## +2 AMU Sc./Dip. Engg. 2013-2014

1. If $x=\frac{1}{1+\sqrt{2}}+\frac{1}{\sqrt{2}+\sqrt{3}}+\frac{1}{\sqrt{3}+\sqrt{4}}+\ldots \ldots+\frac{1}{\sqrt{8}+\sqrt{9}}$, then the value of $x$ is
(a) 0
(b) 1
(c) 2
(d) 3
2. If $2^{2 x+y}=4^{x-y-3}=1$, then $(x, y)$ is
(a) $(-1,-2)$
(b) $(-1,2)$
(c) $(1,2)$
(d) $(1,-2)$
3. The following observations have been arranged in ascending order:

$$
29,32,48,50, x, x+2,72,78,84,95
$$

If the median of the data is 63 , then the value of $x$ is
(a) 65
(b) 64
(c) 63
(d) 62
4. The area of shaded region in the given figure, where ABCD is a square of side 14 cm is
(a) $58 \mathrm{~cm}^{2}$
(b) $83 \mathrm{~cm}^{2}$

(c) $40 \mathrm{~cm}^{2}$
(d) $42 \mathrm{~cm}^{2}$
5. Other zeros of $3 x^{4}+6 x^{3}-2 x^{2}-10 x-5$, if two of its zeroes are $\sqrt{\frac{5}{3}}$ and $-\sqrt{\frac{5}{3}}$ are
(a) 1,1
(b) $-1,-1$
(c) 0,1
(d) $\frac{5}{3},-\frac{5}{3}$
6. Values of $a$ and $b$ for which the following pair of linear equations have an infinite number of solutions are

$$
\begin{aligned}
& 2 x+3 y=7 \\
& (a-b) x+(a+b) y=3 a+b-2
\end{aligned}
$$

(a) $a=-5, b=1$
(b) $\mathrm{a}=5, \mathrm{~b}=-1$
(c) $a=5, b=1$
(d) $a=-5, b=-1$
7. If the number of square centimeters on the surface of a sphere is equal to the number of cubic centimeters in its volume, then the diameter of the sphere is:
(a) 4 cm
(b) 5 cm
(c) 6 cm
(d) 3 cm
8. The floor of a rectangular hall has a perimeter 250 m . If the cost of painting the four walls at the rate of Rs. 10 per $\mathrm{m}^{2}$ is Rs. 15000 , then the height of the hall is:
(a) 5 m
(b) 8 m
(c) 6 m
(d) 7 m
9. The roots of $x+\frac{1}{x}=3, x \neq 0$ are
(a) $3, \frac{1}{3}$
(b) $\frac{3}{2},-\frac{3}{2}$
(c) $\frac{\sqrt{5}}{2}, \frac{-\sqrt{5}}{2}$
(d) $\frac{3+\sqrt{5}}{2}, \frac{3-\sqrt{5}}{2}$
10. Which term of the A.P.: $3,15,27,39, \ldots \ldots \ldots$ will be 132 more than its $54^{\text {th }}$ term?
(a) $45^{\text {th }}$ term
(b) $55^{\text {th }}$ term
(c) $65^{\text {th }}$ term
(d) $35^{\text {th }}$ term
11. Two A.P.s have the same common difference. The difference between their $100^{\text {th }}$ term is 100 , then the difference between their $1000^{\text {th }}$ term is
(a) 10
(b) 100
(c) 1000
(d) None
12. If $\sin 3 A=\cos \left(A-26^{\circ}\right)$, where $3 A$ is an acute angle, then the value of $A$ is
(a) $\mathrm{A}=13^{\circ}$
(b) $\mathrm{A}=64^{\circ}$
(c) $\mathrm{A}=29^{\circ}$
(d) $\mathrm{A}=26^{\circ}$
13. ABC and BDE are two equilateral triangles such that $D$ is the mid-point of $B C$. The ratio of areas of triangles ABC and BDE is
(a) $4: 1$
(b) $1: 4$
(c) $2: 1$
(d) $1: 2$
14. In figure, $P S$ is the bisector of $\angle Q P R$, in the $\triangle P Q R$. If $P Q=6 \mathrm{~cm}, P R=x \mathrm{~cm}, Q S=4 \mathrm{~cm}$ and $R S=3 \mathrm{~cm}$, then the value of $x$ is

