Section – I

Mathematics (Q1 to Q30)

1. 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

2. In the expansion $\left(\sqrt{x}-\frac{2}{x}\right)^{18}$, 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) $18_{c_5}\ 2^6$

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

(A) $50\ m^2$
(B) $60\,m^2$
(C) $70\ m^2$
(D) $90\ m^2$

4. 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) $21m, 15m$

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

(A) ±5
(B) $\pm\sqrt{10}$
(C) $\pm5\sqrt{10}$
(D) $\pm2\sqrt{10}$

6. The area bounded by the Parabola $y=2x-x^2$ and $X-$axis is?

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

7. 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

8. The sides of two cubes are in the ratio 3 : 1 then the ratio of their total surface area is

(A) 3 : 1
(B) 8 : 1
(C) 9 : 1
(D) 12 : 1

9. The co-efficient of x^{15} in the product of $(x-1)(x-2)(x-3)\ldots(x-16)$ is

(A) (16)!
(B) 136
(C) –136
(D) –(16)!

10. If the matrices $\begin{bmatrix} 2a+b & a-2b \\ 5c-d & 4c+3d \end{bmatrix}$ and $\begin{bmatrix} 4 & -3 \\ 11 & 24 \end{bmatrix}$ 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.

11. 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

12. The number of positive divisors of $2^5.3^6.7^3$ is

(A) 144
(B) 168
(C) 169
(D) 167

13. $\left(2+\sqrt{3}\right)^7+\left(2-\sqrt{3}\right)^7 =$

(A) 10080
(B) 10082
(C) 10086
(D) 10084

14. If A is Orthogonal matrix then $|A|=$

(A) 1
(B) -1
(C) ± 1
(D) 0

15. Class marks are given 9, 16, 23, 30, 37, 44 then the 4th class limits are

(A) 23-30
(B) 26.5-33.5
(C) 26.5-33
(D) 26-33.5

16. $\int_0^{\pi/2} Sin^4 x\,dx =$

(A) $\frac{3\pi}{16}$
(B) $\frac{3}{16}$
(C) $\frac{\pi}{16}$
(D) $\frac{1}{16}$

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

(A) ± 4
(B) 4
(C) -4
(D) ± 5

18. If ω is the complex cube root of unity, then $(1-\omega+\omega^2)+(1-\omega^2+\omega)^6 =$

(A) 16
(B) 32
(C) 64
(D) 128

19. $1+\tan 75^\circ+\tan 15^\circ =$

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

20. 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) $c(x^2 + y^2) = y$

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

(A) 0

(B) 1

(C) 2

(D) 4

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

(A) $\sqrt{5}$

(B) 5

(C) $\sqrt{\frac{34}{5}}$

(D) $\sqrt{2}$

23. $Tan18^\circ + Tan42^\circ + \sqrt{3}\,Tan18^\circ.Tan42^\circ =$

(A) 0

(B) $\frac{1}{\sqrt{3}}$

(C) $\sqrt{3}$

(D) 3

24. $Cos1^\circ, Cos2^\circ, Cos3^\circ \ldots\ldots Cos179^\circ =$

(A) 3

(B) 2

(C) 1

(D) 0

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

(A) e

(B) e^3

(C) 3^{-3}

(D) $\frac{1}{e}$

26. If $y=\log(Tanx)$ then $\frac{dy}{dx}$ at $x=\frac{\pi}{4}$

(A) 6

(B) $\frac{\sqrt{3}}{2}$

(C) 2

(D) 0

27. If $f(x)=xSin\frac{1}{x}$ for $x\neq 0, f(o)=0$ then at $x=0$, $f(x)$ is

(A) Continuous

(B) Discontinuous

(C) Not determined

(D) Discontinuity

28. 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) $5x+6y=4$

29. 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

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

(A) $x=-3$

(B) $y=-1$

(C) $x=3$

(D) $y=1$

Section – II
Basic Computer Science (Q31 to Q40)

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

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

32. The size of an IP address in IPv6 is

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

33. What is the decimal equivalent of the binary number 10111?

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

34. What is smallest unit of the information?

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

35. A process is a

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

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

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

37. Internet Works on

(A) Circuit switching

(B) Packet switching

(C) Both packet switching and circuit switching

(D) Data switching

38. What else is a command interpreter called?

(A) Prompt

(B) Kernel

(C) Command

(D) Shell

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

(A) Windows

(B) Linux

(C) Ms-DOS

(D) Oracle

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

(A) 11259375

(B) 11259379

(C) 11259372

(D) 11259371

Section – III
Engineering Graphics (Q41 to Q50)

