1. Creep Error occurs in
   A) Energy meter
   B) Watt meter
   C) Moving iron instruments
   D) Moving coil instruments

2. The scale of Moving Iron Instruments are
   A) Uniform
   B) Non Uniform
   C) Logarithmic
   D) None of these

3. In a dual beam oscilloscope
   A) There are two separate vertical Inputs and one set of horizontal deflection plates
   B) There is only one vertical input and two horizontal deflection plates
   C) There are two vertical inputs and two horizontal deflection plates
   D) There is one vertical and one horizontal input plate

4. A 1000 Hz sinusoidal voltage is applied to both X and Y inputs of a CRO. Which one of the following wave form will appear on its screen ?
   A) Ellipse
   B) Circle
   C) Straight line
   D) Square

5. Inductance can be measured by which one of the following bridge ?
   A) Schering bridge
   B) Wein bridge
   C) Owen bridge
   D) Maxwell bridge

6. How many cycles of 15 kHz sinusoidal signal will appear on a CRO screen if the sweep frequency is 3 kHz ?
   A) 10
   B) 5
   C) 4
   D) 15

7. Moving Coil and Moving Iron Instruments can be distinguished from their
   A) Scale
   B) Pointer
   C) Terminal Connections
   D) Shape

8. For measuring very Low resistance which one of the following bridge is used ?
   A) Maxwell's bridge
   B) Hay's bridge
   C) Kelvin bridge
   D) Wheatstones bridge

9. The smallest change in measured variable to which an instrument will respond is called

A) Sensitivity
B) Repeatability
C) Precision
D) Resolution

10. The non coincidence of loading and unloading curves is known as

A) Drift
B) Backlash
C) Hysteresis
D) Fidility

11. An example of e-mail utility

A) Word
B) Outlook
C) Explorer
D) Excel

12. Spreadsheets cannot

A) do calculations
B) plot graphs
C) create graphics
D) plot charts

13. The _____ is a security app by Microsoft which is a built-in one into Windows OS that is designed to filter network data from your Windows system and block harmful communications or the programs which are initiating them.

A) Windows Security Essentials
B) Windows Firewall
C) Windows app blocker
D) Windows 10

14. The gutter margin refers to

A) Margin that is added to the left margin when printing
B) Margin that is added to the Right margin when printing
C) Margin that is added to the binding side of the page when printing
D) Margin that is added to the outside of the page when printing

15. Which of the following is the hacking approach where cyber-criminals design fake websites or pages for tricking or gaining additional traffic ?

A) Pharming
B) Website-Duplication
C) Mimicking
D) Spamming

16. A group of hackers who are both white and black hat

A) Yellow Hat Hackers
B) Grey Hat Hackers
C) Red Hat Hackers
D) White-Black Hat Hackers

17. From the options below, which of them is not a threat to information security ?

A) Disaster
B) Unchanged default password
C) Information leakage
D) Eavesdropping

18. Which of the following is a type of cyber attack ?

A) Phishing
B) SQL Injections
C) Password Attack
D) All of the above

19. The process or mechanism used for converting ordinary plain text into garbled non-human readable text and vice-versa

A) Malware Analysis
B) Exploit writing
C) Reverse engineering
D) Cryptography

20. _____ passwords are the next level of security.

A) BIOS
B) CMOS
C) SMOS
D) BOIS

21. One mole of an ideal gas undergoes isothermal expansion to double its initial volume at 100°C. In terms of the universal gas constant R, the amount of work done on the gas is approximately

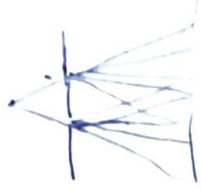
A) 100 *ln* 2 R
B) 273 *ln* 2 R
C) 373 *ln* 2 R
D) 100 *ln* 5 R

22. A gas mixture at a temperature T consists of three gases denoted 1, 2 and 3. If their molecular masses are related by $m_1 > m_2 > m_3$, their rms velocities are related by

A) $(v_{rms})_1 > (v_{rms})_2 > (v_{rms})_3$
B) $(v_{rms})_1 < (v_{rms})_2 > (v_{rms})_3$
C) $(v_{rms})_1 > (v_{rms})_2 < (v_{rms})_3$
D) $(v_{rms})_1 < (v_{rms})_2 < (v_{rms})_3$

