

1. The slope of a velocity-time graph represents:

[1 Marks]

- a. Displacement
- b. Acceleration
- c. Speed
- d. Distance

2. Damping force depends only on

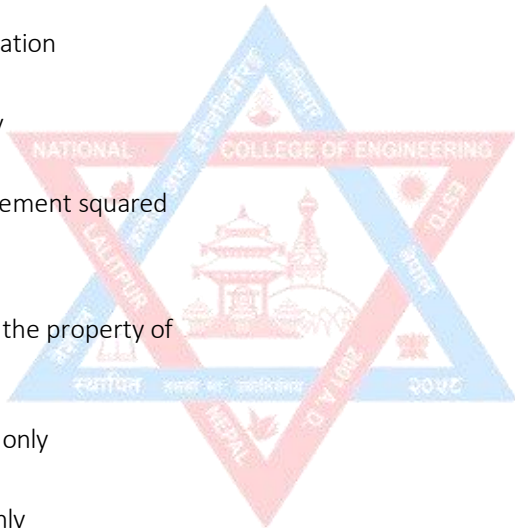
[1 Marks]

- a. Displacement
- b. Acceleration
- c. Velocity
- d. Displacement squared

3. Viscosity is the property of

[1 Marks]

- a. Liquids only
- b. Solid only
- c. Solid and liquid only
- d. Liquid and gas only



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4. Two spherical black bodies of radii r_1 & r_2 at temperatures T_1 & T_2 radiate same power. Then $\frac{r_1}{r_2}$ is

[1 Marks]

- a. $\frac{T_1^2}{T_2}$
- b. $\frac{T_2^2}{T_1}$
- c. $\frac{T_1^4}{T_2}$
- d. $\frac{T_2^4}{T_1}$

5. Two sound waves having phase difference of 60° have path difference of

[1 Marks]

- a. 2λ
- b. $\frac{\lambda}{2}$
- c. $\frac{\lambda}{3}$
- d. $\frac{\lambda}{6}$

6. Which of the following does not support the wave nature of light

[1 Marks]

- a. Interference
- b. Diffraction
- c. Photoelectric effect
- d. Polarization

7. Light travels through a glass of thickness t and refractive index μ . If c be the velocity of light in vacuum, time taken by light to travel through the plate is

[1 Marks]

- a. $t / c\mu$
- b. $t\mu / c$
- c. $\frac{t}{c}$
- d. $tc\mu$

8. An inflated tyre of a bicycle bursts. Which of the following relation between pressure P and temperature T holds good if γ is the ratio of the specific heat capacities of air?

[1 Marks]

- a. $P\gamma^{-1}T\gamma = \text{constant}$
- b. $P\gamma T\gamma^{-1} = \text{constant}$
- c. $P\gamma T\gamma = \text{constant}$
- d. $P^{1-\gamma}T\gamma = \text{constant}$

9. The direction of electric lines of force produced by isolated positive charge is:

[1 Marks]

- a. Radially outward
- b. Radially inward
- c. Parabolic path
- d. Circular path

10. A $800\mu F$ capacitor is charged at a steady rate of $40\mu C/\text{sec}$. Time it takes to raise its potential to 10V is

[1 Marks]

- a. 150sec
- b. 125sec
- c. 100sec
- d. 200sec

11. The p.d. V and current I in an ac circuit are given by $V = 5\cos\omega t$ volts and $I = 5\sin\omega t$ amperes respectively. The power dissipated in the circuit is

[1 Marks]

- a. Zero
- b. 10W
- c. 5W
- d. 2.5W

12. Two parallel wires carrying currents in the same directions attract each other because of

[1 Marks]

- a. Potential difference between them
- b. Mutual inductance between them
- c. Electric force between them
- d. Magnetic force between them

13. The de-Broglie wavelength of an electron at temperature T is

[1 Marks]

- a. $\frac{h}{\sqrt{2mkT}}$
- b. $\frac{h}{\sqrt{3mkT}}$
- c. $\frac{h}{\sqrt{mkT}}$
- d. $\frac{h}{2\sqrt{mkT}}$

