FAR WESTERN UNIVERSITY
Faculty of Engineering
Mahendranagar, Kanchanpur, Nepal
BE Entrance Examination

Full Marks:150
Time: 3 hours

Attempt all questions:

Read the following questions and write down the correct option **a, b, c,** or **d** in the answer sheet provided. In section I each question carries **1(one)** mark and in section II each question carries **2 (two)** marks.

Section I (50x1=50)

1. The unit vector along the direction of the vector $\vec{a}$ is ….

(a) $\frac{1}{\vec{a}}$ (b) $\frac{1}{|\vec{a}|}$ (c) $\frac{\vec{a}}{|\vec{a}|}$ (d) $\frac{|\vec{a}|}{\vec{a}}$

2. The angle between the vectors $\vec{a} = 3\vec{k}$ and $\vec{b} = \sqrt{2}\vec{i} + \sqrt{2}\vec{k}$ is ….

(a) π (b) $\frac{\pi}{4}$ (c) $\frac{\pi}{2}$ (d) 0

3. If A is any $m \times n$ matrix such that AB and BA are both defined, then B is a matrix of order ...

(a) $m \times m$ (b) $n \times n$ (c) $m \times n$ (d) $n \times m$

4. The inverse of a non-singular matrix A is given by …

(a) $\frac{1}{A}$ (b) $\frac{\text{adj A}}{|A|}$ (c) $\frac{|A|}{\text{adj A}}$ (d) does not exist.

5. The value of $i^5 + i^7 + i^3$ is …

(a) $i - 1$ (b) $i + 1$ (c) $-i$ (d) i

6. If two roots of a quadratic equation $x^2 + k\,x + 4 = 0$ have same magnitude but opposite sign. Then the value of k is …

(a) 0 (b) 2 (c) 4 (d) 1

7. If a, b, c are in H.P., then the value of b is …

(a) $\frac{2}{a+c}$ (b) $\frac{a+c}{2ac}$ (c) $\frac{2ac}{a+c}$ (d) $\frac{ac}{a+c}$

8. The total number of different words we can form from the word "BETTER" is …

(a) 30 (b) 20 (c) 90 (d) 180

9. If n is a positive integer, then how many terms are there in the expansion of $(x-a)^n$?
(a) $n-1$ (b) $n+1$ (c) n (d) n^2

10. The value of $2+\frac{1}{2!}+\frac{1}{3!}+\frac{1}{4!}\ldots\ldots$ is
(a) $1+e$ (b) e (c) $2+e$ (d) $e-1$

11. If the temperature of a patient is 40°C, his temperature on the Fahrenheit scale will be …
(a) 72°F (b) 96°F (c) 100°F (d) 104°F

12. The coefficient of linear expansion of iron is 0.000011/K. An iron rod is 10 m long at 27°C. The length of the rod will be decreased by 1.1 mm when the temperature of the rod changes to …..
(a) 0°C (b) 10°C (c) 17°C (d) 20°C

13. A water fall is 168 m high. Assuming that half the kinetic energy of the falling water gets converted into heat, the rise in the temperature of water is approximately ….
(a) 0.1°C (b) 0.2°C (c) 0.3°C (d) 0.4°C

14. A Carnot's engine works with a source at temperature of 27°C and a sink at -123°C. Its efficiency is…
(a) 0.75 (b) 0.4 (c) 0.5 (d) 0.25

15. A cooking pot should have …
(a) High specific heat and low conductivity
(b) High specific heat and high conductivity
(c) Low specific heat and low conductivity
(d) Low specific heat and high conductivity

16. If the intensity of sound is doubled, the intensity level will increase by nearly…
(a) 1 dB (b) 2 dB (c) 3 dB (d) 4 dB

17. If the ratio of amplitudes of two waves is 4:3, then the ratio of maximum and minimum intensity is ….
(a) 16:9 (b) 1:16 (c) 1:49 (d) 49:1

18. A well cut diamond appears bright because ….
(a) It emits light (b) It is radioactive (c) of total reflection (d) of dispersion

19. An object is placed at a distance of 2f from the pole of a convex mirror of focal length f. The linear magnification is ….

(a) 1/3 (b) 2/3 (c) ¾ (d) 1

20. The velocity of light in a medium is 2×10^8 m/s. The refractive index of the medium is …

(a) 2.3 (b) 1.4 (c) 1.5 (d) 1.0

21. Ostwald process is used for the manufacture of …

(a) Nitrogen (b) Ammonia (c) Sulphuric acid (d) Nitric acid

22. Temporary hardness of running water of Mahakali river is due to presence of …

(a) $NaHCO_3$ (b) $Mg(HCO_3)_2$ (c) $CaCO_3$ (d) Both (a) and (b)

23. Starch solution is perfectly used to test experimentally …

(a) Ammonia (b) Chlorine (c) Hydrogen (d) Iodine

24. Which of the following is amorphous form of Sulphur?

(a) Rhombic (b) Monoclinic (c) Milk of Sulphur (d) Beta Sulphur

25. The percent of carbon in steel alloy is …

(a) 2 to 4 (b) 0.2 to 2 (c) 0.02 to 0.2 (d) 0.002 to 0.02

26. Chlorophyll molecule contains …

(a) Fe (b) Mg (c) Ca (d) Na

27. Haematite is an ore of …

(a) Iron (b) Copper (c) Silver (d) Zinc

28. The correct order of electronegativity of halogens is …

(a) F<Cl<Br<I (b) I>Cl>Br>F (c) F=Cl>Br>I (d) F>Cl>Br>I

29. Blistering of blister copper is due to …..

(a) Inherent property
(b) Dissolved gas molecules
(c) Escaping of dissolved gas from molten mass
(d) The presence of oxide moieties

30. Na exposed to atmosphere gives ….

(a) Na_2O (b) NaOH (c) Na_2CO_3 (d) NaCl

31. You should not interfere ……other people's affairs.

(a) for (b) in (c) at (d) none of these

32. Juli..... all praise is a wise girl.
(a) who (b) whom (c) whose (d) which

33. The plural of proof is…
(a) proof (b) proves (c) proofs (d)proves

34. I'm a bit tired. I think …
(a) I'd take rest (b) I 'll take rest (c) I must take rest (d) I rest

35. All .....glitters is not gold.
(a) which (b) who (c) whose (d) that

36. He as well as his friends..... English.
(a) to speak (b) speaks (c) speak (d) speaking

37. Which of the following nouns is singular?
(a) cattle (b) people (c) vermin (d) bacterium

38. The passive voice of the sentence "we admire the brave" is…..
(a) The brave is admired (b) The brave are being admired
(c) The brave are admired (d) We are admired

39. The indirect speech of the sentence "She said, 'You had better start, Rita.'" is…..
(a) She told to better start. (b) She advised Rita to start.
(c) She said to Rita to start. (d) She said Rita had better start.