41. 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

42. As per BIS the standard A0 size sheet area is approximately equal to _____ square meter.

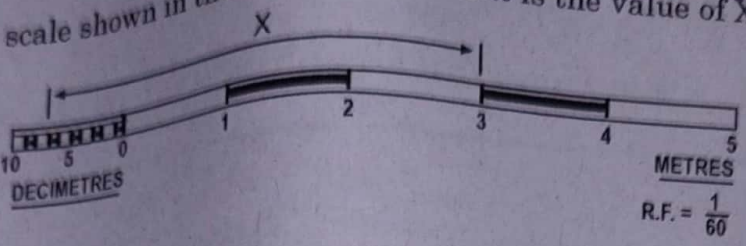
(A) 5

(B) 1

(C) 2

(D) 4

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

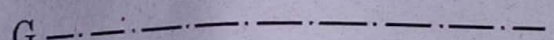


(A) 3.7
(B) 3.6
(C) 5.7
(D) 5.6

44. 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

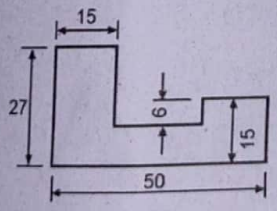
(A) 125
(B) 12.5
(C) 200
(D) 20

45. 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

46. 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

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

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

48. 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

49. 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

50. Four curves are represented by C1, C2, C3, C4 whose eccentricity ratios are ¾, ½, 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, C1 is circle and C2 ellipse
(D) C1 and C2 curves are Ellipse and C3 and C4 are Hyperbola

Section – IV

Civil Engineering (Q51 to Q100)

51. The point, about which a floating body, starts oscillating when the body is tilted is called

(A) Meta-centre
(B) Centre of buoyance
(C) Centre of gravity
(D) Centre of pressure

52. The ratio of actual discharge of a jet of water to its theoretical discharge is known as

(A) Co-efficient of discharge
(B) Co-efficient of velocity
(C) Co-efficient of contraction
(D) Co-efficient of viscosity

53. A document containing detailed description of all the items of work (but their quantities are not mentioned) together with their current rates is called

(A) Tender
(B) Schedule of rates
(C) Analysis of rate
(D) Abstract estimate

54. The moisture content of the soil below which plants cannot extract sufficient water for their requirements is called

(A) Filed capacity
(B) Saturation capacity
(C) Temporary wilting point
(D) Permanent wilting point

55. Canals which are excavated directly from the rivers with or without head regulator are called

(A) Natural canals
(B) Inundation canals
(C) Seasonal canals
(D) Ditch canals

56. Which of the following has higher fire resistance?

(A) Timber
(B) Brick
(C) Glass
(D) Concrete

57. The earliest method used for planning of projects was

(A) PERT
(B) CPM
(C) Bar chart
(D) Milestone chart

58. When engineering departments undertake the works of other departments the amount charged towards design, supervision and execution etc., is called

(A) Work charged establishment
(B) Contingencies
(C) Service charges
(D) Centage charges

59. The maximum permissible slenderness ratio of steel ties is

(A) 180
(B) 250
(C) 350
(D) No limit

60. Turbidity can be removed by

(A) Coagulation and filtration
(B) Aeration and sedimentation
(C) Activated carbon adsorption
(D) Disinfection

61. As per elastic theory of design, the factor of safety is the ratio of

(A) Working stress to yield stress

(B) Yield stress to working stress

(C) Ultimate strength to yield stress

(D) Ultimate load to load at yield

62. A beam is said to have been subjected to a pure bending moment, when

(A) S.F. is maximum

(B) The load is applied as a udl throughout the span

(C) S.F. in a length is zero

(D) The load is applied at the mid-span section only

63. If the fluid particles move in a zig-zag way, the flow is called

(A) Unsteady

(B) Non-uniform

(C) Turbulent

(D) Incompressible

64. The field capacity of an irrigation soil depends on

(A) Both porosity and pore size

(B) Only on porosity

(C) Only on pore size

(D) Porosity and depth of root zone

65. Reverberation means

(A) Sound produced uninterruptedly by a source

(B) Sound produced by a source intermittently

(C) Persistence of sound even after the source of sound has ceased

(D) Acoustic illusion

66. An important principle in drawing a network is

(A) No activity can start until all the previous activities in the same chain are completed

(B) Parallel activities should begin and end at the same time

(C) Between two events there should not be more than two activities

(D) The number of dummy activities in a network should not exceed 4

67. The amount required to be deposited by a contractor while submitting a tender is known as

(A) Fixed deposit

(B) Caution deposit

(C) Security deposit

(D) Earnest money deposit

68. Working out the exact quantities of various items of work is known as

(A) Estimating

(B) Mensuration

(C) Quantity surveying

(D) Valuation

69. Strength, stability and bearing power of a highway depend on

(A) Formation

(B) Sub grade

(C) Base course

(D) Wearing course

70. The shape of the stress-strain curve for compression in concrete is generally taken to be

(A) Hyperbolic

(B) Straight line

(C) Rectangular

(D) Parabolic

71. The ratio of plasticity index and flow index of soil is called

(A) Strength index

(B) Liquidity index

(C) Toughness index

(D) Consistency index

72. In the region of 'made-up-soil' the type of foundation most suitable is

(A) Isolated footing

(B) Pile foundation

(C) Combined footing

(D) Stepped foundation

73. The effective length of column with one and effectively held in position and other restrained against rotation at both directions is