(a) 4.5 cm
(b) 9 cm
(c) 8 cm
(d) 5.4 cm
15. If $(1,2),(4, y),(x, 6)$ and $(3,5)$ are the vertices of a parallelogram taken in order, then $x$ and $y$ are
(a) $x=3, y-1$
(b) $x=4, y=1$
(c) $x=5, y=2$
(d) $x=6, y=3$
16. The centre of a circle passing through the points $(6,-6),(3,-7)$ and $(3,3)$ is
(a) $(2,3)$
(b) $(3,-2)$
(c) $(-3,2)$
(d) $(-2,-3)$
17. If the points $(7,-2),(5,1)$ and $(3, k)$ are collinear, then the value of $k$ is equal to:
(a) 1
(b) 2
(c) 3
(d) 4
18. In the given figure, the side $Q R$ of $\triangle P Q R$ is produced to a point $S$. If the bisector of $\angle P Q R$ and $\angle P R S$ meet at point $T$, then $\angle Q T R$ is equal to

(a) $\angle \mathrm{QPR}$
(b) $2 \angle \mathrm{QPR}$
(c) $1 / 2 \angle \mathrm{QPR}$
(d) $1 / 3 \angle \mathrm{QPR}$
19. The value of $\tan 48^{\circ} \tan 23^{\circ} \tan 42^{\circ} \tan 67^{\circ}$ is
(a) 0
(b) 1
(c) 2
(d) 3
20. The value of $\sqrt{\frac{1-\sin A}{1+\sin A}}$ is
(a) $\sin A-\cos A$
(b) $\tan \mathrm{A}+\cot \mathrm{A}$
(c) $\sec \mathrm{A}-\tan \mathrm{A}$
(d) $\operatorname{cosec} A+\cot A$
21. The zeros of the polynomial $x^{3}-3 x^{2}+x+1$ are $a-b, a, a+b$, then the values of $a$ and $b$ are
(a) $\mathrm{a}=-1, \mathrm{~b}= \pm \sqrt{2}$
(b) $a=1, b= \pm \sqrt{2}$
(c) $\mathrm{a}= \pm \sqrt{2}, \mathrm{~b}=1$
(d) $a= \pm \sqrt{2}, b=-1$
22. Sum of the areas of two squares is $468 \mathrm{~m}^{2}$. If the difference of their perimeters is 24 m , the sides of the two squares are:
(a) $18 \mathrm{~m}, 12 \mathrm{~m}$
(b) $16 \mathrm{~m}, 12 \mathrm{~m}$
(c) $18 \mathrm{~m}, 16 \mathrm{~m}$
(d) $14 \mathrm{~m}, 10 \mathrm{~m}$
23. If the $p$ th term of an A.P. is $\frac{1}{q} \& q$ th term is $\frac{1}{p}$ , then sum of $p q$ terms is
(a) $\frac{1}{3}(p q-1)$
(b) $\frac{1}{3}(p q+1)$
(c) $\frac{1}{2}(p q+1)$
(d) $\frac{1}{2}(\mathrm{pq}-1)$
24. The area of a rhombus if its vertices are $(3,0)$, $(4,5),(-1,4)$ and $(-2,-1)$ taken in order is.
(a) 24 sq. unit
(b) 23 sq. unit
(c) 25 sq. unit
(d) 22 sq. unit
25. The 'Median' for the following data is

| Marks | No. of Students |
| :---: | :---: |
| $00-10$ | 5 |
| $10-25$ | 10 |
| $25-40$ | 15 |
| $40-50$ | 40 |
| $50-60$ | 15 |
| $60-75$ | 10 |