14. The ratio of the energy of the orbital electron in first orbit of Bohr and that of second orbit of Bohr is

[1 Marks]

- a. 2:1
- b. 4:1
- c. 1:2
- d. 1:4

15. The value of fine structure constant is

[1 Marks]

- a. 1840
- b. 1/1840
- c. 137
- d. 1/137

16. The quark content of proton is

[1 Marks]

- a. uud
- b. udd
- c. uds
- d. udc

17. A chain of length L and mass M is kept on a rough horizontal table having coefficient of friction μ . The maximum length of chain that can hang outside without sliding is

[2 Marks]

- a. $\frac{\mu L}{\mu + 1}$
- b. $\frac{L}{\mu}$
- c. μL
- d. $\frac{L}{\mu + 1}$

18. A satellite is moving very close to a planet of density ρ . The time period of satellite is

[2 Marks]

- a. $\sqrt{\frac{3\pi}{\rho G}}$
- b. $\sqrt{\frac{\pi}{\rho G}}$
- c. $\sqrt{\frac{3\pi}{2\rho G}}$
- d. $\sqrt{\frac{\pi}{2\rho G}}$

19. A spherical ball contracts in volume by 0.01% when subjected to normal uniform pressure of 100atmosphere. The bulk modulus of the material in Nm^{-2} is

[2 Marks]

- a. 2×10^{10}
- b. 2×10^{11}
- c. 1×10^{10}
- d. 1×10^{11}

20. An automobile tyre is filled to a gauge pressure of 200kPa at 10°C. After driving 100km, the temperature within the tyre rises to 40°C. The gauge pressure within the tyre is now

[2 Marks]

- a. 333kPa
- b. 122kPa
- c. 434kPa
- d. 232kPa

21. Two strings are made of same material. String 1 has twice the diameter of string 2, but is under half the tension then $\frac{v_2}{v_1}$ is

[2 Marks]

- a. $\sqrt{2}:1$
- b. $\sqrt{8}:1$
- c. $1:\sqrt{2}$
- d. $1:\sqrt{8}$

22. A double slit arrangement produces interference fringes for sodium light ($\lambda=589\text{nm}$) that are 0.2° apart. The angular fringes separation if the entire arrangement is immersed in water ($\mu=1.33$) is

[2 Marks]

- a. 1.5°
- b. 0.15°
- c. 0.10°
- d. 0.266°

23. The angle of minimum deviation for a prism of refractive index 1.5 is equal to angle of prism. The angle of prism is

[2 Marks]

- a. 60°
- b. 75°
- c. 82°
- d. 87°

24. Three charges $-q$, Q and $-q$ are placed at equal distances on a straight line. If the total potential energy of the system of three charges is zero, the ratio of $Q:q$ is

[2 Marks]

- a. 1:2
- b. 2:1
- c. 1:4
- d. 4:1

25. Two resistances are in the ratio 1:4. If these are connected in parallel, their resistance becomes $20\ \Omega$. The value of each resistance is

[2 Marks]

- a. $25\ \Omega$ & $100\ \Omega$
- b. $20\ \Omega$ & $80\ \Omega$
- c. $15\ \Omega$ & $60\ \Omega$
- d. $12\ \Omega$ & $48\ \Omega$

26. A 200km long wire has capacity $0.014\ \mu F$ per km. It carries an alternating current of frequency 5kHz. The inductance to be connected in series so that the impedance is minimum is

[2 Marks]

- a. $360\ \mu H$
- b. $700\ \mu H$
- c. $175\ \mu H$
- d. $1\ mH$

27. An electron of mass m and charge e initially at rest gets accelerated by a constant electric field E . The rate of change of de-Broglie wavelength of this electron at time t is

[2 Marks]

- a. $-\frac{h}{eEt}$
- b. $\frac{h}{2eEt}$
- c. $\frac{h}{eE^2t}$
- d. $-\frac{h}{eEt^2}$

28. A P-type semiconductor has acceptor level 57meV above the valence band. The maximum wavelength of light required to create the hole is

[2 Marks]

- a. $2.28 \times 10^{-6}m$
- b. $2.18 \times 10^{-5}m$
- c. $2.28 \times 10^{-7}m$
- d. $2.28 \times 10^{-4}m$

