Section – Mathematics

1. $\lim_{n\to 0}(1+3x)^{1/x}$

A) e B) e^3

C) 3^{-3} D) $\frac{1}{e}$

2. If y = log (tanx) then $\frac{dy}{dx}$ at x = $\frac{\prod}{4}$

A) 6 B) $\frac{\sqrt{3}}{2}$

C) 2 D) 0

3. If f(x) = x sin$\frac{1}{x}$ for x ≠ 0, f(0) = 0 then at x = 0 , f(x) is

A) Continuous B) Discontinuous

C) Not determined D) Discontinuity

4. The tangent to the hyperbola $4x^2 – 5y^2 = 16$ at the point (3, -2) is

A) 6x – 5y = 28 B) 6x + 5y = 8

C) 5y – 6x = 28 D) 5x + 6y = 4

5. If (1,2) (K,-1) are conjugate points with respect to the ellipse $2x^2 + 3y^2 = 6$ then K is

A) 2 B) 4

C) 6 D) 8

6. Axis of the parabola $x^2 – 3y – 6x + 6 = 0$ is

A) x = -3 B) y = -1

C) x = 3 D) y= 1

7. If A is orthogonal matrix then |A| =

A) 1 B) -1

C) ± 1 D) 0

8. Class marks are given 9, 16, 23, 30, 37, 44; then the 4^{th} class limits are

A) 23-30 B) 26.5-33.5

C) 26.5-33 D) 26-33.5

9. $\int_0^{\prod/2} sin^4 x dx$ =

A) $\frac{3\prod}{16}$ B) $\frac{3}{16}$

C) $\frac{\prod}{16}$ D) $\frac{1}{16}$

10. $\sqrt{2x+1} + \sqrt{x+5} = 6$ then x =

A) ± 4 B) 4

C) – 4 D) ± 5

11. If ω is complex cube root of unity, them $(1 – ω + ω^2)^6 + (1 – ω + ω)^6$ =

A) 16 B) 32

C) 64 D) 128

12. 1 + tan75° + tan15° =

A) 5 B) 4

C) 3 D) 2

13. The solution of $(x^2 + y^2)dx = 2xydy$

A) $c(x^2 - y^2) = x$ B) $c(x^2 + y^2) = x$

C) $c(x^2 - y^2) = y$ D) $c(x^2 + y^2) = y$

14. The number of distinct solutions in R of the equation $|x - |2x + 1|| = 3$ is

A) 0 B) 1

C) 2 D) 4

15. The modulus of the complex number $\frac{3+5i}{1-2i}$ is

A) $\sqrt{5}$ B) 5

C) $\sqrt{\frac{34}{5}}$ D) $\sqrt{2}$

16. $\tan18° + \tan42° + \sqrt{3}\tan18°\tan42° =$

A) 0 B) $\frac{1}{\sqrt{3}}$

C) $\sqrt{3}$ D) 3

17. Cos1° , Cos2° , Cos3° … Cos179° =

A) 3 B) 2

C) 1 D) 0

18. If 8 and 2 are roots of the equation $x^2 + ax + p = 0$ and 3, 3 are the roots of the equation $x^2 + qx + b = 0$, then the roots of the equation $x^2 + ax + b = 0$ are

A) 1, 0 B) 9, 1

C) -8, -2 D) 1, -1

19. In the expansion $(\sqrt{x} - \frac{2}{x})^{18}$, the term independent of x is

A) $^{18}C_6\ 2^6$ B) $^{18}C_4\ 2^5$

C) $^{18}C_6\ 3^6$ D) $^{18}C_5\ 2^6$

20. One side of a rectangular field is 5 m and one of its diagonals is 13 m. The area of the field is

A) 50 m^2 B) 60 m^2

C) 70 m^2 D) 90 m^2

21. The length of a room is $1\frac{1}{2}$ times its breadth, the cost of carpeting the room at Rs. 18 per m^2 is Rs. 972, the dimensions of the room are

A) 9m, 6m B) 15m, 16m

C) 20m, 30m D) 21m, 15m

22. The roots of $12x^2 + kx + 5 = 0$ are in the ratio 3:2 then K =

A) ± 5 B) $\pm \sqrt{10}$

C) $\pm 5\sqrt{10}$ D) $\pm 2\sqrt{10}$

23. The area bounded by the parabola $y = 2x - x^2$ and X – axis is

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A) $\frac{4}{3}$ B) $\frac{1}{3}$
C) 2 D) 4

24. The sides of a triangle are in the ratio 5 : 12 : 13 and its perimeter is 300 m. Its area is
A) 3000 sqm B) 3127 sqm
C) 3225 sqm D) 3750 sqm

25. The sides of two cubes are in the ratio 3 : 1 then the ratio of their total surface
A) 3 : 1 B) 8 : 1
C) 9 : 1 D) 12 : 1

26. The co-efficient of x^{15} in the product of (x-1)(x-2)(x-3)…(x-16) is
A) 16! B) 136
C) -136 D) -16!

27. If the matrices $\begin{matrix} 2a+b & a-2b \\ 5c-d & 4c+3d \end{matrix}$ and $\begin{matrix} 4 & -3 \\ 11 & 24 \end{matrix}$ are equal, then the values of a, b, c, d are in
A) A.P. B) G.P.
C) H.P. D) A.P. and G.P.