75-100

(a) 40
(c) 48
(b) 45
26. Two dice are rolled. Probability that both show
six is
(a) $1 / 36$
(b) $1 / 18$
(c) $1 / 6$
27. A sphere and a cube have equal surface area. Ratio of their volume is
(a) $\sqrt{6}: \sqrt{\pi}$
(b) $\pi: 6$
(c) $6: \pi$
(d) $36: \pi$
28. Number of sides of a polygon is equal to the number of its diagonals, then the polygon is a
(a) Pentagon
(b) Hexagon
(c) Heptagon
(d) Octagon
29. If the Arithmetic Mean of 100 values is 50 and their Median is 48 , then the approximate value
of Mode is
(a) 44
(b) 46
(c) 49
(d) 54
30. The angle between the hour hand and minute hand of a clock at 10:10 is
(a) $60^{\circ}$
(b) $105^{\circ}$
(c) $115^{\circ}$
(d) $120^{\circ}$
31. An organism which obtains nourishment from another larger living organism and harms it also is best defined as
(a) Parasite
(b) Autotroph
(c) Saprophyte
(d) Symbiont
32. Which of the following cannot multiply outside the living cells
(a) Bacteria
(b) Protozoa
(c) Viruses
(d) Fungi
33. Those plants that grow in places with scanty water are called as
(a) Mesophytes
(b) Hydrophytes
(c) Xerophytes
(d) Epiphytes
34. Which one of the following is called "Suicide Bag" of a cell?
(a) Plastids
(b) Lysosome
(c) Golgi Apparatus
(d) None of these
35. The organisms that feed on both plants and animals are
(a) Carnivorous
(b) Parasitic
(c) Herbivorous
(d) Omnivorous
36. Which is not an example of connective tissue
(a) Tendon
(b) Cartilage
(c) Blood
(d) Neuron
37. Sea urchin belongs to
(a) Echinodermata
(b) Mollusca
(c) Arthropoda
(d) Cnidaria
38. Archaeopteryx is considered missing link between
(a) Fishes and amphibians
(b) Birds and reptiles
(c) Birds and mammals
(d) Reptiles and mammals
39. Villi are present in
(a) Small Intestine
(b) Lungs
(c) Large Intestine
(d) Both (a) \& (c)
40. The deficiency of iodine in the diet of a person causes disease known as 'goitre'. This is because of reduction in the production of a hormone namely
(a) Insulin
(b) Thyroxin
(c) Glucagon
(d) Testosterone
41. Alveoli are found, in which one of the following parts
(a) Brain
(b) Lungs
(c) Heart
(d) Stomach
42. Which one is wrong?
(a) Catabolism and anabolism $\rightarrow$ Metabolism
(b) Meiosis and fertilization $\rightarrow$ Sexual reproduction
(c) Abiotic and biotic components $\rightarrow$ Ecosystem
(d) Prebiotic and abiotic components $\rightarrow$ Ecosystem
43. Which enzyme is present in saliva?
(a) Pepsin
(b) Trypsin
(c) Amylase
(d) None
of these
44. Pinus is included in which group of Plantae?
(a) Pteridophyta
(b) Bryophyta
(c) Gymnosperms
(d) Angiosperms
45. The three ' $R$ ' of reducing pressure on environment do not include
(a) Refuse
(b) Reduce
(c) Recycle
(d) Reuse
46. Sea Horse (Hippocampus) comes in which group of Vertebrates
(a) Amphibia
(b) Aves
(c) Reptiles
(d) Pisces
47. In a Food Chain, which one of the following is the starting point
(a) Primary consumers
(b) Secondary consumers
(c) Tertiary consumers
(d) Producers
(a) Trilobite
(b) Ammonite
(c) Dinosaur
(d) Brachiopod
49. Morphological evidence of evolution is not exhibited by
(a) Fossils
(b) Homologous organs
(c) Analogous organs
(d) DNA sequence homology
50. Which is not correct
(a) Y bearing sperm +X - bearing egg $\rightarrow$ Male foetus
(b) $X$ bearing sperm $+X-$ bearing egg $\rightarrow$ Female foetus
(c) X - bearing sperm +Y bearing egg $\rightarrow$ Female foetus
(d) XX - bearing sperm +X - bearing egg $\rightarrow$