(A) $2l$
(B) $1.2l$
(C) l
(D) $0.65l$

74. Which of the following is not a method for analysing two way slabs with fixed edges?

(A) Hardy-cross method
(B) Pigeauds method
(C) Marcus's method
(D) IS code method

75. The commonly used method for quick determination of water content at field embankments is

(A) Oven drying method
(B) Sand bath method
(C) Alcohol method
(D) Calcium carbide method

76. A soil has percentage air voids of the order of 30%. It has a porosity of 0.4. The air content of that soil shall be

(A) 0.75
(B) 0.12
(C) 1.33
(D) 0.70

77. For cohesive soil, with increasing compactive effort, the optimum moisture content

(A) Increase
(B) Decrease
(C) Remains constant
(D) Zero

78. When a brick is cut into two halves longitudinally, one part is called

(A) King closer

(B) Cornice brick

(C) Queen closer

(D) Voussoir

79. The most suitable type of door for air-conditioned rooms

(A) Revolving door

(B) Sliding door

(C) Swinging door

(D) Rolling shutter door

80. Isogonic lines are the lines having the same

(A) Elevation

(B) Bearing

(C) Declination

(D) Dip

81. A levelling station is a place where

(A) The level is set up

(B) The level staff is held

(C) Both B.S. and F.S. are taken

(D) Temporary adjustments are done

82. The most economical section for a column is

(A) I – section

(B) Tubular section

(C) Solid round section

(D) Rectangular section

83. Purest water may have

(A) No colour

(B) Faint bluish green colour

(C) Dark blue colour

(D) Brownish yellow colour

84. A natural method of disposal of sewage is

(A) Sewage irrigation

(B) Septic tank treatment

(C) Composting

(D) Aerated lagooning

85. Creep is principally due to

(A) Wave motion of rails due to moving trains

(B) Rigid holding of track

(C) Motions in either direction as on a single track

(D) Longer lengths or rails

86. Sullage is

(A) Waste water from baths

(B) Drainage from roads

(C) Industrial liquid waste

(D) Waste water from toilets

87. Primary function of a sleeper is

(A) To maintain gauge

(B) To take loads from rails

(C) To give cushioning action

(D) To give stability to the track

88. The most dangerous defect of a rail track that requires urgent rectification is

(A) Hogging of rails

(B) Corrugations of rails

(C) Crippling of rails

(D) Buckling of rails

89. The ingredient added in the manufacturing process to control the setting time of cement is

(A) Magnesium sulphate

(B) Free lime

(C) Gypsum

(D) Calcium sulphate

90. The most commonly used deep foundation in buildings

(A) Well foundation

(B) Pile foundation

(C) Raft foundation

(D) Grillage foundation

91. The vertical intermediate support to the hand railing is known as

(A) Balustrade
(B) Barrister
(C) Baluster
(D) Newel post

92. A chain may get elongated due to

(A) Change in temperature
(B) Difference in pull
(C) Opening of rings
(D) Kinks in links

93. Contour lines look to cross each other in case of

(A) An overhanging cliff
(B) A dam of vertical face
(C) A steep hill
(D) A deep valley

94. The maximum shear stress from a Mohr's circle is given by

(A) The diameter of the circle
(B) The distance of centre from the origin
(C) The distance of farthest point on the Mohr's circle from origin
(D) The radius of the circle

95. A Cantilever of span 1 is subjected to bending moment M at the free end. The S.F. diagram will be

(A) A triangle with maximum ordinate at the fixed end
(B) A rectangle with ordinate M
(C) A parabola with maximum ordinate of $\frac{Ml^2}{2}$ at the fixed end
(D) No shear force at all

96. The canals meant for the purpose of draining off water from water logged areas are called

(A) Seepage canals
(B) Percolation canals
(C) Drains
(D) Ditch canals

97. Which of the following method of plane table surveying is also called 'graphic triangulation' method?

(A) Intersection method
(B) Radiation method
(C) Resection method
(D) Traversing method

98. Camber depends on

(A) Smoothness of base coarse
(B) Permeability of subgrade
(C) Amount of rainfall
(D) Grade of wearing coarse

99. A pavement that offers poor visibility is

(A) Gravel road
(B) WBM road
(C) Bituminous road
(D) Cement concrete road

100. The maximum diameter of the reinforcement bars in RCC slabs is

(A) 20 mm
(B) 16 mm
(C) $\frac{span}{100}$
(D) $\frac{thickness\ of\ slab}{8}$