

1. A body constrained to move along z-axis is subjected to a constant force given by $\vec{F} = -\hat{i} + 2\hat{j} + 3\hat{k}$. The work done by this force in moving the body by a distance of 4m is

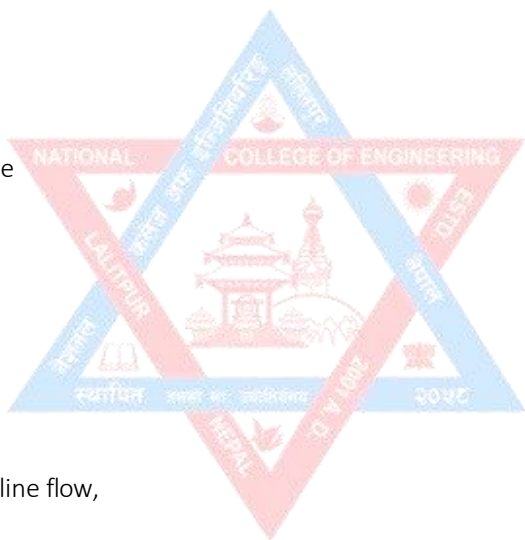
[1 Marks]

- a. 4J
- b. 8J
- c. 12J
- d. 16J

2. Young's modulus of a perfectly rigid body is

[1 Marks]

- a. 0
- b. Infinite
- c. Finite
- d. 1



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3. In streamline flow,

[1 Marks]

- a. speed of particle remain same through out
- b. velocity of particle remain same through out
- c. kinetic energy of all particles arriving at given point are same
- d. momenta of all particles arriving at given point are same

4. For a gas if the ratio of specific heats at constant pressure and constant volume is γ , then the value of degree of freedom is

[1 Marks]

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

5. A thunder clap is heard 5.5s later the lightning flash. The distance of flash is

[1 Marks]

- a. 178m
- b. 568m
- c. 308m
- d. 1778m

6. Two coherent source produces a dark fringe when the phase difference between interfering waves is

[1 Marks]

- a. 0
- b. 2π
- c. $N\pi$
- d. $(2n+1)\pi$, $n=1,2,3,\dots$

7. When a convex lens is dipped in a liquid whose refractive index is equal to refractive index of the lens, then focal length will be

[1 Marks]

- a. 0
- b. Four times
- c. Remains same
- d. Infinite

8. Velocity of sound generally greater in solids than in gases because

[1 Marks]

- a. Density of solids is low but the elasticity is high
- b. Density of solid is high but the elasticity is low
- c. Density of solids is high and the elasticity of solids are very high
- d. Both density and elasticity of solids are low.

9. Two infinite plane parallel sheets, separated by a distance d have equal and opposite uniform charge densities σ . Electric field at a point between the sheets is:

[1 Marks]

a. Zero

b. $\frac{\sigma}{\epsilon_0}$

c. $\frac{\sigma}{2\epsilon_0}$

d. Depends up on the location of point

10. 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

11. The quantity in electricity analogous to friction in linear mechanical motion is

[1 Marks]

a. Resistance

b. Potential

c. Charge

d. Inductance

12. Lenz's law is a consequence of law of conservation of

[1 Marks]

- a. Energy
- b. Momentum
- c. Mass
- d. Charge

13. The induced emf produced when a magnet is inserted into a coil does not depend on the

[1 Marks]

- a. Number of turns in the coil
- b. Resistance of the coil
- c. Magnetic moment of the magnet
- d. Speed of approach of magnet

14. If total energy of an electron is E_0 , then its potential energy is

[1 Marks]

- a. E_0
- b. $2E_0$
- c. $\frac{E_0}{2}$
- d. $4E_0$

15. Which of the following is not the property of Higgs boson

[1 Marks]

- a. It is charge less
- b. Its spin is zero
- c. its mean life time is 1.56×10^{-22} sec
- d. its mass is less than boson