28. The number of 5 digit numbers that can be formed using 2, 3, 4, 5, 6, 7 digits which are divisible by 25 without repetition is
A) 24 B) 64
C) 48 D) 84

29. The number of positive divisors of $2^5.3^6.7^3$ is
A) 144 B) 168
C) 169 D) 167

30. $(2+\sqrt{3})^7 + (2-\sqrt{3})^7$ =
A) 10080 B) 10082
C) 10086 C) 10084

Section – Basic of Computer Science

31. Which of the following values is the correct value of this hexadecimal code ABCDEF?

A) 11259375 B) 11259379
C) 11259372 D) 11259371

32. Which of the following is not an operating system?

A) Windows B) Linux
C) Ms-DOS D) Oracle

33. What else is a command interpreter called?

A) Prompt B) Kernel
C) Command D) Shell

34. Internet Works on

A) Circuit switching
B) Packet switching
C) Both packet switching and circuit switching
D) Data switching

35. Which of the following can be looked at using the find tab?

A) Format B) Characters
C) Symbol D) All of the above

36. A process is a

A) Single thread of execution B) Task
C) Program in the execution D) Program in the memory

37. What is smallest unit of the information

A) A nibble B) A byte
C) A block D) A bit

38. What is the decimal equivalent of the binary number 10111

A) 23 B) 21
C) 43 D) 25

39. The size of an IP address in IPv6 is

A) 32 bits B) 256 bits
C) 128 bits D) 64 bits

40. Which of the following alignment cannot be placed where the tab stops?

A) Decimal Alignment
B) Bar Alignment
C) Center Alignment
D) Justify Alignment

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Section – Engineering Graphics

41. As per BIS the standard A0 size sheet area is approximately equal to _____square meter.

A) 5 B) 1

C) 2 D) 4

42. The following labels are drawn with different scales as given below

Label	Scale
L1	1:25
L2	2:1
L3	1:1
L4	5:1

Choose the correct Answer

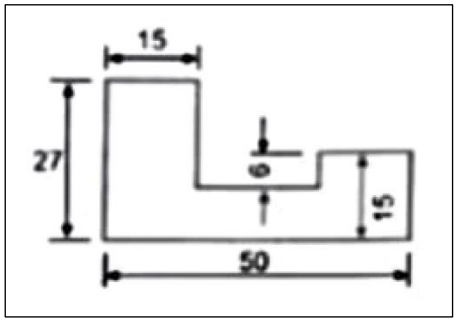
A) L1 and L2 are enlarging scales and L3 is -full scale

B) L2 and L4 are reducing scales; L1 is enlarging scales and L3 is full scale

C) L2 and L4 are enlarging scales; L1 is reducing scales and L3 is full scale

D) L3 is full scale and L1, L2, L4 are reducing scales

43. For the figure shown below identify the correct reason for incorrect representation of dimensions.



Reasons:

I) Dimension 27 and 50 not written according to aligned system.

II) Dimensions lines are placed inside the view

III) Dimensions lines used as extension

Choose the correct choice.

A) Only I) and II) are correct statements

B) All three reasons are correct statements

C) Only II) and III) are correct statements

D) Only I) is correct statement

44. Identify the type of line

G–·–·–·–·–·–·–·–·–·–·–·–·–

A) Dashed thin narrow line

B) Dashed thick narrow line

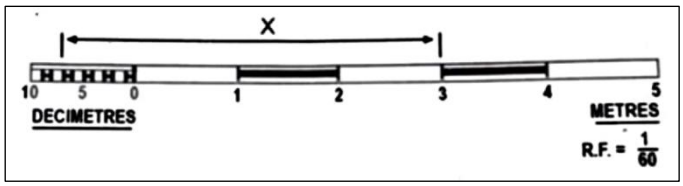
C) Continues thin line

D) Chain thin long-dashed dotted line

45. Consider the R.F of a map is 1: 4000, the actual length of the object is 500 m, and then the length to be drawn in cm is

A) 125 B) 12.5
C) 200 D) 20

46. For the plane scale shown in the figure below, what is the value of X in meters?



A) 3.7 B) 3.6
C) 5.7 D) 5.6

47. Four curves are represented by C1, C2, C3, C4 whose eccentricity ratios are %, Yh, 1, 5/3 respectively. Choose the correct statements