Abnormal female foetus
51. Which is the capital of Spain?
(a) Barcelona
(b) Madrid
(c) Lisbon
(d) Gibraltor
52. Ranji Trophy is associated with
(a) Tennis
(b) Cricket
(c) Hockey
(d) Kabaddi
53. Leander Paes is a famous Indian player of
(a) Tennis
(b) Golf
(c) Volley Ball
(d) Foot Ball
54. NCERT is concerned with
(a) Film
(b) Sports
(c) Education
(d) Law
55. Tsunami had struck Andaman and Nicobar in
(a) 2004
(b) 2005
(c) 2006
(d) 2007
56. Kofi Annan is the
(a) Present Secretary General of the UN
(b) Former Secretary General of the UN
(c) Former President of the World Bank
(d) Present President of the World Bank
57. PDS stands for
(a) Poor Development Scheme
(b) Poor Distribution Scheme
(c) Public Distribution System
(d) Private Distribution System
58. Quartz is made of
(a) Iron and Carbon
(b) Silicon and Oxygen
(c) Iron and Nitrogen
(d) Silicon \& Hydrogen
59. Mummy is
(a) A dead body
(b) A name for a witch
(c) An embalmed dead body
(d) The American slang word for mother
48. Which is not an invertebrate fossil form?
60. Who formulated first the laws of planetary motion?
(a) Kepler
(b) Newton
(c) Galileo
(d) Einstein
61. Who did destroy the seat of the Naqshbandi order in Sirhind?
(a) Sikhs
(b) British
(c) Hindus
(d) Rival Muslim sects
62. Khwaja Moinuddin Chisti passed away in
(a) 1098
(b) 1176
(c) 1209
(d) 1236
63. The Anglo-Arabic College was established in
(a) Calcutta in 1875
(b) Aligarh in 1877
(c) Hyderabad in 1920
(d) Dethi in 1825
64. Sultant period in Muslim Indian history was from
(a) 1268-1512
(b) 1309-1498
(c) 1206-1526
(d) 1367-1483
65. Qutb Minar in Delhi is located next to
(a) Masjid Quwwat al-Islam
(b) Jama Masjid
(c) Moti Masjid
(d) Kali Masjid
66. Who was the editor of Hamdard?
(a) Hakim Abdul Hamid
(b) Muhammad Ali Jauhar
(c) Abul Kalam Azad
(d) Hakim Muhammad Said
67. Who among the following is not a compilor of Hadith
(a) ShahWaliullah
(b) Imam Malik
(c) Imam Nasai
(d) Imam Abu Dawud
68. Who did lead Prayers in Prophet Muhammad's (pbuh) last days?
(a) Abu Bakr
(b) Umar
(c) Usman
(d) Ali
69. After conquering Makkah Prophet Muhammad (pbuh) got all the Makkan unbelievers
(a) killed
(b) exiled
(c) imprisoned
(d) pardoned
70. Abdul-Muttalib was Prophet Muhaimmad's (pbuh)
(a) Uncle
(b) Cousin
(c) Father
(d) Grandfather
71. An object is moving with uniform velocity. The area enclosed under the velocity-time
graph between any two instants $t=t_{1}$ and $t=t_{2}$ gives us
(a) The magnitude of the displacement
(b) Velocity of the object
(c) Acceleration of the object
(d) Force acting on the object
72. The natural tendency of an object to resist any change in its state of motion is called its
(a) Weight
(b) Momentum
(c) Energy
(d) Inertia
73. A batsman hits a cricket ball which then rolls on a level ground. After covering a short distance, the ball comes to rest. The ball comes to a stop because
(a) The batsman did not hit the ball hard enough
(b) There is a force on the ball opposing the motion
(c) The velocity is proportional to the force exerted on the ball
(d) There is no unbalanced force on the ball, so the ball would want to come to rest
74. A ball is thrown vertically upwards with a velocity of $49 \mathrm{~m} / \mathrm{s}$. What is the total time it takes to return to the surface of the earth?
(a) 5 seconds
(b) 10 seconds
(c) 15 seconds
(d) 20 seconds
75. An electric bulb of 1000 W is used for 5 hours per day. The 'units' of energy consumed in one
day are
(a) 10 'units'
(b) 5 'units'
(c) 4 'units'
(d) 1 'unit'
76. A person clapped the hands near a cliff and heard the echo after 4 seconds; Assuming the speed of sound in air at the given temperature to be $346 \mathrm{~m} / \mathrm{s}$, calculate the distance of the cliff from the person
(a) 1730 m
(b) 1384 m
(c) 865 m
(d) 692 m
77. Where should an object be placed in front of a convex lens to get a real image of the size of the object?
(a) At the principal focus of the lens
(b) At infinity
(c) At twice the focal length
(d) Between the optical centre of the lens and its principal focus
78. The human eye can focus objects at different distances by adjusting the focal length of the eye lens. This is due to
(a) Near sightedness
(b) Far sightedness
(c) Accommodation
(d) Presbyopia
79. A $16 \Omega$ resistance wire is doubled on it. Calculate the new resistance of the wire
(a) $01 \Omega$
(b) $04 \Omega$
(c) $08 \Omega$
(d) $32 \Omega$
80. A nichrome wire has diameter 0.5 mm and resistivity of $10^{-4} \Omega \mathrm{~m}$. What will be the length of the wire to make its resistance of $70 \Omega$ ?
(a) 48.75 m
(b) $187.5 \times 10^{-4} \mathrm{~m}$
(c) $137.5 \times 10^{-3} \mathrm{~m}$
(d) 122.7 m
81. A network of five identical resistors. each of value $10 \Omega$ is made as shown in the figure. Equivalent resistance between points $A$ and $B$ is