29. What part of speech connects words or groups of words?

[1 Marks]

- a. Adverb
- b. Interjection
- c. Conjunction
- d. Preposition

30. Among the options, select the correct structure of the given sentence: How clever he is!

[1 Marks]

- a. How + Adjective + Subject + Verb
- b. Subject + Verb + Pronoun + Complement
- c. How + adverb + Subject + Verb
- d. Subject + Verb + Object

31. He was extremely when the matterto him.

[1 Marks]

- a. Annoyed, was explained
- b. Annoyed, is explained
- c. Annoyed, explained
- d. Annoyed, explains

32. You won't _____ good at sports if you _____ a lot.

[1 Marks]

- a. Like- smoking
- b. Be – smoke
- c. Are- smoke
- d. Being – smoking

33. The passive voice for “I saw a snake” is:

[1 Marks]

- a. A snake is seen by me.
- b. A snake had seen by me.
- c. A snake was seen by us.
- d. A snake was seen by me.

34. Convert the following exclamatory sentence to an assertive sentence: Hurrah! We have one the match.

[1 Marks]

- a. Hurrah, we have one the match.
- b. We won the match.
- c. We rejoice to have won the match.
- d. We have won the match, hurrah.

35. Either you or your mother _____ spread the rumor.

[1 Marks]

- a. is
- b. are
- c. has
- d. were

36. Sita is afraid _____spiders.

[1 Marks]

- a. of
- b. about
- c. in
- d. from

37. Look _____you leap.

[1 Marks]

- a. Before
- b. After
- c. Behind
- d. Beside

38. Pick out the word that is most nearly the same in meaning as the word BENEVOLENT.

[1 Marks]

- a. Secretive
- b. Stingy
- c. Kind
- d. Careful

39. Which of the following contains the words beginning with the same consonant?

[1 Marks]

- a. Charm-choice
- b. Church-chemistry
- c. Cheap-keep
- d. Ship-chip

40. The stressed syllable for the word “Accessible” is:

[1 Marks]

- a. acCEssible
- b. aCCEssible
- c. accESSible
- d. None of the above

41. The number of carbon atoms in 1.12 liters of ethane gas at STP is

[1 Marks]

- a. $0.1N_A$
- b. $0.05N_A$
- c. $0.1580)N_A$
- d. $1.2N_A$

42. Which of these species doesn't have co-ordinate covalent bond?

[1 Marks]

- a. H_2CO_3
- b. HNO_3
- c. H_2SO_4
- d. NH_4Cl

43. Identify the indicator used to titrate Na_2CO_3 solution with HCl.

[1 Marks]

- a. Phenolphthalein
- b. Dil. H_2SO_4
- c. Methyl orange
- d. None of these

44. Element A belongs to group VII in p-block and element B belongs to group I in s-block of the periodic table. Out of the following assumptions, the correct one is:

[1 Marks]

- a. A and B are metals
- b. A and B are non-metals
- c. A is a metal and B is a non-metal
- d. A is a non-metal and B is a metal

45. An element has the general configuration $(n-1)d^3ns^2$. The element is placed in the group.

[1 Marks]

- a. II A
- b. II B
- c. VA
- d. VB

46. Which of the following halogens does not exhibit positive oxidation state in its compounds?

[1 Marks]

- a. Cl
- b. Br
- c. I
- d. F

47. HNO_3 is stored in vessel made up of:

[1 Marks]

- a. Al
- b. Fe
- c. Ni
- d. Zn

48. The flux used during extraction of copper is

[1 Marks]

- a. SiO_2
- b. CaO
- c. MgO
- d. P_2O_5

49. The IUPAC name of glyoxal is

[1 Marks]

- a. Ethane dioic acid
- b. Ethane dial
- c. Ethane dione
- d. Ethanediol

50. Metamerism is exhibited by

[1 Marks]

- a. acids
- b. aldehyde
- c. alcohol
- d. ketone

51. A gas decolourises alkaline KMnO_4 solution but does not give precipitate with ammonical AgNO_3 solution is:

[1 Marks]