23. In a double slit experiment, the fringe width is found to be β for red light. If the distance between the slits is doubled and blue light is used, then

A) β increases
B) β decreases
C) β remains unchanged
D) Data insufficient to calculate change in β



24. The refractive index for a material is $\sqrt{3}$. When a block of the material is placed in air, the Brewster angle for the air – material pair will be

A) 15° B) 30° C) 45° D) 60°

25. The type of pumping mechanism employed in a Ruby Laser is

A) Electrical B) Chemical

C) Optical D) Thermal

26. The SI unit for luminous intensity is

A) Lux B) Candela

C) Dioptre D) Joules per m

27. The mass of an object is measured to be 4.237 g and its volume is known to be 2.51 cm^3. Considering the rule for number of significant figures in the result of a calculation, the density of the object is correctly expressed as

A) 1.69 B) 1.688 g cm^{-3} C) 1.6880 g cm^{-3} D) 1.7 g cm^{-3}

28. Which of the following is a consequence of the law of conservation of angular momentum ?

A) Inverse square law for gravity

B) Spherical shape of a liquid drop in space

C) The circular orbit of a charged particle in a magnetic field

D) Kepler's second law

29. The velocity of projection required for a body to become a satellite of Earth is (g is acceleration due to gravity, G is universal gravitational constant, M is the mass of the Earth and R is the radius of Earth)

A) $\sqrt{gR}$ B) $\sqrt{\frac{2GM}{R}}$ C) $\frac{GM}{R}$ D) 2gR

30. The displacement of a particle undergoing simple harmonic motion is given by $x = a \sin(\omega t + \varphi)$. If v is its velocity, which of the following is incorrect ?

A) $v = a\omega \sin\left(\omega t + \varphi + \frac{\pi}{2}\right)$ B) $v = \omega\sqrt{a^2 - x^2}$

C) $v = a\omega \sin(\omega t + \varphi + \pi)$ D) $v = a\omega \cos(\omega t + \varphi)$

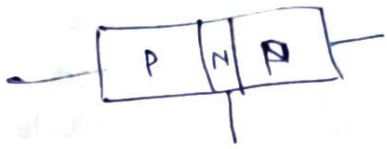
31. In a reverse biased PN junction, the minority current flows from

A) N region to P region

B) P region to N region

C) There will be no minority current

D) Both ways



32. The current amplification factor for CB configuration of a transistor is α and that for the CE configuration is β. They are related as

A) $\alpha = \frac{\beta}{1-\beta}$ B) $\beta = \frac{\alpha}{1+\alpha}$ C) $\alpha = \frac{\beta}{1+\beta}$ D) $\beta = \frac{\alpha}{1+2\alpha}$

33. For faithful amplification, the operating point should be

A) located near the midpoint in the dc load line

B) located near the saturation point in the dc load line

C) located near the cut-off point in the dc load line

D) can be anywhere along the dc load line

34. In a logic gate, the output is low only when both inputs are high or only when both inputs are low and the output is high otherwise. Then the logic gate is

A) OR B) NOR C) XOR D) NAND

35. Which of the following particles does not obey Pauli's exclusion principle ?

A) Proton B) Neutron C) Electron D) Photon

36. The energy density in a parallel plate capacitor is ε. If the distance between the plates of the capacitor are halved, the energy density becomes

A) 2ε B) 4ε C) $\frac{\varepsilon}{2}$ D) $\frac{\varepsilon}{4}$

37. A particle A carrying a charge Q and mass 2M and another particle B carrying a charge 2Q and mass M both enter a magnetic field perpendicular to the field and move along circular paths of same radii. Then

A) the momentum of A equals that of B

B) the momentum of A is half that of B

C) the momentum of A is twice that of B

D) the momentum of A is four times that of B

38. An electromagnetic crane uses a magnetic field of strength B to lift a metal scrap of mass m up to a height of h metres. The work done by the magnetic field is