40. If I were you, I …....
(a) would have replied (b) would have been replied (c) would reply (d) will reply

41. Einstein discovered that the Universe ……
(a) expanded (b) expands (c) is expanding (d) have expanded

42. Slow and steady .....the race.
(a) win (b) wins (c) won (d) winning

43. Things once..... can't be returned.
(a) sell (b) to sell (c) have sold (d) sold

44. He goes to visit his aunt <u>once in a blue moon</u>; she lives in a remote village. The underlined idiom means:
(a) most often (b) only once (c) very rarely (d) fortnightly

45. It is I.....no wrong.
(a) who does (b) that does (c) who do (d) who has done

46. Many Nepali children are deprived..... decent education.
(a) from (b) of (c) by (d) for

47. The antonym of 'reliable' is……
(a) Dependable (b) Trustworthy (c) Unreliable (d) Irreliable

48. I will have her .....the phone.
(a) to cook (b) answer (c) to answer (d) answered

49. The word "green" has the same vowel sound as the word….
(a) bring (b) peace (c) kill (d) head

50. In the word "Police", the stress falls on …..
(a) the first syllable (b) the second syllable (c) both the syllable (d) no syllable

Section II (50x2=100)

51. The total number of non-empty proper subsets of the set $A = \{1,2,3\}$ is …
(a) 3 (b) 8 (c) 6 (d) 1

52. If a function $f(x)$ is defined by $f(x) = \frac{x-|x|}{x+2|x|}$ then the value of $f(-1)$ is ...
(a) 1 (b) 0 (c) -1 (d) -2

53. If $\tan\theta \tan 2\theta = 1$ .Then the general value of θ are given by …
(a) $(n\pi + 1)\frac{\pi}{2}$ (b) $(2n + 1)\frac{\pi}{6}$ (c) $(2n + 1)\frac{\pi}{4}$ (d) $(n\pi + 1)\frac{\pi}{6}$

54. The value of $\sin^{-1} x + \cos^{-1} x$ is…..
(a) 1 (b) π (c) $\frac{\pi}{2}$ (d) $\frac{\pi}{4}$

55. In any triangle if $\tan A + \tan B + \tan C = 6$ and $\tan A \tan B = 2$. Then the value of $\tan A + \tan B$ is……
(a) 3 (b) 2 (c) 4 (d) 9

56. If the lines $2x + 3y = 9$ and $3x + ky = 5$ are perpendicular then what will be the value of k?
(a) 2 (b) 1 (c) -1 (d) -2

57. If two lines represented by $ax^2 + 2hxy + by^2 = 0$ are parallel then…..
(a) $h^2 - ab = 0$ (b) $h^2 - ab > 0$ (c) $h^2 - ab < 0$ (d) $h^2 - ab \neq 0$

58. The distance from the origin to the centre of the circle which touches the x axis and y axis at (1,0) and (0,1) respectively is ……
(a) 1 (b) 2 (c) $\sqrt{2}$ (d) $\frac{1}{\sqrt{2}}$

59. If e denotes the eccentricity of the hyperbola. Then the value of e is……

(a) < 1 (b) i (c) 1 (d) > 1

60. The direction cosine of the normal to the plane $2x + y + 3z - 5 = 0$ are ……..

(a) $\frac{2}{\sqrt{14}}, \frac{1}{\sqrt{14}}, \frac{3}{\sqrt{14}}$ (b) $\frac{1}{\sqrt{14}}, \frac{1}{\sqrt{14}}, \frac{1}{\sqrt{14}}$ (c) $\frac{2}{\sqrt{12}}, \frac{1}{\sqrt{12}}, \frac{3}{\sqrt{12}}$ (d) $\frac{2}{\sqrt{13}}, \frac{1}{\sqrt{13}}, \frac{3}{\sqrt{13}}$

61. The value of $\lim_{x\to 0} x \sin \frac{1}{x}$ is …….
(a) -1 (b) 0 (c) 1 (d) does not exist

62. The derivative of $\log|x|$ with respect to x for $x < 0$ is ….

(a) $\frac{1}{|x|}$ (b) $-\frac{1}{|x|}$ (c) $\frac{1}{x}$ (d) $-\frac{1}{x}$

63. The value of $-\int_e^1 \frac{1}{x} dx$ is .....
(a) 1 (b) 0 (c) -1 (d) 2

64. The graph of the function $y = 4x^2 + 2x + 3$ is concave ….
(a) up ward (b) down ward (c) right ward (d) left ward

65. $\int_0^2 |x - 1| dx$ is ……..

(a) 0 (b) 1 (c) 2 (d) 3

66. When some detergent is added to water, the surface tension …..
(a) remains unaffected (b) increases (c) decreases (d) may increase or decrease

67. If P represents pressure, c represents speed of light and Q represents energy striking a unit area per second, then non-zero integers x, y, and z, such that $P^xQ^yc^z$ is dimensionless, are…..
(a) x = 1, y = 1, z = -1 (b) x = 1, y = -1, z = 1 (c) x = -1, y = 1, z = 1 (d) x = 1, y = 1, z = 1

68. When two bodies move towards each other with constant speeds, the distance between them decreases at the rate of 6 m/s. If they move in the same direction with the same speeds, the distance between them increases at the rate of 4 m/s. Their speeds are….
(a) 5 m/s and 1 m/s (b) 3 m/s and 3 m/s (c) 4 m/s and 2 m/s (d) 2m/s and 4 m/s