16. Second generation of quark include

[1 Marks]

- a. up and down quark
- b. top and bottom quark
- c. charm and strange quark
- d. strange and bottom quark

17. The human heart discharges 75ml of blood at each beat against a pressure of 0.1m of Hg. Assuming that the pulse frequency is 80 beats per minute, the power of heart is

[2 Marks]

- a. 4.33W
- b. 3.33W
- c. 2.33W
- d. 1.33W

18. An artificial satellite moving in a circular orbit at a distance h from the center of earth has total energy E_0 . Its potential energy is

[2 Marks]

- a. $-E_0$
- b. $1.5E_0$
- c. E_0
- d. $2E_0$

19. A wire of cross-sectional area 3 mm^2 having Young's modulus $2 \times 10^{11} \text{ Nm}^{-2}$ is just stretched between two fixed points at a temperature of 20°C . If the coefficient of linear expansion is $10^{-5} \text{ }^\circ\text{C}^{-1}$, then tension on the wire when temperature falls by 20°C is

[2 Marks]

- a. 100N
- b. 200N
- c. 120N
- d. 140N

20. 1gm of water at 100°C is converted into steam at the same temperature. If the volume of steam is 1671cm^3 and latent heat of steam is 2256Jgm^{-1} , the change in internal energy of the system is

[2 Marks]

- a. 2086.8J
- b. 2432.3J
- c. 2687.5J
- d. 3126.2J

21. A wire under tension vibrates with a frequency of 450Hz. The fundamental frequency of the wire were half as long, twice as thick and under one fourth tension is

[2 Marks]

- a. 190Hz
- b. 225Hz
- c. 150Hz
- d. 900Hz

22. Light of wavelength 600nm is incident normally on a slit of width 0.1mm. The position of the second order minimum on a screen 3m from the slit is

[2 Marks]

- a. 36cm
- b. 0.36cm
- c. 18cm
- d. 0.18cm

23. A convex mirror of focal length f produces an image $\frac{1}{n}th$ of size of object. The distance of object from the mirror is

[2 Marks]

- a. $fn - 1$
- b. $\frac{f}{n}$
- c. $\frac{f}{n - 1}$
- d. nf

24. An electron at rest has mass m and charge e . It is accelerated by a constant electric field E . The velocity of the electron after covering a distance S is

[2 Marks]

a. $\sqrt{\frac{eE}{S}}$

b. $\sqrt{\frac{eEm}{S}}$

c. $\sqrt{\frac{2eES}{m}}$

d. $\sqrt{\frac{2eEm}{S}}$

25. A given wire of resistance R and diameter d is stretched to reduce its diameter to half its original value. The resistance of wire becomes

[2 Marks]

a. $8R$

b. $16R$

c. $32R$

d. $64R$

26. A coil having 100 turns and area 0.20m^2 is placed normally in a magnetic field. The magnetic field changes from 0.20wb m^{-2} to 0.60wb m^{-2} at a uniform rate over a period of 0.01s . the induced emf in the coil is

[2 Marks]

a. 200V

b. -400V

c. 600V

d. -800V

27. The number of electrons emitted per second from the heated cathode is 1.8×10^{17} . These electrons are accelerated by a P.D. between cathode and anode. The maximum anode current is

[2 Marks]

a. 1mA

b. 2.3mA

c. 2.9mA

d. 4.3mA

28. If $\beta = 200$ and $I_C = 5mA$, the value of I_E is

[2 Marks]

- a. $5.02 \times 10^{-3}A$
- b. $5.02A$
- c. $5.02 \times 10^{-4}A$
- d. $5.02 \times 10^{-2}A$

29. Identify the correct parts of Speech for the underlined word in the given sentence: After lunch let's go out for a coffee.