- a. ethane
- b. ethylene
- c. methane
- d. ethyne

52. Two element X (At. Wt. = 75) and Y (At. Wt. = 16) forms a compound which contains 75.8% of X. The formula of the compound is:

[2 Marks]

- a. XY
- b. X_2Y_3
- c. X_3Y_2
- d. XY

53. The current required to liberate 1 cc of H_2 gas at STP per second by the electrolysis of acidified water is:

[2 Marks]

- a. 0.86 A
- b. 1.72 A
- c. 8.6 A
- d. 17.2 A

54. 20ml of HCl solution required 21.8 ml of 0.1N NaOH for neutralization, vol. of water that should be added to 1 litre of HCl to get exactly decinormal is

[2 Marks]

- a. 1090
- b. 90
- c. 1000
- d. 190

55. 1 litre of saturated solution of $BaSO_4$ contains 2.33×10^{-3} g of $BaSO_4$. The K_{SP} of $BaSO_4$ is (mol. wt. of $BaSO_4$ = 233)

[2 Marks]

- a. 1×10^{-9}
- b. 1×10^{-10}
- c. 5×10^{-8}
- d. 5×10^{-9}

56. Which of the following mixture liberates Nitrogen gas on heating?

[2 Marks]

- a. $\text{NH}_3 + \text{HCl}$
- b. $\text{NH}_4\text{Cl} + \text{CaO}$
- c. $\text{Zn} + \text{dil. HNO}_3$
- d. $\text{NH}_4\text{Cl} + \text{NaNO}_2$

57. What is the chemical formula for Prussian blue?

[2 Marks]

- a. $\text{Fe}_4 [\text{Fe} (\text{CN})_6]_3$
- b. $\text{Fe} [\text{Fe} (\text{CN})_6]$
- c. $\text{Fe}_3 [\text{Fe} (\text{CN})_6]_2$
- d. $\text{K}_2\text{Fe} [\text{Fe} (\text{CN})_6]$

58. A hydrocarbon formed by electrolysis of potassium acetate on ozonolysis gives :

[2 Marks]

- a. glyoxal
- b. oxalic acid
- c. acetaldehyde
- d. formaldehyde

59. If the fourth term of the binomial expansion of $(px + \frac{1}{x})^n$ is $5/2$, then

[1 Marks]

- a. $n = 6, p = 6$
- b. $n = 8, p = 6$
- c. $n = 8, p = \frac{1}{2}$
- d. $n = 6, p = \frac{1}{2}$

60. The roots of the equation $ax^2 + bx + c = 0$ are real and equal if

[1 Marks]

- a. $b^2 - 4ac < 0$
- b. $b^2 - 4ac = 0$
- c. $b^2 - 4ac > 0$
- d. none of these

61. If A and B are two matrices then which is true

[1 Marks]

- a. $AB = BA$
- b. $A - B = B - A$
- c. $A + B = B + A$
- d. all of these

62. For a positive integer n

[1 Marks]

- a. $n! = n(n + 1)$
- b. $n! = n(n + 1)!$
- c. $n! = n(n - 1)$
- d. $n! = n(n - 1)!$

63. The n th term of a G.P. is

[1 Marks]

- a. $a_1 r^n$
- b. $a_1 r^{n+1}$
- c. $a_1 r^{n-1}$
- d. ar^{-n}

64. $\int_{-1}^1 |1-x| dx$ equals to
[1 Marks]

- a. -2
- b. 0
- c. 2
- d. 4

65. The area of the region bounded by the y-axis, $y = \cos x$ and $y = \sin x$, $0 \leq x \leq \frac{\pi}{2}$ is
[1 Marks]

- a. $\sqrt{2}$ sq. units
- b. $(\sqrt{2} + 1)$ sq. units
- c. $(\sqrt{2} - 1)$ sq. units
- d. $(2\sqrt{2} - 1)$ sq. units.