69. The displacement of a body of mass 2 kg as a function of time is given by x = 2t2 + 5, where x is in meter and t in seconds. The increase in its kinetic energy, one second after the start of motion is …

(a) 8J (b) 16J (c) 32J (d) 64J

70. A weightless thread can bear tension up to 3.7 kg weight. A stone of mass 500 gm is tied to it and revolved in a circular path of radius 4m in a vertical plane. If g = 10 m/s^2, the maximum angular velocity of the stone will be…

(a) 4 radians/sec (b) 16 radians/sec (c) √21 radians/sec (d) 2 radians/sec

71. Two springs fixed at one end are stretched by 5 cm and 10 cm respectively, when masses 0.5 kg and 1 kg are suspended at their lower ends. When displaced slightly from their mean positions and released they will oscillate with time periods in the ratio…

(a) 1:√2 (b) √2:1 (c) 2:1 (d) 1:2

72. The following four wires are made of the same material. Which of these will have the largest extension when the same tension is applied?

(a) Length = 50 cm, diameter = 0.5 mm (b) Length = 100 cm, diameter = 1 mm
(c) Length = 200 cm, diameter = 2 mm (d) Length = 400 cm, diameter = 3 mm

73. An electron of charge e coulomb passes through a potential difference of V volts. Its energy in joules will be ….

(a) V/e (b) eV (c) e/V (d) V

74. The electric intensity E, current density j and conductivity σ are related as …

(a) j =σE (b) j = E/σ (c) jE = σ (d) $j = \sigma^2 E$

75. Two resistors of 500 ohm and 300 ohm are connected in series with a battery of emf 20V. A voltmeter of resistance 500 ohm is used to measure the p. d. across the 500 ohm resistor. The error in the measurement is ……

(a) 1.4 V (b) 2.4 V (c) 3.4 V (d) 4.4 V

76. A 60 W bulb operates on 220 V supply. The current flowing through the bulb is …….

(a) 11/3 amp (b) 3/11 amp (c) 3 amp (d) 6 amp

77. The photoelectric work function of metal is 1eV. Light of wavelength 3000 Angstrom falls on it. The photoelectrons will come out with approximate speed equal to …….

(a) 10 m/s (b) 10^2 m/s (c) 10^4 m/s (d) 10^6 m/s

78. A potential difference of 42 kV is used in an X-ray tube to accelerate electrons. The maximum frequency of X- radiations produced is ……..

(a) 10^{19} Hz (b) 10^{18} Hz (c) 10^{16} Hz (d) 10^{20} Hz

79. If 20 gm of a radioactive substance reduces to 10 gm in 4 minutes, then in what time will 80 gm of the same substance reduce to 10 gm?
(a) 8 min (b) 12 min (c) 16 min (d) 20 min

80. In a p type semiconductor the majority charge carriers are ……..
(a) Electrons (b) Holes (c) Neutrons (d) Protons

81. The amount of charge to deposit 24 g of Mg from $MgCl_2$ solution is ….
(a) 1 F (b) 2 F (c) 96500 C (d) 48250 C

82. The number of unpaired electrons in Cr^{+++} ion are …….
(a) 6 (b) 2 (c) 3 (d) 1

83. The equivalent weight of KMnO4 (molecular weight M) in acidic medium is ……..
(a) M/5 (b) M/3 (c) M/2 (d) M

84. The number of atoms present in 0.1 mol of SO_2 is ……
(a) 3 (b) $3N_A$ (c) $0.3N_A$ (d) $0.1N_A$

85. The solubility of AgCl will be minimum in
(a) 0.01M NaCl (b) 0.01 M $CaCl_2$ (c) Pure water (d) 0.001M $AgNO_3$

86. Which is covalent compound
(a) HCl (b) NaCl (c) $MgCl_2$ (d) NaHCO3

87. Which one is correct
(a) pH of acid may be zero (b) pOH of acid may be 4.74
(c) pH of weak base may be 13.5 (d) pH meter cannot measure the pH of weak acid

88. The mass of pure marble required to neutralize 40 mL of 0.5M HCl solution?
(a) 2 g (b) 4 g (c) 8 g (d) 1 g

89. The correct order of acidic strength is ……..
(a) HI>HBr>HCl>HF (b) HI<HBr<HCl<HF (c) HI>HBr=HCl>HF (d) HI>HBr>HCl=HF

90. Which element has higher tendency to lose electrons?
(a) K (b) Be (c) S (d) F

91. A heteroatom in pyrrole is ……
(a) N (b) S (c) O (d) P

92. Possible functional isomers of $C_2H_4O_2$ are ….
(a) Aldehyde and ketone (b) Carboxylic acid and ester
(c) Ester and acid anhydride (d) Acid anhydride and carboxylic acid

93. Which is arometic compund ?

(a) Acetic acid (b) Acetone (c) Furan (d) Formalehyde

94. Benzene when treated with ethanoylchloride in the presence of anhydrous aluminium chloride yields …

(a) Toluene (b) Ethylbenzene (c) Acetophenone (d) Benzophenone

95. Functional group of ester is ….

(a) RCOCl (b) –C=O (c) –CO (d) $-CO_2-$

Read the passage carefully and answer the questions that follow (Q.N. 96-100):

Nepal is a country with a very high incidence of son preference. Sons are economic insurance against the insecurities of old age. They ritually open the gateway to heaven by performing the death rites for their parents and they carry on the family name and legacy. Daughters, however, are to be given away in marriage, to care for their husband's property. In the considerations of many parents, daughter's economic value is restricted to their childhood years and investment in future, such as education and often health care, are poor investments. There is a popular saying in rural areas, "to get a girl is watering a neighbour's tree". Thus, if the girl baby survives until early childhood, she faces neglect. Although they receive the same care and nutrition as boys when infants, older girls often receive less health care and less food resulting in higher mortality rates than boys, and as adolescents, Nepal's girl children face early marriage and pregnancy.

96. How do sons open the gateway to heaven?

(a) They open the gateway to heaven by performing death rites for their parents.
(b) They open the gateway to heaven by carrying on the family name and legacy
(c) They open the gateway to heaven by insuring their parents against old age insecurities
(d) They open the gateway by performing filial rights

97. Why do parents invest less money in their daughters?

(a) because daughters survive less long than the sons
(b) because daughters go away to their husband's house after their marriage
(c) because daughters do not care for them
(d) because daughters water their neighbour's tree.