[1 Marks]

- a. Pronoun
- b. Preposition
- c. Verb
- d. Adverb

30. An interrogative sentence ends with.

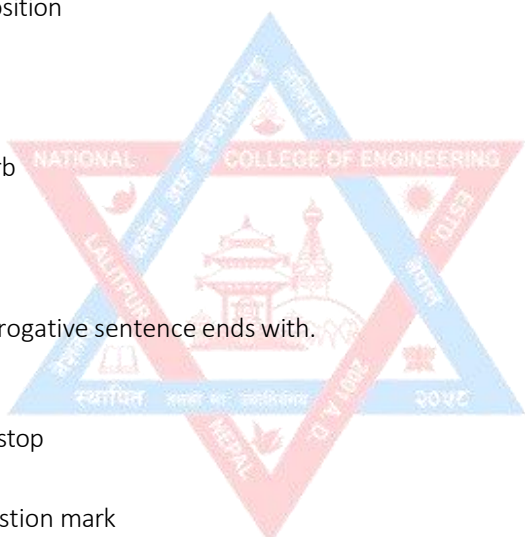
[1 Marks]

- a. a full stop
- b. a question mark
- c. an exclamatory mark
- d. a comma

31. The old Peepal tree which.....in our compound for fifty years suddenly crashed to the ground last night.

[1 Marks]

- a. Had stood
- b. Has stood
- c. Is standing
- d. Stands



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32. If we _____ you 10%, we _____ have any money on it.

[1 Marks]

- a. Are giving- will
- b. Gives- won't
- c. Gave- wouldn't
- d. Give – would

33. The passive voice for “Sudesh spoke the truth” is:

[1 Marks]

- a. The truth was spoken by Sudesh
- b. The truth spoken by Sudesh
- c. Lie was spoken by Sudesh
- d. The truth was spoken by Sudesh.

34. Identify the complex sentence from the following:

[1 Marks]

- a. The cow gives milk.
- b. Ram went to the park and played football.
- c. The sky is blue.
- d. When we went there, we found that he had gone.

35. Sita as well as her parents _____stupid.

[1 Marks]

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

36. He confided _____ me.

[1 Marks]

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

37. Time and tide _____ for no man.

[1 Marks]

- a. Wait
- b. Waits
- c. Do not wait
- d. Is waiting

38. What is the synonym for Admiration?

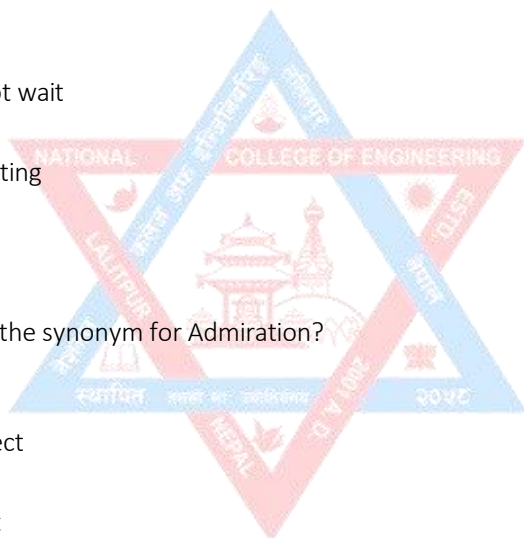
[1 Marks]

- a. Respect
- b. Effect
- c. Avoidance
- d. Addition

39. Which of the following does not have / ia / sound?

[1 Marks]

- a. Near
- b. Deer
- c. Ear
- d. Pray



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40. _____ are considered as Function words.