A) Zero B) Bgh C) $\frac{Bgh}{m}$ D) mgH

39. The unit of inductance is

A) Weber B) Hertz C) Tesla D) Henry

40. Which of the following is called an acceptor circuit ?

A) Series LCR circuit
B) Parallel LCR circuit
C) Series LC circuit
D) Parallel LC circuit

41. Which of the following is incorrect regarding the spectra produced by a prism and by a diffraction grating ?

A) The spectrum from a prism is more intense
B) In a prism spectrum, red is deviated more
C) There is only a single spectrum from a prism whereas there are more than one spectra from a grating
D) Prism uses dispersion whereas grating uses diffraction to produce spectrum

42. In Rayleigh scattering, the amount of scattered light is

A) Directly proportional to the square of wavelength
B) Directly proportional to fourth power of the wavelength
C) Inversely proportional to square of wavelength
D) Inversely proportional to the fourth power of wavelength

43. The electric potential V due to an electric dipole varies with distance r from the dipole as

A) $V \propto r$ B) $V \propto \frac{1}{r}$ C) $V \propto \frac{1}{r^2}$ D) $V \propto \frac{1}{r^3}$

44. Which of the following quantities does not obey the principle of superposition ?

A) Electric force
B) Electrostatic field
C) Electrostatic potential
D) Electrostatic energy

45. A conducting sphere carries a charge Q. The work required to move a charge from point on the surface to a diametrically opposite point.

A) Is always zero
B) Depends on the charge transported
C) Depends on the radius of the sphere
D) Depends on the charge Q

46. Which of the following is an invariant under Galilean transformation ?

A) Position
B) Velocity
C) Acceleration
D) Kinetic energy

47. Theoretically, the limiting values of Poisson's ratio σ are

A) $-0.5 < \sigma < 1$
B) $-1 < \sigma < 0.5$
C) $-0.5 < \sigma < 0.5$
D) $-1 < \sigma < 1$

48. Which of the following is an incorrect expression for Bernoulli's theorem in fluid dynamics ?

A) $\frac{1}{2}v^2 + \frac{p}{\rho} + gh = \text{constant}$
B) $\frac{1}{2}\rho v^2 + p + \rho gh = \text{constant}$
C) $\frac{1}{2g}v^2 + \frac{p}{\rho}g + h = \text{constant}$
D) $\frac{1}{2}v^2 + \frac{p}{\rho} + \rho gh = \text{constant}$

49. The unit of surface tension is

A) Newton per meter
B) Newton per square meter
C) Newton per meter cube
D) Newton

50. An amount of heat Q raises the temperature of 1 g of material A by 3°C and 1 g of material B by 4°C. Which material has the greater specific heat capacity ?

A) Material A
B) Material B
C) Both has same specific heat capacity but different heat capacity
D) Both have same specific heat as well as heat capacity

51. Select the UV-Vis region, where O_3 undergoes decomposition forming O_2 and O

A) 150 – 200 nm
B) 220 – 330 nm
C) 420 – 720 nm
D) 300 – 600 nm

52. What are the different forms through which carbon nano tube exist ?
    1. Armchair
    2. Linear
    3. Zigzag
    4. Spherical

    A) 1 Only B) 1 and 3 C) 2 Only D) 3 and 4

53. Endosulfan applied in cashew plantation belongs to which category of pesticide ?

    A) Organo phosphorous B) Organo chlorine
    C) Carbamate D) None of the above

54. Name the person who developed 12 principles of Green Chemistry.

    A) Paul Anastas B) John Warner
    C) Paul Chirik D) K.N. Ganesh

55. Choose the selection rule for anharmonic oscillator in IR spectroscopy.
    1. $\Delta\upsilon = \pm 1$
    2. $\Delta\upsilon = \pm 2$
    3. $\Delta\upsilon = \pm 0$
    4. $\Delta\upsilon = \pm 1, \pm 2, \pm 3...$