98. What does it mean, "To get a girl is watering a neighbour's tree"?

(a) It means to water a neighbour's tree.
(b) It means to get a girl to water a neighbour's tree.
(c) It means that when parents invest in a daughter's care, their investment is nearly wasted because she belongs to her husband after her marriage.
(d) To get a girl means a complete ruin as she defames her parents.

99. Why is a girl's mortality rate higher than a boy's?

(a) Her mortality rate is higher than a boy's for want of affection.
(b) Her mortality rate is higher than a boy's because when older she is given less health care and less food by her parents.
(c) Her mortality rate is higher because of her inability to grow healthier.
(d) Her mortality rate is naturally higher than a boy's.

100. What problem do adolescent girls face?

(a) They receive less care during their infancy
(b) Although they receive the same care and food as boys during their infancy, they do not receive them when older.
(c) As adolescent girls, they face early marriage and become pregnant.
(d) They lose their parent's house because of their marriage.

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Section I (50x1=50)

1. The angle between the vectors $\vec{a} = \vec{\imath} + \vec{\jmath} + \vec{k}$ and $\vec{b} = \vec{\imath} - \vec{\jmath} + \vec{k}$ is
(a) $\cos^{-1}(\frac{1}{3})$ (b) $\cos^{-1}(\frac{1}{\sqrt{3}})$ (c) $\cos^{-1}(3)$ (d) $\cos^{-1}(\sqrt{3})$

2. If$\vec{a} = \vec{\imath} + \vec{\jmath} - \vec{k}$ and $\vec{b} = \vec{\imath} - \vec{\jmath} + \vec{k}$ then the magnitude of the vector $\overrightarrow{2a} + 3\vec{b}$ is
(a)$\sqrt{3}$ (b) 9 (c) 3 (d) $3\sqrt{3}$

3. If $A = \begin{bmatrix} 1 & -1 \\ 1 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} -1 & 0 \\ 0 & 1 \end{bmatrix}$, Then the matrix AB is equal to

(a)$\begin{bmatrix} -1 & -1 \\ -1 & 0 \end{bmatrix}$ (b)$\begin{bmatrix} 1 & -1 \\ 1 & 0 \end{bmatrix}$ (c)$\begin{bmatrix} 1 & 1 \\ 1 & 0 \end{bmatrix}$ (d)$\begin{bmatrix} 0 & -1 \\ 1 & 1 \end{bmatrix}$

4. A square matrix ***A*** is said to be a singular matrix if
(a)$|A| = 1$ (b) $|A| = 0$ (c) $|A| \neq 1$ (d) $|A| > 1$

5. The value of $i + i^2 + i^3$ is
(a) $2i - 1$ (b)$2i + 1$ (c) -1 (d) 1

6. The product of the roots of the equation $3x^2 - 2x + 1$ is
(a) $\frac{1}{3}$ (b) $-\frac{1}{3}$ (c) $-\frac{2}{3}$ (d) $\frac{2}{3}$

7. If a, b, c are in G.P. then a^k, b^k, c^k are in
(a) A.P. (b) G.P. (c) H.P. (d) A.G.P.

8. In how many ways 8 guests and a host be seated in a circular table
(a)7! (b) 8! (c) 9! (d)10!

9. If n is a positive integer, then how many terms are there in the expansion of $(x + a)^n$?
(a) $n - 1$ (b) n (c) $n + 1$ (d) n^2

10. The value of $\frac{1}{1!}+\frac{1}{2!}+\frac{1}{3!}+\cdots$ is

(a) e (b) $e+1$ (c) $e-2$ (d) $e-1$

11. Apparent frequency received by listener when source of sound and listener are approaching each other is….

(a) $\frac{(v-v_s)}{(v-v_l)}\times f$ (b) $\frac{(v+v_l)}{(v-v_s)}\times f$ (c) $\frac{(v-v_s)}{(v+v_l)}\times f$ (d) $\frac{(v+v_s)}{(v+v_l)}\times f$

12. At same temperature and pressure, velocity of sound is highest in…….....

(a) hydrogen (b) oxygen (c) nitrogen (d) carbon dioxide

13. Expression for lateral shift is…….....

(a) $\frac{t}{Cosr}Sin(i-r)$ (b) $\frac{t}{Cosr}Sin(i+r)$ (c) $\frac{t}{Cosr}Sin(r-i)$ (d) $\frac{t}{Sinr}Sin(i-r)$

14. When light travels from air into water……..

(a) frequency decreases (b) frequency increases

(c) wavelength increases (d) wavelength decreases

15. When Young's double slit experiment is carried inside water with same geometry, fringe width…….....

(a) increases (b) decreases

(c) remains same (d) first increases and then decreases

16. At 0^0C, kinetic energy of gas molecule is…….....

(a) zero (b) negative (c) positive (d) none of these

17. Two bodies will be in thermal equilibrium when they have same…….....

(a) heat energy (b) specific heat capacity

(c) temperature (d) thermal conductivity

18. Isobaric process takes place at constant…….....

(a) pressure (b) volume (c) temperature (d) none of these

19. Ideal gas is considered under…….....

(a) high pressure and high temperature

(b) high pressure and low temperature

(c) low pressure and low temperature

(d) low pressure and high temperature

20. Entropy change during adiabatic process is…….....

(a) zero (b) positive (c) negative (d) infinite

21. Hardness of water is due to…….....

(a) Sodium bicarbonate (b) Calcium carbonate

(c) Potassium carbonate (d) Magnesium chloride

22. Haber's process is used for the manufacture of ….....
(a) Nitrogen (b) Ammonia (c) Hydrogen (d) Nitric oxide

23. Which of the following is amorphous form of Sulphur?
(a) Rhombic (b) Monoclinic (c) Milk of Sulphur (d) Beta Sulphur

24. …….....changes the starch emulsion into blue-black color
(a) Fluorine (b) Chlorine (c) Bromine (d) Iodine