[1 Marks]

- a. Stressed
- b. Accented
- c. Non-stressed
- d. Content

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. $0.1580N_A$
- d. $1.2N_A$

42. Which of these set represents electron with least energy?

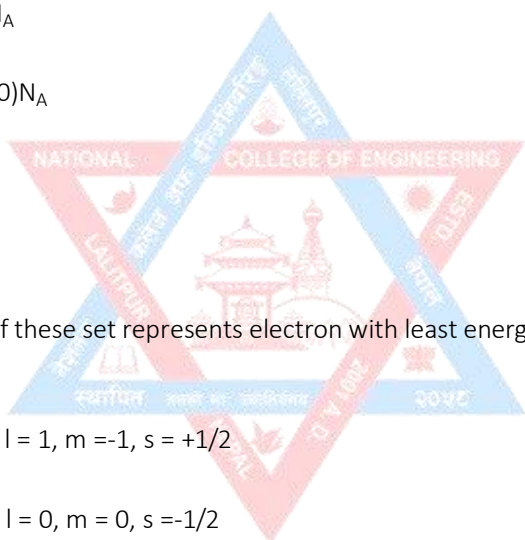
[1 Marks]

- a. $n = 2, l = 1, m = -1, s = +1/2$
- b. $n = 3, l = 0, m = 0, s = -1/2$
- c. $n = 3, l = 1, m = -1, s = +1/2$
- d. $n = 3, l = 2, m = +1, s = -1/2$

43. The addition of HCOONa to a solution of HCOOH makes the pH of the solution to

[1 Marks]

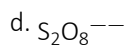
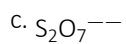
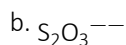
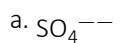
- a. Increase
- b. Decrease
- c. No change
- d. Cannot be predicted



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44. Which of this have – O – O – linkage?

[1 Marks]



45. Isoelectronic species pair of carbomonoxy is

[1 Marks]



46. Which of these halogen is obtained from Caliche?

[1 Marks]



47. The gas formed by passing NH_3 over heated sodium is

[1 Marks]



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48. Froth floatation process is used for the metallurgy of

[1 Marks]

- a. Chloride ores
- b. Amalgams
- c. Oxide ores
- d. Sulphide ores

49. IUPAC name of iso – butyl acetylene is:

[1 Marks]

- a. 4 – ethyl but-1 –ene
- b. 4 – methylpent – 1 – yne
- c. 3 – methylpent – 2 – yne
- d. 2 – methylpent – 4 – yne

50. Some meta-directing substituents in aromatic substitution are given. Which one is the most deactivating?

[1 Marks]

- a. $-\text{SO}_3\text{H}$
- b. $-\text{COOH}$
- c. $-\text{NO}_2$
- d. $-\text{C}\equiv\text{N}$

51. Lindlar's catalyst is

[1 Marks]

- a. Pd
- b. $\text{Pd}-\text{CaCO}_3$
- c. Pd and CO_2
- d. Pd and H_2

52. The volume of oxygen required for complete combustion of 0.0223 gm ethane is

[2 Marks]

- a. 30 ml
- b. 60 ml
- c. 40 ml
- d. 50 ml

53. The thickness of silver coat on a copper vessel of surface area $80 \text{ cm} \times 10 \text{ cm}$ applied by passing 0.2 A current for 3 hrs. (

p of silver = 10.47 gm/cc)

[2 Marks]

- a. $1.88 \times 10^{-4} \text{ cm}$
- b. $1.88 \times 10^{-3} \text{ cm}$
- c. $2.88 \times 10^{-4} \text{ cm}$
- d. $2.88 \times 10^{-3} \text{ cm}$

54. 10 ml of 1M NaOH solution will be neutralized by the following volume of 1M H_2SO_4 ?

[2 Marks]

- a. 25 ml
- b. 20 ml
- c. 10 ml
- d. 5 ml

55. The no. of hydrogen ions present in 1 ml of solution having pH value 4 are

[2 Marks]

- a. 10^{-4}
- b. 10^{-7}
- c. 6.022×10^{19}
- d. 6.022×10^{16}

56. The final acid obtained during the manufacture of H_2SO_4 by contact process is:

[2 Marks]

- a. H_2SO_4 (conc.)
- b. H_2SO_4 (dil.)
- c. H_2SO_4
- d. $\text{H}_2\text{S}_2\text{O}_7$

57. 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.