(a) $100 \Omega$
(b) $50 \Omega$
(c) $20 \Omega$
(d) $10 \Omega$
82. Commonly used electric generators work on the principle of
(a) Nuclear fission
(b) Nuclear fusion
(c) Solar energy conversion
(d) Electromagnetic induction
83. The temperature at which the fusion of light nuclei may occur is of the order of
(a) $10^{7}$ deg. K
(b) $10^{5}$ deg. K
(c) $10^{3}$ deg. K
(d) $10^{-3} \mathrm{deg} . \mathrm{K}$
84. Which energy source may yield relatively pollution free energy?
(a) Wood
(b) Solar energy
(c) Coal
(d) Petrol
85. The ocean thermal energy is due to
(a) Geothermal changes deep inside the ocean
(b) Nuclear fission inside the ocean
(c) Chemical reactions inside the ocean
(d) Heating of water of the surface of the ocean by the sun
86. Bio-gas does not contain
(a) $\mathrm{CH}_{4}$
(b) $\mathrm{CO}_{2}$
(c) $\mathrm{H}_{2} \mathrm{~S}$
(d) $\mathrm{N}_{2}$
87. Identify the substance that is oxidised in the reaction given below

$$
\mathrm{CuO}_{(\mathrm{s})}+\mathrm{H}_{2(\mathrm{~g})} \rightarrow \mathrm{Cu}_{(\mathrm{s})}+\mathrm{H}_{2} \mathrm{O}_{(\mathrm{l})}
$$