25. Tincture of iodine is.....
(a) KI (b) KI +I_2 (c) KI + I_2 + C_2H_5OH (d) KI + I_2 + Ti

26. Haematite is an ore of .....
(a) Iron (b) Copper (c) Silver (d) Magnesium

27. When brine solution is saturated with ammonia in presence of carbon dioxide gas, the resulting products is/are .....
(a) Ammonium bicarbonate
(b) Sodium bicarbonate
(c) Ammonium bicarbonate or sodium bicarbonate
(d) Ammonium bicarbonate and sodium bicarbonate

28. Steel is an alloy of iron containing …….....percent of carbon with possibly traces of phosphorus, sulphur, and silicon.
(a) 2 to 4 (b) 0.2 to 2 (c) 0.02 to 0.2 (d) 0.002 to 0.02

29. Blistering of blister copper is due to .....
(a) Inherent property
(b) Dissolved gas molecules
(c) Escaping of dissolved gas from molten mass
(d) The presence of oxide moieties

30. Which of the following compound shows thermochromic property?
(a) FeO (b) CuO (c) Na_2O (d) ZnO

31. Had she run away, she …… by police?
(a) Won't be caught (b) Wouldn't have been caught
(c) Wouldn't be caught (d) Will be caught

32. Which of the following word has different vowel sound than the rest?
(a) Pear (b) Pair (c) Care (d) Rare

33. Which of the following is true for the word 'Collection'?
(a) It contains three syllables and the first syllable is stressed.
(b) It contains four syllables and the second syllable is stressed
(c) It contains three syllables and the second syllable is stressed.
(d) It contains four syllables and the last syllable is stressed.

34. My boss visits the office ….....the morning.
(e) at (b) on (c) in (d) with

35. I am running out … .....money so I could not pay your debt this month.
(a) up (b) of (c) with (d) in

36. Which of the following is the appropriate adjective pattern?
(a) attractive new Japanese car
(b) new attractive Japanese car
(c) Japanese new attractive car
(d) attractive Japanese new car

37. No one told me that …..... 's going to be a party.
(a) it (b) there (c) here (d) where

38. Which of the following is the plural form of word **crisis?**
(a) crisises (b) crisis (c) crises (d) crisisses

39. Don't <u>put off</u> making a decision. Which of the formal word can replace the underlined word in the sentence?
(a) solve (b) calculate (c) organize (d) postpone

40. You should not wake someone up when they're….....walking.
(a) night (b) dream (c) day (d) sleep

41. I am interested in. I don't want to study it, ….....
(a) however (b) though (c) although (d) even though

42. Identify the correct order of the determiners in the sentence.
(a) All our many hopes were kept alive by her encouraging words.
(b) Our many all hopes were kept alive by her encouraging words.
(c) Many all our hopes were kept alive by her encouraging words.
(d) Our all many hopes were kept alive by her encouraging words.

43. Both the China institute and the Brooklyn Museum …..... Asian art.
(a) are (b) has (c) is (d) have

44. Most people in Argentina …..... Spanish.
(a) to speak (b) speak (c) speaking (d) speaks

45. Dr. Murray Salby, a well-known climatologist, …..... a paper about the causes of global warming.
(a) are writing (b) write (c) writes (d) is writing

46. The search engine BackRub….....Google in 1998.
(a) became (b) becomes (c) become (d) was becoming

47. In his youth he was practically rolling in money. The underlined idiom is closest to the meaning:
(a) spending more than his income (b) wasting a lot of money
(c) Very rich (d) borrowing money liberally

48. I don't want to stifle your creativity, but your ideas for the brochure are too complicated. Let's try to make it very simple. The underlined word is closest to the meaning:
(a) to let go of something (b) to prevent something form happening
(c) to support something strongly (d) to make something clear

49. Which of the following is the correct sentence?
(a) Rohan I was wondering where, the cookies were.
(b) Rohan I was wondering where the cookies, were.
(c) Rohan, I was wondering where the cookies were.
(d) Rohan I was wondering, where the cookies were.

50. The passive of ' do not waste the time.' Is…....
(a) Let the time be not wasted.
(b) Let not the time be wasted.
(c) Let the time not wasted.
(d) Let the time not be wasted.

Section II (50x2=100)

51. If A and B are two sets having 5 and 17 elements respectively and 2 elements are common. How many elements are there in the set $A \cup B$?
(a) 3 (b) 15 (c) 20 (d) 12

52. If a function $f(x)$ is defined by $f(x) = \frac{x^2-|x|}{1+2|x|}$ then the value of $f(-1)$ is
(a)1 (b) 0 (c) -1 (d) $\frac{2}{3}$

53. If $\sin\theta = 1$.Then the general value of θ are given by
(a) $n\pi + \frac{\pi}{2}$ (b) $n\pi - \frac{\pi}{2}$ (c) $n\pi$ (d) $n\pi + (-1)^n \frac{\pi}{2}$

54. The value of $\sin^{-1} x + \cos^{-1} x$ is
(a) 1 (b) π (c) $\frac{\pi}{2}$ (d) 2

55. In any triangle if $\tan A + \tan B + \tan C = 6$ and $\tan A \tan B = 3$. Then the value of $\tan A + \tan B$ is...
(a) 4 (b) 2 (c) 3 (d) 9

56. If the lines $3x + 4y = 9$ and $4x + ky = 5$ are perpendicular then what will be the value of k?
(a) 3 (b)-3 (c) 4 (d) -4

57. The condition for a homogenous equation $ax^2 + 2hxy + by^2 = 0$ to represent a real and coincident lines is .....

(a) $h^2 - ab = 0$ (b)$h^2 - ab > 0$ (c)$h^2 - ab < 0$ (d)$h^2 = ab$

58. The centre of the circle $x^2 + y^2 - 2x + 6y + 18 = 0$ is .....

(a) $(-1,3)$ (b) $(1,3)$ (c) $(-1,-3)$ (d) $(1,-3)$

59. If e denotes the eccentricity of the parabola $x^2 - 4x - 8y + 12 = 0$. Then the value of e is.....

(a) < 1 (b) ∞ (c) 1 (d) > 1

60. If the direction ratios of a line are 4,5,6. Then its direction cosines are .....

(a) $\frac{4}{\sqrt{77}}, \frac{5}{\sqrt{77}}, \frac{6}{\sqrt{77}}$ (b) $\frac{4}{\sqrt{77}}, -\frac{5}{\sqrt{77}}, \frac{6}{\sqrt{77}}$ (c) $-\frac{4}{\sqrt{77}}, \frac{5}{\sqrt{77}}, \frac{6}{\sqrt{77}}$ (d) $\frac{4}{\sqrt{77}}, -\frac{5}{\sqrt{77}}, -\frac{6}{\sqrt{77}}$