58. The IUPAC name of $\text{CH}_3 - \text{CH}_2 - \text{C}(\text{Br})(\text{OH}) - \text{C}(=\text{O})\text{OH}$ is :

[2 Marks]

- a. 3 – bromo – hydroxyl butanoic acid
- b. 3 – hydroxy – 3 – bromo butanoic acid
- c. 2 – hydroxy – 2 – bromo butanoic acid
- d. 2 – bromo – 2 – hydroxy butanoic acid

59. The middle term in the Expression $(a + b)^{12}$ is

[1 Marks]

- a. 6th term
- b. 7th term
- c. 8th term
- d. 9th term

60. If w is a cube root of unity then $1 + w + w^2 =$

[1 Marks]

- a. 1
- b. 2
- c. 0
- d. -1

61. A matrix $\begin{pmatrix} 13 & 0 & 0 \\ 0 & 13 & 0 \\ 0 & 0 & 13 \end{pmatrix}$ is a

[1 Marks]

- a. diagonal matrix
- b. scalar matrix
- c. triangular matrix
- d. identity matrix

62. $n_{c_r} =$

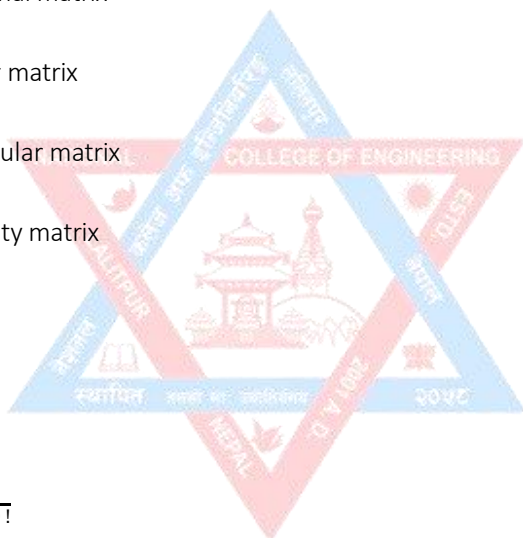
[1 Marks]

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

63. $\sum_{k=1}^n k^2 =$

[1 Marks]

- a. $\frac{n(n+1)}{2}$
- b. $\frac{n^2(n+1)^2}{4}$
- c. $\frac{n(n+1)(2n+1)}{6}$
- d. none of these



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64. The area bounded by the curves $y^2 = 4x$ and $y = x$ is equal to

[1 Marks]

- a. $8/3$
- b. $35/6$
- c. $1/3$
- d. none of these

65. The area of the circle $x^2 + y^2 = 16$ exterior to the parabola $y^2 = 6x$ is

[1 Marks]

- a. $\frac{4}{3}(4\pi - \sqrt{3})$
- b. $\frac{1}{3}(4\pi + \sqrt{3})$
- c. $\frac{2}{3}(8\pi - \sqrt{3})$
- d. $\frac{4}{3}(8\pi + \sqrt{3})$

66. If $f'(c) = 0$, then f has relative maximum value at $x = c$, if

[1 Marks]

- a. $f'(c) > 0$
- b. $f''(c) < 0$
- c. $f''(c) = 0$
- d. None

67. The derivative of $\frac{1}{1+x}$ is:

[1 Marks]

- a. x
- b. $1+x$
- c. $(1+x)^2$
- d. $-(1+x)^{-2}$

68. $\lim_{x \rightarrow \infty} x^2 \sin \frac{1}{x}$

[1 Marks]

- a. is 1
- b. is 0
- c. is ∞
- d. oscillates between -1 and 1

69. The equation of the tangent to the circle $x^2 + y^2 = 5$ at point (1,2) is

[1 Marks]