66. If $y = \sin \sqrt{x}$, then $\frac{dy}{dx}$ is equal to
[1 Marks]

- a. $\frac{\cos \sqrt{x}}{2\sqrt{x}}$
- b. $\frac{\cos \sqrt{x}}{\sqrt{x}}$
- c. $\cos \sqrt{x}$
- d. $\frac{\cos x}{\sqrt{x}}$

67. $\frac{d}{dx} 2^x =$
[1 Marks]

- a. $\frac{2^x}{\ln 2}$
- b. $\frac{\ln 2}{2^x}$
- c. $2^x \ln 2$
- d. 2^x

68. $\lim_{x \rightarrow 2} \frac{x^2 - 4}{x^2 + 4}$ is
[1 Marks]

- a. 1
- b. 0
- c. $-\frac{1}{2}$
- d. -1

69. If the length of a chord of a circle is 16 cm and is at a distance of 15 cm from the Centre of the circle, then the radius of the circle is
[1 Marks]

- a. 15 cm
- b. 16 cm
- c. 17 cm
- d. 34 cm

70. The vertex of the parabola $y^2 = 4a(x-a)$ is:
[1 Marks]

- a. (0,
- b. (-a,0)
- c. (a,0)
- d. (0,-a)

71. The product of the length of the perpendicular from the point (1,2) to the lines $2x^2 + 5xy - 4y^2 = 0$ is
[1 Marks]

- a. $\frac{4}{\sqrt{61}}$
- b. $\frac{2}{\sqrt{31}}$
- c. $\frac{5}{\sqrt{49}}$
- d. $\frac{3}{17}$

72. If slope of one line is $1/4$ and other is $5/3$ then find the angle between two lines.

[1 Marks]

- a. 30°
- b. 45°
- c. 90°
- d. 180°

73. The projection of a line on the axes are 12,4,3. Then the length of the line is

[1 Marks]

- a. 8
- b. 6
- c. 5
- d. 13

74. The domain of binary relation $y^2 = -4x$ is,

[1 Marks]

- a. R
- b. Z
- c. R^+
- d. Negative real numbers including zero.

75. $\operatorname{cosec}^{-1}x =$

[1 Marks]

- a. $\frac{\pi}{2} + \sec^{-1}x$
- b. $\pi + \sec^{-1}x$
- c. $\pi - \sec^{-1}x$
- d. $\frac{\pi}{2} - \sec^{-1}x$

76. The probability of India winning a test match against West Indies is $\frac{1}{2}$ assuming independence from match to match. The probability that in a match series India's second win occurs at the third test is

[1 Marks]

- a. $\frac{1}{8}$
- b. $\frac{1}{4}$
- c. $\frac{1}{2}$
- d. $\frac{2}{3}$

77. If $\vec{a}$ is a non zero vector then $\vec{a} \cdot \vec{a} =$

[1 Marks]

- a. 0
- b. 1
- c. $|\vec{a}|^2$
- d. None of these

78. For an open-end frequency distribution, it is not possible to find:

[1 Marks]

- a. Arithmetic mean
- b. Geometric mean
- c. Harmonic mean
- d. All of the above

79. $\omega^{28} + \omega^{38} =$

[2 Marks]

- a. 0
- b. 1
- c. ω
- d. -1

80. If the area of triangle is 35 square units with vertices 2,6, 5,4 and $(k,4)$.Then k is

[2 Marks]

- a. 12
- b. -2
- c. -12, -2
- d. 12, -2

81. $\frac{1}{(n+2)(n+1)n} =$

[2 Marks]

- a. $n!$
- b. $(n+2)!$
- c. $\frac{(n-1)!}{(n+2)!}$
- d. $\frac{(n+2)!}{(n-1)!}$

82. If $a_{n-2} = 3n - 11$, find the n^{th} term of the sequence

[2 Marks]

- a. 11
- b. $3n - 5$
- c. $3n - 6$
- d. none of these

83. $\int e^x \sec x (1 + \tan x) dx$ equals

[2 Marks]

- a. $e^x \cos x + c$
- b. $e^x \sec x + c$
- c. $e^x \sin x + c$
- d. $e^x \tan x + c$