61. The value of $\lim_{x\to\infty} x \tan\frac{1}{x}$ is.....

(a) -1 (b) 0 (c) 1 (d) does not exist

62. The derivative of $\cos^{-1} x$ is.....

(a) $\frac{1}{\sqrt{1-x^2}}$ (b) $-\frac{1}{\sqrt{x^2-1}}$ (c) $\frac{1}{1-x^2}$ (d)$-\frac{1}{\sqrt{1-x^2}}$

63. The value of $\int_1^e \frac{1}{x} dx$ is ....

(a) 1 (b) 0 (c)-1 (d) 2

64. If the function $f(x) = 4x^2 + 2x + 3$ has a local minima at x_0 then the value of x_0 is

(a) $\frac{1}{4}$ (b) $-\frac{1}{4}$ (c) $\frac{1}{2}$ (d) $-\frac{1}{2}$

65. The area bounded by the lines $y = x, x = 1$ and the x axis is

(a) 1 (b) 2 (c) $\frac{1}{2}$ (d) $\frac{1}{4}$

66. If velocity, force and time are taken as fundamental units then dimensional formula of mass is…

(a)$[FT]$ (b)$[FTV^{-1}]$ (c) $[FTV]$ (d) $[FTV^{-2}]$

67. Angle between $\vec{A} = (3\hat{i} + 4\hat{j} - 5\hat{k})$ and $\vec{B} = (3\hat{i} + 4\hat{j} - 5\hat{k})$ is.....

(a) 0^0 (b) 30^0 (c) 60^0 (d) 90^0

68. A lift with mass 1500kg supported by string is moving upward with acceleration 1.8ms^{-2}. The tension in the string is…

(a) 1770N (b)17700N (c)15000N (d)16000N

69. If angular velocity of earth increases then value of g at poles…..

(a) increases (b) decreases (c) remains same (d) none of these

70. Time period T of simple pendulum inside lift moving upward with acceleration g/2 becomes…

(a) $\frac{\sqrt{3}}{2}T$ (b) $\frac{\sqrt{3}}{4}T$ (c) $\frac{\sqrt{3}T}{6}$ (d) $\sqrt{\frac{2}{3}}T$

71. Young's modulus for perfectly plastic body is…

(a) 0 (b)1 (c) ∞ (d) some finite value

72. An ice berg of density 0.92g/cc is floating in water of density 1.03g/cc. The percentage volume of iceberg outside water is….

(a) 11% (b) 72% (c) 79% (d) 89%

73. Ratio of specific charge of electron to that of beta-particle is….

(a)1:3 (b) 1:1 (c) 2:1 (d) 4:1

74. The ratio of frequency of electron in third orbit to second orbit is…

(a) 2:3 (b) 4:5 (c) 4:9 (d)6:5

75. Nuclear density increases with…..

(a) increase in mass number (b) increase in atomic number

(c) increase in number of proton (d) none of these

76. A radioactive element has half -life 15 years. The fraction will decayed in 30 years is….

(a) 1:2 (b) 2:3 (c) 3:4 (d) 4:5

77. Discharging equation of capacitor is.....

(a) $q = q_0 e^{\frac{t}{RC}}$ (b) $q = q_0 e^{-\frac{t}{RC}}$ (c) $q = q_0 e^{\frac{-tC}{R}}$ (d) $q = q_0 e^{\frac{-tR}{C}}$

78. Vector form of Biot-Savart law is…

(a) $d\vec{B} = \frac{\mu_0 I(d\vec{l} \times \vec{r})}{4\pi r^3}$ (b) $d\vec{B} = \frac{\mu_0 I(\vec{r} \times d\vec{l})}{4\pi r^3}$

(c) $d\vec{B} = \frac{\mu_0 I(\vec{r} \times d\vec{l})}{4\pi r^2}$ (d) $d\vec{B} = \frac{\mu_0 I(d\vec{l} \times \vec{r})}{4\pi r^2}$

79. When two bulbs rated 40w, 220v and 60w, 220v are connected in parallel with 220v supply,……

(a) 40w will glow brighter than 60w bulb

(b) 60w will glow brighter than 40w bulb

(c) both bulbs glow equally brighter

(d) both bulbs burn out

80. Peak and r.m.s. value of A.C. are related as….

(a) $I_{r.m.s.} = 70.7\% I_0$ (b) $I_{r.m.s.} = 63.7\% I_0$ (c) $I_{r.m.s.} = 67.7\% I_0$ (d) $I_{r.m.s.} = 67.3\% I_0$

81. Chloride of a metal 'M' is MCl_4. The salt of the metal when treated with concentrated nitric acid is….

(a) M_3N_4 (b) M_3NO_3 (c) M_4NO_3 (d) $M(NO_3)_4$

82. Which of the following set of quantum number designation (in the order of *n, l, m, s*) is incorrectly expressed?

(a) 4, 2, 1, +1/2 (b) 4, 2, 1, –1/2 (c) 4, 2, 1, 0 (d) 4, 3, 1, +1/2

83. Which of the following compound has exact numbers of valence electrons as much as demanded by octet rules?

(a) $AlCl_3$ (b) $SiCl_4$ (c) PCl_5 (d) SF_6

84. Complete reduction of one mole permanganate ions in acidic medium is possible by ….mole of electrons .

(a) 5 (b) 3 (c) 2 (d) 1

85. The number of atoms present in 0.1 mol of water is…

(a) 3 (b) 0.3 (c) $0.3N_A$ (d) $0.1N_A$

86. 4 gram of a metal displaces 10.8 g of silver from silver nitrate solution. The equivalent weight of the metal is .....