(a) CuO
(b) $\mathrm{H}_{2}$
(c) Cu
(d) $\mathrm{H}_{2} \mathrm{O}$
88. Tyodall effeet in colloidal soluition ta due to
(a) Absorption of lighe by tho prortictes
(b) Refraction of light
(c) Scattering of light by the particlos
(d) The presence of electrically charged partictes
89. Isobars do not differ in the number of'
(a) Protons
(b) Electrons
(c) Nentrons
(d) Nucleons
90. Out of the following, the aqueous solution of which compound has the lowest pH?
(a) NaOH
(b) $\mathrm{NH}_{4} \mathrm{Cl}$
(c) $\mathrm{Na}_{2} \mathrm{CO}_{3}$
(d) NaCl
91. Which element has twice as many electrons in its second shell as in its first shell?
(a) Ne
(b) B
(c) Si
(d) C
92. Which of the following reaction is mainly performed by the alkene?
(a) Substitution
(b) Addition
(c) Decomposition
(d) Replacement
93. In which of the following process metal carbonates change into metal oxide?
(a) Calcination
(b) Roasting
(c) Reduction
(d) All of these
94. Which of the following is isoelectronic of $\mathrm{Na}^{\prime}$ ?
(a) $\mathrm{Cl}^{-}$
(b) $\mathrm{O}_{2}^{-}$
(c) $\mathrm{O}^{2-}$
(d) $\mathrm{Li}^{\prime}$
95. Amphoteric oxide is
(a) $\mathrm{Na}_{2} \mathrm{O}$
(b) BaO
(c) ZnO
(d) $\mathrm{K}_{2} \mathrm{O}$
96. Oxidation of ethanol with alkaline potassium permanganate produces
(a) $\mathrm{CH}_{3} \mathrm{CHO}$
(b) $\mathrm{CH}_{3} \mathrm{COOH}$
(c) $\mathrm{CH}_{3} \mathrm{COCH}_{3}$
(d) $\mathrm{CH}_{3} \mathrm{COONa}$
97. The following reaction shows that

$$
\mathrm{Zn}+\mathrm{CuSO}_{4} \rightarrow \mathrm{ZnSO}_{4}+\mathrm{Cu}
$$

(a) Zn is more reactive metal than Cu
(b) Zn and Cu both have same reactivity
(c) Cu is more reactive than Zn
(d) All of these
98. For rusting of iron, the necessary condition is
(a) Dry $\mathrm{N}_{2}$
(b) Moist air
(c) Dry air
(d) None of these
99. An isotope of cobalt is used in the treatment of
(a) Goiter
(b) Anaemia
(c) Carbon dating
(d) Cancer
100.The organic compound present in tincture of iodine is
(a) Potassium
(b) Iodine
(c) Ethanol
(d) Chloroform

## ANSWERS 2013-14

| 1 | c | 26 | a | 51 | b | 76 | d |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 2 | d | 27 | a | 52 | b | 77 | c |
| 3 | d | 28 | a | 53 | a | 78 | c |
| 4 | d | 29 | a | 54 | c | 79 | c |
| 5 | b | 30 | c | 55 | a | 80 | c |
| 6 | c | 31 | a | 56 | b | 81 | d |
| 7 | c | 32 | c | 57 | c | 82 | d |
| 8 | c | 33 | c | 58 | b | 83 | a |
| 9 | d | 34 | b | 59 | c | 84 | b |
| 10 | c | 35 | d | 60 | a | 85 | d |
| 11 | b | 36 | d | 61 | a | 86 | d |
| 12 | c | 37 | a | 62 | d | 87 | b |
| 13 | a | 38 | b | 63 | d | 88 | c |
| 14 | a | 39 | a | 64 | c | 89 | d |
| 15 | d | 40 | b | 65 | a | 90 | b |
| 16 | b | 41 | b | 66 | b | 91 | d |
| 17 | d | 42 | d | 67 | a | 92 | b |
| 18 | c | 43 | c | 68 | a | 93 | a |
| 19 | b | 44 | c | 69 | d | 94 | c |
| 20 | c | 45 | a | 70 | d | 95 | c |
| 21 | b | 46 | d | 71 | a | 96 | b |
| 22 | a | 47 | d | 72 | d | 97 | a |
| 23 | c | 48 | c | 73 | b | 98 | b |
| 24 | a | 49. | d | 74 | b | 99 | d |
| 25 | b | 50 | c | 75 | b | 100 | c |

