 0$

148) The equation of line of intersection of planes $4x + 4y - 5z = 12$, $8x + 12y - 13z = 32$ can be written as :

a) $\dfrac{x-1}{2} = \dfrac{y+2}{-3} = \dfrac{z}{4}$ b) $\dfrac{x-1}{2} = \dfrac{y-2}{3} = \dfrac{z}{4}$

c) $\dfrac{x}{2} = \dfrac{y+1}{3} = \dfrac{z-2}{4}$ d) $\dfrac{x}{2} = \dfrac{y}{3} = \dfrac{z-2}{4}$

149) A particle is acted upon by constant forces $4\hat{i} + \hat{j} - 3\hat{k}$ and $3\hat{i} + \hat{j} - \hat{k}$ which displace it from a point $\hat{i} + 2\hat{j} + 3\hat{k}$ to the point $5\hat{i} + 4\hat{j} + \hat{k}$. The work done in standard units by the forces is given by

a) 40 unit   b) 30 unit

c) 25 unit   d) 15 unit

150) The projection of the vector $\hat{i} - 2\hat{j} + \hat{k}$ on the vector $4\hat{i} - 4\hat{j} + 7\hat{k}$ is equal to :

a) $\dfrac{5\sqrt{6}}{10}$ b) $\dfrac{19}{9}$

c) $\dfrac{9}{19}$ d) $\dfrac{\sqrt{6}}{19}$

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Directions (Question 151-155) : In each of the following questions, choose the word opposite in meaning to the given word

151) HAUGHTY
   a) Pitiable   b) Scared
   c) Humble   d) Cowardly
152) ACQUITTED
   a) Entrusted   b) Convicted
   c) Burdened   d) Freed
153) TRUMPERY
   a) Defeat   b) Wastage
   c) Treasure   d) Vague
154) UNSULLIED
   a) Visible   b) Foul
   c) Stainless   d) Strong
155) ONEROUS
   a) Straight-forward   b) Easy
   c) Complex   d) Plain

Directions (Question 156-160) : Select the word or phrase that is most near similar in meaning to the word or phrase in capital letters given below.

156) OSTRACIZE
   a) To exclude   b) To show off
   c) To point out   d) To offend
157) TRENCHANT
   a) Incisive   b) Greedy
   c) Temporary   d) Arduous
158) PEJORATIVE
   a) Arduous   b) Disparaging
   c) Exorbitantly   d) Extrovert
159) DEMEANOUR
   a) Demarcation   b) Way of behaving
   c) Detection   d) Liability
160) GARNER
   a) Compute   b) Collect
   c) Prevent   d) Assist

Directions (Question 161-165) : In each of the following questions, an idiomatic expression/ a proverb has been given, followed by some alternatives. Choose the one which best expresses the meaning of the given idiom/proverb

161) To cast pearls before a swine
   a) To spend recklessly
   b) To spend a lot of money on the unkeep of domestic hogs.
   c) To waste money over trifles
   d) To offer to a person a thing which he cannot appreciate
162) To through up the sponge
   a) To surrender of give up a contest
   b) To offer a challenge
   c) To become utterly disappointed
   d) To maintain grit and enthusiasm until the end
163) Harp on
   a) To comment
   b) To criticise
   c) To keep on talking
   d) To keep on insulting
164) To give/get the bird
   a) To get the awaited
   b) To have good luck
   c) To send away
   d) To get the impossible
165) Will o' the wisp
   a) Anything which eludes or deceives
   b) To act in a childish way
   c) To act in a foolish way
   d) To have a desires unbacked by efforts

Directions (Question 166-170) : In the following items some parts of the sentence have been jumbled up. You are required to rearrange these parts which are labeled P, Q, R and S to produce the correct

sentence. Choose the proper sequence and mark in your Answer Sheet Accordingly.

166) All of us who refused to take time off from the gambling table (P) without giving a thought to their noble inventor, the Earl of Sandwich (Q) to eat a regular meal (R) eat sandwiches at one time or another (S)
The proper sequence should be
a) SRPQ　　　　b) PQSR
c) SQPR　　　　d) PRSQ

167) A dilemma faced whose jobs are being eliminated) (P) but by an organization that downsizes (Q) not only by large bureaucracies (R) is how to be as fair as possible to employees (S)
The proper sequence should be
a) SPRQ　　　　b) RQSP
c) SQRP　　　　d) RPSQ

168) In the years, into a fully integrated biotechnology enterprise, (P) focused on healthcare (Q) that followed, Bicon evolved (R) from an industrial enzymes company (S)

169) Dispite India is yet to develop forensic databases (P) being referred for DNA testing, (Q) which would help solve cases faster (R) the encouraging trend of more cases (S)
The proper sequence should be
a) PQSR　　　　b) SRPQ
c) PRSQ　　　　d) SQPR

170) It has where strong minds have (P) also been a cricket tour (Q) into delivering one more effort (R) whipped tired bodies (S)
The proper sequence should be
a) QRSP　　　　b) SPQR
c) QPSR　　　　d) SRQP

Directions (Questions 171 - 173) : There is a certain relation between two given words on one

side of: : and one word is given on another side of: : while another word is to be found from the given alternatives, having the same relation with this word as the given pair has. Select the best alternative.