A) C1 and C2 curves are Ellipse and C3 and C4 are parabola
B) C3 is parabola; C4 is Hyperbola and C1 and C2 curves are ellipse
C) C3 curve is parabola, C4 curve is Hyperbola, Ci is circle and C2 ellipse
D) Cl and C2 curves are Ellipse and C3 and C4 are Hyperbola

48. The distance between fixed point and vertex is VF and the distance from vertex to the fixed line is VD. If VD is greater than VF then the curve generated is

A) Parabola B) Hyperbola
C) Ellipse D) Data is insufficient to name the curve

49. When a line PQ is inclined to HP and parallel to VP and the line is in the first quadrant, which of the following statements is true.

I) No vertical traces to the line PQ
II) Line in the front view is true length
III) Line in the top view is true length

A) All three statements are correct B) Only (iii) is correct
C) Only (i) and (ii) are correct D) Only (ii) is correct

50. In orthographic projection, each projection view represents how many dimensions of an object?

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

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Section – Chemical Engineering

51. The molecular formula of oleum is

A) H_2SO_4 B) H_2SO_3

C) $H_2S_2O_7$ D) $H_2S_2O_6$

52. Vanaspati is obtained by the process of

A) Reduction B) Oxidation

C) Hydrogenation D) Hydrolysis

53. The major constituents of producer gas are

A) CO and CO_2 B) CH_4 and CO_2

C) CO, H_2 and N_2 D) CH_4 and C_2H_4

54. Kinematic viscosity has the dimensions of

A) $L\ t^{-1}$ B) $L^2\ t^{-1}$

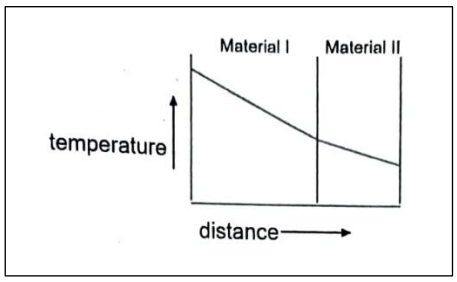
C) $M\ L^{-1}\ t^{-1}$ D) $M^{-1}L\ t^{-1}$

55. Which one of the following, do you recommend for the measurement of small pressure differences?

A) U-tube manometer B) Ring type manometer

C) Tilting manometer D) Inclined leg manometer

56. At steady state, the temperature profiles in a laminated system are as shown in the figure below. The ratio of thermal conductivities of material I to that of material II is



A) Equal to 1 B) Greater than 1

C) Less than 1 D) Infinity

57. According to Newton's law of cooling, the rate of heat transfer is proportional to

A) The fourth power of excess temperature

B) The cube of excess temperature

C) The square of excess temperature

D) The excess temperature

58. The purpose of a steam trap is

A) To remove steam

B) To remove condensate and inert gases

C) To release excess pressure

D) To add steam

59. A thermodynamic cycle consisting of two reversible, constant temperature and two reversible, constant entropy processes is

A) Carnot Cycle
B) Stirling cycle
C) Brayton cycle
D) Rankine Cycle

60. In an isometric process, which one of the following remains constant?

A) Pressure
B) Volume
C) Temperature
D) Enthalpy

61. In screen analysis, 8/12 means

A) Passing through 8, retained by 12
B) Passing through 12, retained by 8
C) 8 parts fine and 12 parts coarse
D) 12 parts fine and 8 parts coarse

62. Absorption is a separation technique based on difference in

A) Volatility
B) Density
C) Solubility
D) Viscosity

63. The dimensions of rate constant are (n is the order of the reaction)

A) $time^{-1}(Concentration)$
B) $time^{-1}(Concentration)^{n}$
C) $time^{-1}(Concentration)^{1-n}$
D) $time\ (Concentration)^{1-n}$

64. The symbol shown indicates that the piping line is



A) Electric line
B) High pressure line
C) Pneumatic line
D) Insulated line

65. Octane number is indicative of

A) Ease of ignition
B) Calorific value
C) Pollution level
D) Anti knock

66. Which refractory is preferred for extremely high temperatures?

A) Silica
B) Alumina
C) Magnesia
D) Zirconia

67. What is the mass of CO contained in a container of volume 44.8 m^3 at STP?

A) 56 Kg
B) 28 Kg
C) 14 Kg
D) 44 Kg

68. Hydrotreating of crude oil is practiced

A) To treat with water
B) To improve anti knock property
C) To remove sulfur and nitrogen
D) To remove water

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69. Natural rubber is mainly

A) Polyisoprene
B) Polystyrene
C) Polyvinylidene
D) Polybutadiene

70. BOD of water is mainly caused by

A) Metal ions
B) Phenolic compounds
C) Particulate pollutants
D) Organic Pollutants