    A) 1 only B) 1, 2 and 3 C) 3 only D) 4 only

56. What is the standard used in NMR spectroscopy ?
    1. TMS
    2. $CDCl_3$
    3. C_6H_6
    4. $CHCl_3$

    A) 1 Only B) 1 and 2 C) 4 Only D) 3 and 4

57. What should be the ppm level of dissolved oxygen in potable water ?

    A) 1 – 3 ppm B) 4 – 6 ppm
    C) 5 – 10 ppm D) 0 ppm

58. Itai-Itai disease is caused by exposure to which metal ?

    A) Hg B) Cr C) Pb D) Cd

59. Which gas is used as propellant in rockets ?
A) CO_2 B) O_2 C) SO_2 D) NH_3

60. Which among the following is not a super critical fluid ?
A) CO_2 B) CH_4 C) NH_3 D) CO

61. Which one of the following is the correct example for Rhombohedral crystal system ?
A) Si B) As_2S_3 C) Co D) Sb

62. The relation between RMS velocity, average velocity and most probable velocity is
A) most probable velocity > average velocity > RMS velocity
B) average velocity > RMS velocity > most probable velocity
C) RMS velocity = average velocity > most probable velocity
D) RMS velocity > average velocity > most probable velocity

63. What is the normality of 1M sodium carbonate solution ?
A) 1N B) 0.1N C) 2N D) 0.2N

64. What is the unit of interplanar distance (d) in Bragg's equation ?
A) pm B) nm C) mm D) µm

65. Identify one of the system which shows positive deviation from Raoult's law.
A) Chloroform-Acetone B) Water-HCl
C) Ethanol-2-Propanol D) Ethanol-Benzene

66. Which one of the following gas is used as mobile phase in Gas-Liquid chromatography ?
A) CO_2 B) CO C) NO D) NO_2

67. During condensation polymerization which one of the following will be eliminated during polymerization ?
A) CH_4 B) HCl C) HCN D) CO

68. What happens if ionic product of a salt exceeds its solubility product ?
A) Solution becomes homogeneous B) Solution remains unsaturated
C) Solution becomes super saturated D) Solution becomes saturated

69. What is Kevlar ?

A) Melamine-formaldehyde
B) Phenol-formaldehyde
C) Poly-para-phenyleneterethalimide
D) Poly-meta-phenyleneisopthalimde

70. Which one of the following has the highest calorific value ?

A) Coal
B) Petrol
C) Methane
D) LPG

71. Which one of the following is the cause for increase of molar conductance with dilution in the case of strong electrolytes ?

A) Wein effect
B) Kharasch effect
C) Asymmetric effect
D) Peroxide effect

72. What is the relation between edge length and atomic radius for a unit cell in simple cubic system ?

A) $r = a/4$
B) $r = a/2$
C) $r = a/6$
D) $r = a/8$

73. Which one of the following liquid has the highest molar heat of vaporization ?

A) Ethanol
B) Ether
C) Water
D) Hydrogen fluoride

74. 10^{-6} M NaOH solution is diluted to 100 times. The pH of the diluted base is

A) Between 6 and 7
B) Between 3 and 4
C) Between 10 and 11
D) Between 7 and 8

75. Which one of the following parameter is temperature dependent ?

A) Molality
B) Mole fraction
C) Molarity
D) Mass fraction

76. Choose the correct redox indicator.

A) Methylene blue
B) Diphenyl amine
C) Eriochrome Black-T
D) Thymol Blue

77. What is the hybridization in carbon nanotube ?

A) sp^3
B) sp^3d^2
C) sp^2
D) dsp^2

78. Which one of the following method is Top-Down method for preparing nano materials ?

A) Sol-Gel
B) Ball Milling
C) Solvo-thermal
D) Chemical vapor deposition

79. What is the main ingredient of cement ?

A) SiO_2
B) $CaCO_3$
C) Al_2O_3
D) CaO

80. Blue shift in UV-Vis spectroscopy refers to

A) Shift to lower wavelength
B) Shift to higher frequency
C) Shift to higher wavelength
D) Shift to higher energy