171) Reading: Knowledge : : Work : ?
a) Experience　　b) Engagement
c) Employment　　d) Experiment

172) Enough: Excess : : Sufficiency : ?
a) Adequacy　　b) Surplus
c) Competency　　d) Import

173) Man: Machine :: Master:?
a) Worker　　　b) Manager
c) House　　　d) Slave

174) Pride is related to Humility in the same way as Desire is related to ....' ?.
a) Wish　　　b) Hate
c) Suppress　　d) Indifference

Directions (Questions 175 & 176) : Each of the following questions consists of two words that have a certain relationship to each other, followed by four lettered pairs of words. Select that lettered pair which has the same relationship as the original pair of words.

175) Chocolate : Sugar
a) Egg : Yolk
b) Road : Traffic
c) Building : Cement
d) Milk : Cream

176) Heart : Cardiology
a) Brain : Psychology
b) History : Histology
c) Civics : Polity
d) Fossils : Palaeontology

Direction (Question 177-179): Each of the following (27-29) questions has four alternative responses. Choose the correct response

177) Which of the following is the same as Steel, Bronze, Brass ?
a) Calcite   b) Magnalium
c) Methane   d) Zinc

178) Which of the following is the same as Flood, Fire, Cyclone ?
a) Damage   b) Earthquake
c) Rain   d) Accident

179) Which of the following is the same as Count, List, Weigh, ?
a) Compare   6) Sequence
c) Number   d) Measure

Directions (Questions 180 & 181) : In each of the following questions, choose that set of numbers from the four alternative sets, that is similar to the given set

180) Given set: (12, 20, 4)
a) (5, 10, 5)   b) (13, 18, 5)
c) (17, 27, 5)   d) (20, 15, 25)

181) Given set : (21, 51, 15)
a) (21, 30, 51)   b) (21, 35, 41)
c) (21, 51, 42)   d) (21, 91, 35)

Directions (Questions 182 & 183) : In each of the following questions, a number series is given with one term missing. Choose the correct alternative that will continue the same pattern and fill in the blank spaces.

182) 1, 9, 17, 33, 49, 73, ( )
a) 97   b) 98
c) 99   d) 100

183) 2, 15, 41, 80, ( )
a) 111   b) 120
c) 121   d) 132

184. Looking at a portrait of a man, Harsh said, "His mother is the wife of my father's son. Brothers and sisters I have none." At whose portrait was Harsh looking ?

a) His son   b) His cousin
c) His uncle   d) His nephew

185) Pointing to a photograph, a person tells his friend, "She is the granddaughter of the elder brother of my father" How is the girl in the photograph related to his then?
a) Niece   b) Sister
c) Aunt   d) Sister-in-law

186) The head office of the world trade organization is located in …..
a) Nepal   b) Japan
c) Australia   d) none of these

187) Which of the following awards is given for excellence in the field of sports?
a) Kalidas Samman
b) shanty Swarup Bhatnagar award
c) Jnanpith award
d) Arjuna award

188) Which of the following is a horticulture crop?
a) Paddy   b) wheat
c) Mango   d) Bajra

189) Which of the following is NOT a civilian Award given by the govt of india?
a) Sahitya Akademi Award
b) Shanti Swarup Bhatnagar Award
c) Padma shri
d) Kirti chakra

190) Which of the following is the primary source of energy in India?
a) Hydel power   b) Natural Gas
c) Coal   d) Non-conventional energy

191) The second largest river basin in india is that of
a) Mahanadi   b) Godavari
c) narmada   d) Krishna

192) Location of Delhi approximately closest to which one of the following?
a) 32º N and 72º E   b) 28º N and 77º E
c) 25º N and 75º E   d) 22º N and 70º E

193) To port blair, which one of the following cities is geographically nearest?
a) Kolkata   b) kuala lumpur
c) Singapore   d) yangon

194) consider the following statement:
1. in india , mica production is confined to bihar only
2. in india, gold production is confined to Karnataka only
a) 1 only   b) 2 only
c) both 1 and 2   d) neither 1 nor 2

195) The environmental temperature lapse rate per 100m of ascent is
a) 4.6º C   b) 5.8º C
C)6.4º C   d) 6.8º C

196) In the world, india is the major producer of which of the following minerals?
a) copper   b) lead
c) chromium   d) zinc

197) Fatehpur sikri symbolizes
a) mogul architecture
b) Hindu and Muslim architectures
c) Muslim and Christian architectures
d) Hindu, Muslim and Christian architectures

198) The indian flag was designed by
a) Indulal Yagnik   b) Madam Cama
c) Aurobindo Ghosh   d) Mrs. Annie Besant

199) Who of the following is popularly known as 'Deshbandhu'?
a) Aurobindo Ghosh   b) Chittaranjan das
c) G.B Pant   d) R.M.Lohia

200) Which one of the following is not a constituent of biogas?
a) Carbon dioxide   b) Hydrogen
c) Methane   d) Nitrogen dioxide

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