71. The temperature at which paraffin begins to separate out, when a fuel oil is chilled, is known as

A) Melting point
B) Smoke point
C) Cloud point
D) Pour point

72. Point velocity of a flowing fluid is measured by

A) Pitot tube
B) Venturimeter
C) Orifice meter
D) V-notch

73. Sizing agent in paper helps to

A) Realize uniform paper thickness
B) Improve the gloss
C) Resist liquid penetration
D) Size the paper

74. Domestic cooking gas is essentially

A) Propane Butane
B) Methane- Ethane
C) Ethane-Propane
D) Butane Pentane

75. The reaction between an acid and an alcohol is called

A) Saponification
B) Esterification
C) Alcoholysis
D) Hydrolysis

76. A falling liquid drop assumes spherical shape due to its

A) Compressibility
B) Viscosity
C) Surface tension
D) Kinetic energy

77. Two capillary tubes of different diameters are dipped in water. The rise of water is

A) Same in both the tubes
B) Greater in larger diameter tube
C) Zero in greater diameter tube
D) Greater in smaller diameter tube.

78. The ratio of inertial forces to viscous forces is better known as

A) Reynolds number
B) Weber number
C) Euler number
D) Froude number

79. Boundary layer formation occurs because of

A) Fluid adhesion
B) Fluid density
C) Surface tension
D) Fluid viscosity

80. If k_s, k_l, k_g are the thermal conductivities of aluminum, water and air at the same temperature, then

A) $k_l > k_g > k_s$
B) $k_g < k_l < k_s$

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C) $k_s < k_l < k_g$ D) $k_s > k_g > k_l$

81. 1-4 shell and tube heat exchanger means
A) 4 tubes per pass
B) 4 shell side passes and 4 tube side passes
C) 4 shell side passes 1 tube side pass
D) 1 shell side pass and 4 tube side passes

82. By creating vacuum in an evaporator, the steam economy
A) Increases B) Decrease
C) Remains same D) Cannot say

83. A system boundary permits only energy flow across it. This system is
A) Flow System B) Closed system
C) Isolated System D) Open system

84. A relief valve is normally provided in positive displacement pumps to
A) Protect the pump from excessive pressure
B) Control discharge rate
C) Act as back pressure valve
D) Control 3-way valve

85. For good performance, a ball mill is to be operated
A) Below its critical speed B) At its critical speed
C) Above its critical speed D) At its maximum speed

86. Presence of a filter aid in the slurry before filtration
A) Decreases the porosity of cake
B) Increases the compressibility
C) Increases the porosity of cake
D) Decreases compressibility

87. A check valve in the discharge line of a centrifugal pump is
A) To control the out flow when the pump is running
B) To control the discharge pressure
C) To prevent back flow of fluid when the pump is stopped
D) To check the energy delivered to the fluid

88. A liquid mixture that provides a vapor of the same composition as that of the liquid is
A) Compotrope B) Raffinate
C) Eluate D) Azeotrope

89. Solubility of Carbon dioxide in water increases with
A) Temperature B) Pressure
C) Water purity D) CO_2 purity

90. Pyrometer is an instrument used to measure
A) Level B) Flow
C) Pressure D) Temperature

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91. A potassic fertilizer is graded on the basis of its

A) KNO_3 content
B) K content
C) K_2O content
D) KCl content

92. Gypsum is a byproduct obtained in the manufacture of

A) H_2SO_4
B) HNO_3
C) H_3PO_4
D) HCl

93. Biochemical treatment of liquid effluents is essentially a process of

A) Chlorination
B) Dehydration
C) Reduction
D) Oxidation

94. Alumina (50% aluminum oxide) refractory is

A) Neutral
B) Basic
C) Acidic
D) Mixed

95. Pyrometric Cone Equivalent is an indicator of

A) Degree of Melting
B) Degree of softening
C) Degree of thermal conduction
D) Degree of Yield

96. Which of the following hydrocarbon series is almost absent in crude petroleum?

A) Naphthenes
B) Aromatics
C) Paraffins
D) Olefins

97. It is noticed that a weighing machine gives a reading, always 0.5 less than the actual value, over its entire span. What is this called

A) Sensitivity
B) Zero drift
C) Constant error
D) Poor reproducibility

98. Acrylonitrile is usually derived from

A) Propylene
B) Butylene
C) Ethane
D) Ethylene

99. Preparation of Ten decoction is an example of

A) Leaching
B) Dissolution
C) Wetting
D) Absorption

100. The ratio of moisture present to the maximum moisture that can be present in air, at the prevailing temperature, is known as

A) Percentage humidity
B) Relative humidity
C) Absolute humidity
D) Moisture ratio