- a. $x + 2y = 5$
- b. $2x + 3y = 4$
- c. $3x - 4y = 7$
- d. $2x + y = 5$

70. The length of the latus rectum of the parabola $y^2 + 8x - 2y + 17 = 0$ is

[1 Marks]

- a. 2
- b. 4
- c. 8
- d. 16

71. The equation to the pair of lines perpendicular to the pair of lines $3x^2 - 4xy + y^2 = 0$ is

[1 Marks]

- a. $x^2 + 4xy + 3y^2 = 0$
- b. $x^2 - 4xy - 3y^2 = 0$
- c. $x^2 + 4xy + y^2 = 0$
- d. None of these

72. If angle between the two lines is 45° and slope of one line is $1/4$ then which of the following is possible value of the slope of other line.

[1 Marks]

a. $3/5$

b. $-3/5$

c. $-5/3$

d. $4/5$

73. The Z co-ordinate of any point in the xy plane is

[1 Marks]

a. 1

b. -1

c. -2

d. 0

74. The domain of the binary relation $2x^2 + 2y^2 = 18$ is

[1 Marks]

a. R

b. R^+

c. Z

d. $\{-3, 3\}$

75. If $x + y = 3 - \cos 4\theta$ and $x - y = 4\sin 2\theta$ then

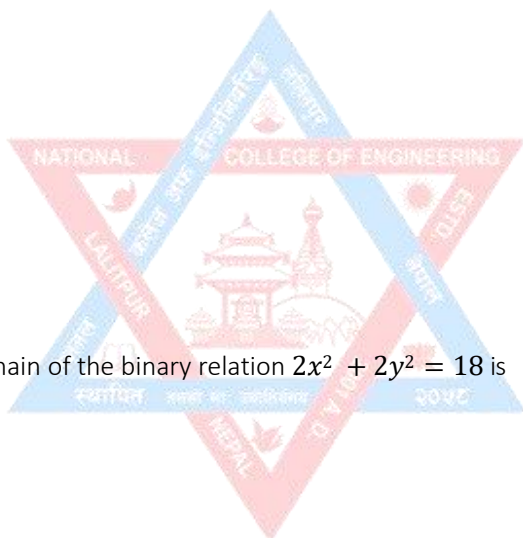
[1 Marks]

a. $x^4 + y^4 = 9$

b. $\sqrt{x} + \sqrt{y} = 16$

c. $x^3 + y^3 = 2x^2 + y^2$

d. $\sqrt{x} + \sqrt{y} = 2$



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76. The mean and the variance of a binomial distribution are 4 and 2 respectively. Then the probability of 2 successes is

[1 Marks]

- a. $\frac{37}{256}$
- b. $\frac{219}{256}$
- c. $\frac{128}{256}$
- d. $\frac{28}{256}$

77. If the S.D. of a set of observations is 4 and if each observation is divided by 4, find the S.D. of the new observations.

[1 Marks]

- a. 4
- b. 3
- c. 2
- d. 1

78. For grouped data the formula for median is based on

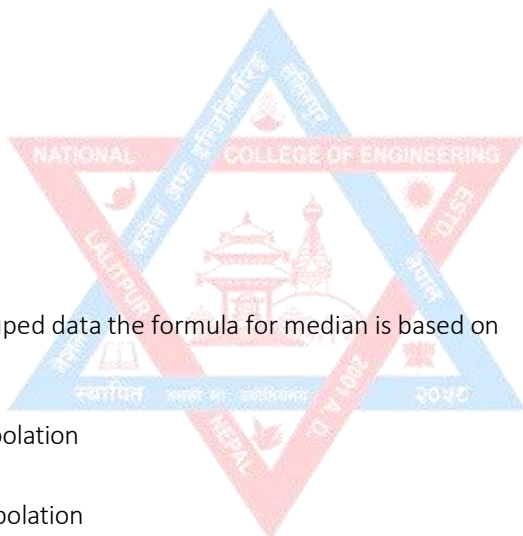
[1 Marks]