81. Area of the region bounded by the curve $y = \cos x$ between $x = 0$ and $x = \pi$ is

A) 2sq. units
B) 4sq. units
C) 3sq. units
D) 0sq. units

82. The parabolic curve $y = 2\sqrt{x}$, $1 \le x \le 2$ is revolved around X-axis. The volume of solid of revolution is

A) $\pi/4$
B) 6π
C) 4π
D) 12π

83. The general solution of the differential equation $\frac{dy}{dx} = e^{x+2y}$ is

A) $e^x + \frac{e^{-2y}}{2} = c$

B) $e^x + e^{-2y} = c$

C) $e^x + 2e^{-2y} = c$

D) $e^{-x} + \frac{e^{-2y}}{2} = c$

84. Which of the following equations has $y = x^2$ as one of its particular solution ?

A) $x\frac{d^2y}{dx^2} - \frac{dy}{dx} = x$
B) $x\frac{d^2y}{dx^2} - \frac{dy}{dx} = 0$
C) $x^2\frac{d^2y}{dx^2} - \frac{dy}{dx} = 0$
D) $x^2\frac{d^2y}{dx^2} - y = 0$

85. Find the number of three digit numbers in which all the digits are distinct, odd and the number is a multiple of 5.

A) 72 B) 81 C) 12 D) 24

86. The term independent of x in the expansion of $(x - 1/x)^6$ is

A) 15 B) – 20 C) – 15 D) 6

87. The rate of change of area of a circle with respect to its radius r at r = 8 cm is

A) 12π B) 8π

C) 16π D) 64π

88. The interval in which the function $x^2 - 6x + 7$ is increasing in

A) $(-\infty, 3)$ B) $(-\infty, 6)$ C) $(3, \infty)$ D) $(6, \infty)$

89. Find the next term of 1, 4, 11, 34, 101,....

A) 303 B) 304 C) 302 D) 305

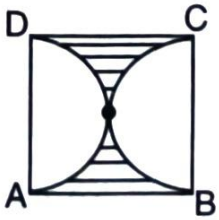
90. If 20% of an amount is 120, what will be 50% of that amount ?

A) 300 B) 360 C) 600 D) 250

91. A hostel has sufficient food for 100 students for 80 days. After 20 days, 20 more students join the hostel. Now how many days the food will continue ?

A) 60 B) 64 C) 50 D) 54

92. If ABCD is a square of side 28cm, then area of the shaded region will be



A) 476 cm^2 B) 268 cm^2 C) 696 cm^2 D) 168 cm^2

93. If $\begin{vmatrix} 2 & 3 \\ 1 & 4 \end{vmatrix} = \begin{vmatrix} x & -1 \\ 2x & 3 \end{vmatrix}$, the value of x is

A) x = 5 B) x = – 1 C) x = 1 D) x = – 5

94. $\begin{vmatrix} 1 & x & yz \\ 1 & y & xz \\ 1 & z & xy \end{vmatrix} =$

A) $(x - y)(y - z)(z - x)$ B) xyz

C) $(1 + xyz)(x - y)(x - z)$ D) $1 + x^2 + y^2 + z^2$

95. The solution of the simultaneous equation $3x + 2y = 5$, $2x + 5y = 7$ is

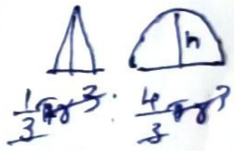
A) (2, 3) B) (2, 2) C) (1, 1) D) (1, – 1)

96. Graph of the linear equation is a

A) parabola B) circle C) ellipse D) line

97. The heights and radii of a cone and hemisphere are same then the ratio of their volumes is

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



98. The roots of $2x^2 - 7x + 5$ are

A) real, unequal and rational B) real, unequal and irrational

C) real and equal D) imaginary

99. If the roots of the equation $ax^2 + 2bx + c = 0$ are in the ratio 2 : 1 then

A) $9ac = 4b^2$ B) $b^2 = 6ac$

C) $8b^2 = 9ac$ D) $b^2 = 2ac$

100. For the following matrix A satisfies $A^2 = I$ (I is identity matrix). Then,

$A = \begin{bmatrix} -\alpha & \beta \\ \gamma & \alpha \end{bmatrix}$

A) $\alpha^2 + \beta\gamma - 1 = 0$

B) $\alpha^2 + \beta\gamma + 1 = 0$

C) $\alpha^2 - \beta\gamma - 1 = 0$

D) $-\alpha^2 + \beta\gamma - 1 = 0$

C