84. If $f(x) = x^3 + 2x + 9$ then $f''(x) =$

[2 Marks]

a. $3x^2 + 2$

b. $3x^2$

c. $6x$

d. $2x$

85. The function $f(x) = a^x, a > 0, a \neq 0$, and x is any real number is called

[2 Marks]

a. Exponential function

b. logarithmic function

c. algebraic function

d. composite function

86. $\lim_{x \rightarrow \infty} \frac{1 - \cos x}{x}$ is

[2 Marks]

a. nonexistent

b. 1

c. ∞

d. none of these

87. The equation of the tangent to the circle $x^2 + y^2 + 4x - 6y - 13 = 0$ at point (3,4) is

[2 Marks]

a. $3x + 4y = 17$

b. $5x + y = 9$

c. $2x - 7y = 9$

d. $5x + 3y = 1$

88. The number of real tangents that can be drawn to the ellipse $3x^2+5y^2=32$, passing through (3,5) is

[2 Marks]

- a. 0
- b. 1
- c. 2
- d. none

89. The centroid of a triangle is (2,7) and two of its vertices are (4,8) and (-2,6). The third vertex is

[2 Marks]

- a. (0,0)
- b. (4,7)
- c. (7,4)
- d. (7,7)

90. The angle between the diagonals of a cube is

[2 Marks]

- a. $\cos^{-1}(1/2)$
- b. $\cos^{-1}(1/3)$
- c. $\cos^{-1}(1/\sqrt{3})$
- d. $\frac{\pi}{3}$

91. If A and B two non-empty subsets of a set X such that A is not a subset of B, then

[2 Marks]

- a. A is subset of the complement of B
- b. B is a subset of A
- c. A and B are disjoint
- d. A and the complement of B are non-disjoint

92. $\sec(\sin^{-1}\frac{1}{2}) =$

[2 Marks]

- a. $\frac{\sqrt{3}}{2}$
- b. $\frac{1}{2}$
- c. $\frac{2}{\sqrt{3}}$
- d. 2

93. The points O, A, B, C, D are such that $OA = a, OB = b, OC = 2a + 3b$ and $OD = a - 2b$. If $|\vec{a}| = 3|\vec{b}|$, then the angle between BD and AC is

[2 Marks]

- a. π
- b. $\frac{\pi}{2}$
- c. $\frac{\pi}{3}$
- d. none of these

94. Which of the following is not a cyclic ether?

[2 Marks]

- a. THF
- b. Oxetane
- c. Oxirane
- d. Anisole

95. The conversion of FeO into Fe_2O_3 is compulsory in the extraction of iron. It is because

[2 Marks]

- a. FeO is not easily reduced
- b. Fe_2O_3 is easily reduced
- c. Fe_2O_3 does not form slag with SiO_2 and prevents loss of Fe.
- d. Fe_2O_3 is more reactive

96. Soap is formed by :

[1 Marks]

- a. acidic hydrolysis of fat
- b. alkaline hydrolysis of fat
- c. acidic hydrolysis of ester
- d. acidic hydrolysis of ether

97.

Read the following passage and answer the four question that follow:

The Suez Canal is a man-made canal located in Egypt that connects the Red Sea to the Mediterranean Sea. It was built in the mid-19th century to provide a shorter and more direct route for ships travelling between Europe and Asia. The Suez Canal is an important waterway for international trade, with over 50,000 ships passing through each year. It is also a major source of revenue for Egypt, as ships must pay a fee to use the canal. The Suez Canal is an engineering marvel and is considered one of the greatest achievements of the 19th century.

Q. Where is the Suez Canal located?

[2 Marks]

- a. Egypt
- b. Mediterranean Sea
- c. Red Sea
- d. Europe

98. What does the Suez Canal connect?

[2 Marks]

- a. The Red Sea to the Mediterranean Sea
- b. The Mediterranean Sea to the Atlantic Ocean
- c. The Red Sea to the Indian Ocean
- d. The Mediterranean Sea to the Pacific Ocean

99. Why was the Suez Canal built?

[2 Marks]

- a. To provide a shorter and more direct route for ships
- b. To connect the two seas for recreational purposes
- c. To create a new source of revenue
- d. To boost tourism in the area

100. What is the Suez Canal considered to be?

[2 Marks]

- a. An engineering marvel
- b. A tourist attraction
- c. A minor waterway
- d. A failure of the 19th century



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