(a) 108 (b) 40 (c) 4 (d) 10.8

87. 5A current was passed into a voltameter containing copper sulphate solution for 15 minutes. Assuming 50% efficacy of the process, the amount of copper deposited during the process is….

(a) 1.480 g (b) 0.740 g (c) 0.370 g (d) 2.960 g

88. Solubility of calcium carbonate is 3.049×10^{-4}. What is the solubility product of that salt?

(a) 9.3×10^{-8} (b) 3.049×10^{-4} (c) 3.049×10^{-2} (d)3.049×10^{-16}

89. What is the mass of calcium carbonate required to neutralize 40 mL of seminormal HCl solution?

(a) 8 g (b) 4 g (c) 2g (d) 1 g

90. 10 mL of decinormal ammonium hydroxide was mixed with 20 mL of 0.05M hydrochloric acid. The pH of the resulting solution after mixing is…

(a) 7 (b) Less than 7 (c) More than 7 (d) Amphoteric

91. Pyrrole consists of …..... as a heteroatom

(a) N (b) S (c) O (d) P

92. Functional group of ester and acid chloride are……...respectively.

(a) HCOOR and RCOCl (b) –C=O and –COCl (c) $–CO_2$ and –CO (d) $–CO_2-$ and –COCl

93. Which of the following pair of organic compounds show functional isomerism?
(a) Alcohol and aldehyde (b) Alcohol and ether
(c) Ether and aldehyde (d) Aldehyde and ester

94. …….....are more likely to be obtained on heating a product formed upon introducing streams of ozone into an alkene solution in organic medium.
(a) Aldehyde (b) Ketone (c) Aldehyde and ketone (d) Aldehyde or ketone or mixture of both

95. Sodium benzoate upon heating in presence of sodalime gives…. as a major product.
(a) Benzene (b) Toluene (c) Benzoic acid (d) azobenzene

Read the passage carefully and answer the questions that follow (for Q.N. 96-100)

It is estimated that over one million people volunteer overseas each year. Many of these volunteers travel thousands of miles to other countries all across Africa, Asia, and Latin America. They experience foreign cultures and visit beautiful places. However, volunteering in a foreign country is not just for the fun of international travel. In fact, people volunteer overseas for several important reasons.

One of the main reasons people volunteer overseas is to give back to those in need. For example, many volunteers travel to poorer countries where people don't have basic conveniences that are found in other countries. Some build wells to give small villages access to clean water. Others set up medical clinics so people can get treatment for common illnesses like the flu. Many of these volunteers come from countries with good schools and they want to give others the same educational opportunities. Overall, these volunteers feel they have a responsibility to people who deserve the same opportunities they have back home.

Second of all, many volunteers feel that travelling overseas can improve their job skills. These volunteers can add their international experiences to their resumes. This is important because many companies today are looking for employees who have a global perspective. Volunteering overseas also teaches people how to work effectively on a team, which helps when applying for future jobs. Learning about teamwork in a foreign setting will make these volunteers stand out from the crowd when they apply for jobs.

A third reason people volunteer in foreign countries is because they want to immerse themselves in a foreign culture. Living in another country is one of the most rewarding experiences a person can have. Being a part of a new culture for even a short period of time will bring these volunteers a sense of belonging and a deeper level of understanding of how people live on other parts of the world.

In addition to experiencing the new country volunteers also get time away from their modern, fast paced lifestyles back home. The majority of volunteers come from Canada, the United States and the United Kingdom, where people are often rushing around the feeling stressed. When these volunteers

spend time in a country with a slower pace of life, they feel less stress and can enjoy a different life style. This shows that volunteering abroad can be good for both the mind and the body.

Overseas volunteers don't just travel for fun. They travel with a purpose. All these volunteers travel because they want to help others in some way. At the same time, they are gaining valuable work and life experiences. It's hard to ask for anything more than that.

96. Many volunteers travel to poorer countries so that
(a) they could know how people work.
(b) they can work with minimum facilities like them.
(c) they can provide some assistance to them.
(d) they can learn survival skills.

97. Which of the following is not associated with contributing to improving the job skills of the volunteers?
(a) It adds skills to their CV.
(b) It increases their teamwork spirit.
(c) It makes them aware about the global perspective.
(d) It helps them learn the foreign culture.

98. The word 'conveniences' in the second paragraph is closest to the meaning:
(a) amenities (b) ease (c) communicable (d) transportable

99. The phrasal verb 'stand out' in the third paragraph can be replaced by
(a) to be effective
(b) to be much better that others
(c) to show
(d) to prove

100. How is volunteering good for mind and body according to the passage?
(a) It helps them to learn new culture.
(b) It improves their job skills.
(c) They help people in need.
(d) It keeps them in slower pace of life.

Far-western University
Faculty of Engineering
BE Entrance Examination

Full Marks: 150
Time: 3 hours

Attempt all questions

Read the following questions and write down the correct option **a, b, c,** or **d** in the answer sheet provided. In section I each question carries **1** mark and in section II each question carries **2** marks.

Section I (50x1=50)

1. If roots of the equation $8x^3 - 14x^2 + 7x - 1 = 0$ are in G.P. then the roots are

a) 2, 4, 8 b) 1, $\frac{1}{2}$, $\frac{1}{4}$ c) 4, 8, 16 d) 3, 9, 27

2. Let $a > 0$ and $b > 0$. Then $\sqrt{-a}\sqrt{-b}$ is

a) $\sqrt{ab}$ b) $i\sqrt{ab}$ c) $-\sqrt{ab}$ d) either (a) or (c)

3. If the matrix $\begin{pmatrix} -x & x & 2 \\ 2 & x & -x \\ x & -2 & -x \end{pmatrix}$ is nonsingular, then possible result is

a) $x = \pm 2$ b) $-2 < x < 2$ c) $-2 \leq x \leq 2$ d) $x \neq \pm 2$

4. 7 persons can be arranged in a round table so that 2 of them never come together is

a) $4 \times 5!$ b) $5 \times 4!$ c) $(5 \times 4)!$ d) $(5 + 4)!$

5. It is necessary to pass all 5 subjects to pass an exam. Then a student may fail in

a) 30 ways b) 31 ways c) 32 ways d) 33 ways

6. If a, b, c are in A.P. and $x > 0$. Then x^a, x^b, x^c are in

a) A.P. b) G.P. c) H. P. d) None

7. Let **a** and **r** be the first term and common ratio respectively of an infinite G.S. If its sum is **4** and the second term is $\frac{3}{4}$, then

a) a= $\frac{4}{7}$, r = $\frac{7}{3}$ b) a=2 , r = $\frac{3}{8}$ c) a = $\frac{3}{2}$, r = $\frac{1}{4}$ d) a=3, r = $\frac{1}{4}$