- a. Interpolation
- b. Extrapolation
- c. Both (a) and (b)
- d. None

79. Roots of the equation $x^2 + 5x - 1 = 0$ are

[2 Marks]

- a. rational
- b. irrational
- c. complex
- d. none of these



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80.
$$\begin{vmatrix} 1 & a & b+c \\ 1 & b & c+a \\ 1 & c & a+b \end{vmatrix}$$
 is

[2 Marks]

- a. $a + b + c$
- b. 0
- c. 1
- d. none of these

81. The number of the words that can be formed out of the letters of ASSASSINATION is

[2 Marks]

- a. $\frac{13!}{4! \cdot 3! \cdot 2! \cdot 2!}$
- b. $\frac{13}{4 \cdot 3 \cdot 2 \cdot 2}$
- c. $\frac{13!}{4!}$
- d. $\frac{4! \cdot 3! \cdot 2! \cdot 2!}{13!}$

82. Write the first four terms of the arithmetic sequence if $a_1 = 5$ and other three consecutive terms are 23, 26, 29

[2 Marks]

- a. 23, 26, 29, 32
- b. 5, 8, 11, 14
- c. 8, 11, 14, 17
- d. none of these

83. $\int_0^{\pi} \frac{\cos x - \sin x}{1 + \cos x \sin x} dx$ is equal to

[2 Marks]

- a. 0
- b. $\frac{\pi}{2}$
- c. $\frac{\pi}{4}$
- d. $\frac{\pi}{6}$

84. The maximum value of the function $f(x) = x^2 - x - 2$ is

[2 Marks]

a. $-\frac{9}{2}$

b. $-\frac{9}{4}$

c. -1

d. 0

85. $\frac{d}{dx} \ln[f(x)] =$

[2 Marks]

a. $f'(x)$

b. $\ln f'(x)$

c. $\frac{f'(x)}{f(x)}$

d. $f(x) \cdot f'(x)$

86. $\lim_{x \rightarrow \infty} \frac{2^{-x}}{2^x}$ is

[2 Marks]

a. -1

b. 1

c. 0

d. none of these

87. An equation of the form $Ax^2 + By^2 + Gx + Fy + C = 0$ represents a circle if

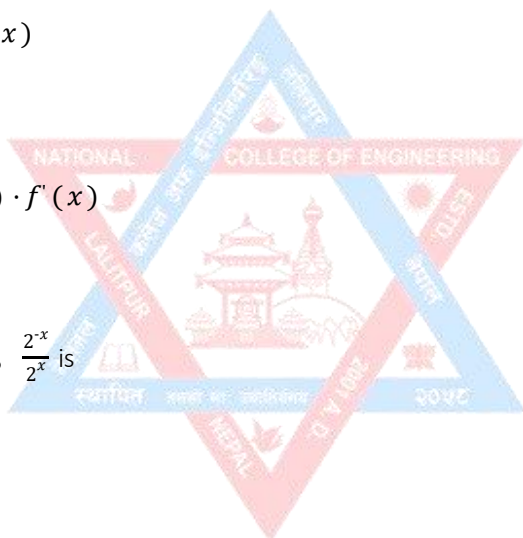
[2 Marks]

a. $A = 0$ or $B = 0$

b. $A = B \neq 0$

c. $A \neq B$

d. None of these



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88. If e and e_1 are the eccentricities of a hyperbola and its conjugate, then

[2 Marks]

- a. $e^{-2} - e_1^{-2} = 1$
- b. $e^2 - e_1^2 = 1$
- c. $e^2 + e_1^2 = 1$
- d. $e^{-2} + e_1^{-2} = 1$

89. If the vertices of the parallelogram are respectively $(0,0)$, $(1,1)$, $(2,2)$ and $(1,2)$ then the angles between the diagonals is

[2 Marks]

- a. $\frac{\pi}{2}$
- b. $\frac{\pi}{3}$
- c. $\frac{\pi}{4}$
- d. $\frac{\pi}{6}$

90. If A,B,C,D are the points $(2,3,-1)$, $(3,5,-3)$, $(1,2,3)$ and $(3,5,7)$ respectively the the angle between AB and CD

[2 Marks]

- a. $\frac{\pi}{2}$
- b. $\frac{2\pi}{3}$
- c. $\frac{\pi}{4}$
- d. $\frac{\pi}{6}$

91. In a group of 65 people, 40 like cricket, 10 like both cricket and tennis. The number of persons liking tennis only and not cricket is

[2 Marks]

- a. 21
- b. 25
- c. 15
- d. None of these



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92. $\cos^{-1}A + \cos^{-1}B =$

[2 Marks]

a. $\cos^{-1}(A\sqrt{1-B^2} - B\sqrt{1-A^2})$

b. $\cos^{-1}(AB - \sqrt{1-A^2}\sqrt{1-B^2})$

c. $\cos^{-1}(A\sqrt{1-B^2} + B\sqrt{1-A^2})$

d. $\cos^{-1}(AB + \sqrt{1-A^2}\sqrt{1-B^2})$

93. If $\vec{a} = 2\hat{i} - 3\hat{j} - \hat{k}$ and $\vec{b} = \hat{i} + 4\hat{j} - 2\hat{k}$ then $(\vec{a} + \vec{b}) \times (\vec{a} - \vec{b}) =$

[2 Marks]

a. $\hat{i} - 6\hat{j} + 22\hat{k}$

b. $-20\hat{i} - 6\hat{j} - 22\hat{k}$

c. $20\hat{i} + 6\hat{j} + 22\hat{k}$

d. None of these

94. On addition of HCN on the compound followed by hydrolysis gives lactic acid. The compound is

[2 Marks]

a. acetaldehyde

b. formaldehyde

c. acetone

d. benzaldehyde

95. Tarnishing of silver is due to the formation of

[2 Marks]

a. AgCl

b. Ag₂S

c. Ag₂O

d. Ag₂SO₄

96. A compound that will form an offensive smell when heated with chloroform and alcoholic potash is

[1 Marks]

- a. $C_2H_5NH_2$
- b. $(C_2H_5)_2NH$
- c. $(CH_3)_3N$
- d. CH_3CN

97.

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

Over the past 50 years, doctors around the world have adopted the practice of prescribing antibiotics at the first sign of a minor infection or treating patients with a handful of antibiotics. Nowadays it is not unusual that practitioners are prescribing multiple antibiotics without any real indication or relevance for such drug combinations. Antibiotics have traditionally been known as miracle drugs, but there is growing evidence that they are overworked miracles, especially in countries like ours where there is easy access to over-the-counter drugs including antibiotics. We can't imagine going back to the pre-antibiotic days. Yet the unbridled use of these agents is driving us in that direction.

Q. How long has the practice of prescribing antibiotics at the first sign of a minor infection been in use?

[2 Marks]

- a. The past 10 years
- b. The past 20 years
- c. The past 30 years
- d. The past 50 years

98. What is the common practice of practitioners prescribing antibiotics?

[2 Marks]

- a. Prescribing multiple antibiotics without any real indication or relevance for such drug combinations
- b. Prescribing antibiotics only when necessary
- c. Prescribing single antibiotics for minor infections
- d. Not prescribing antibiotics at all

99. How have antibiotics traditionally been known?

[2 Marks]

- a. As miracle drugs
- b. As dangerous drugs
- c. As unnecessary drugs
- d. As over-the-counter drugs

100. What is the growing evidence about antibiotics?

[2 Marks]

- a. They are overworked miracles
- b. They are not overworked
- c. They are not miracles
- d. They are not necessary



NCE