8. The coefficient of x^{99} in the expansion of $(x + 1)(x + 2) \ldots (x + 100)$ is

a) 5050 b) 2525 c) 1000 d) none

9. If $\vec{a}$ and $\vec{b}$ be two vectors such that $\vec{a}.\vec{b} = 0$ and $\vec{a} \times \vec{b} = 0$ then

a) The vectors are parallel to each other b) the vectors are perpendicular to each other

c) At least one of them is a null vector d) none of these

10. If $(\vec{a} \times \vec{b})^2 + (\vec{a}.\vec{b})^2 = 144$ and $|\vec{a}|$ =4, then $|\vec{b}|$=

a) 3 b) 6 c) 9 d) 12

11. If tuning fork of frequency 220Hz produces sound wave of wavelength 1.5m in air at N.T.P. then increase in wavelength when air temperature is 27^0C is……..

a) 0.07m b) 0.07cm c) 0.7m d) 0.7cm

12. Apparent frequency received by the listener when source of sound and listener approaching each other is……

a) $\frac{(v+v_l)}{(v+v_s)} \times f_0$ b) $\frac{(v-v_l)}{(v-v_s)} \times f_0$ c) $\frac{(v-v_l)}{(v+v_s)} \times f_0$ d) $\frac{(v+v_l)}{(v-v_s)} \times f_0$

13. Expression for pressure amplitude can be written as….

a) $\frac{2\pi v^2 \rho^2 A}{\lambda}$ b) $\frac{\pi v^2 \rho A}{\lambda}$ c) $\frac{2\pi v^2 \rho A}{\lambda}$ d) $\frac{4\pi v^2 \rho A}{\lambda}$

14. Our retina is most sensitive to……colour.

a) red b) yellow c) green d) blue

15. According to Brewster, polarizing angle and angle of refraction are related as……

a) $\theta_p + r = \pi$ b) $\theta_p - r = \pi$ c) $\theta_p = r - \frac{\pi}{2}$ d) $\theta_p + r = \frac{\pi}{2}$

16. Entropy change in adiabatic process is……..

a) positive b) negative c) zero d) none of these

17. Ideal gas equation is valid under……

a) high temperature and high pressure b) low temperature and low pressure

c) low temperature and high pressure d) high temperature and low pressure

18. Variation of density with temperature can be written as…….

a) $\rho_2 = \rho_1[1 + \gamma(\theta_2 - \theta_1)]$ b) $\rho_2 = \rho_1[1 + \gamma(\theta_1 - \theta_2)]$

c) $\rho_2 = \rho_1\left[1 - \frac{1}{2}\gamma(\theta_1 - \theta_2)\right]$ d) $\rho_2 = \rho_1\left[1 + \frac{1}{2}\gamma(\theta_1 - \theta_2)\right]$

19. Dimensional formula of latent heat is……

a) $[L^2T^2]$ b) $[L^2T^{-2}]$ c) $[L^{-2}T^2]$ d) $[LT^2]$

20. Transfer of heat takes place in fluid through….

a) conduction b) radiation c) convection d) both a & b

21. The Hydrogen Phosphate of certain metal has formula $MHPO_4$. The formula of metal chloride would be…….

a)MCl_2 b) MCl c)M_2Cl_2 d)MCl_3

22. How much quick lime can be obtained from 25 gm of $CaCO_3$?

a)28 gm b) 56 gm c) 14 gm d) None of the above

23. Concept of quantization of energy was introduced by …..

a) Sommerfeld b) Bohr c)Dalton d)Heisenburg

24. Diamond has …..

a) Ionic bonds b) Co-ordinate bonds c) Covalent and co-ordinate bonds d) Covalent bonds

25. Oxidation number of oxygen in KO_2 is……

a) Zero b) -1/2 c) -1 d) -2

26. The PH of a 10^{-8} molar HCl solution is……

a) 8 b) -8 c) between 7 and 8 d) between 6 and 7

27. Conjugate base of H_2PO_4 is……

a) HPO_4^{2-} b) PO_4^{3-} c)H_3PO_4 d)H_3PO_3

28. The amount of electricity required to deposit 0.2 mole of Ag^+ is ……..

a) 2 x 96500 C b) 96500 C c) 2 x 9650 C d) 965C

29. The weight of anhydrous Sodium Carbonate just enough to neutralize 100 ml of 0.1M HCl will be……..

a) 1.06 gm b) 10.60 gm c) 5.03 gm d) 0.53 gm

30. How many Oxygen atoms are present in 11.2 liters of SO_2 gas at NTP?

a) 6.023×10^{23} b)12.046×10^{23} c) 3.0115×10^{23} d) 6.023×10^{22}

31. She was standing……the entrance

a) at b) in c) on d) to

32. When the thief……(come)……..the police……(arrive)…….there.
a) came, arrived b) had come, had arrived c) came, had arrived d) comes, had arrived

33. The indirect version of 'the seller said, "come on, buy it" is
a) The seller told the customer to come on and buy it.
b) The seller told the customer to buy it
c) The seller said to the customer to buy it
d) The seller persuaded the customer to buy it

34. If you…….invited, I would have come.
a) had b) will have c) have d) have had

35. I ……..... this article by the day after tomorrow
a) will finish b) am to finish c) finish d) will have finished

36. He fell down while he …… the staircase
a) climbed b) had been climbing c) was climbing d) had climbed

37. The negative of "I always appreciate good jobs" is ……..
a) I always do not appreciate good jobs.
b) I never appreciate good jobs
c) I never criticize good jobs
d) I rarely criticize good jobs

38. The simple sentence derived by joining "Ram lifted the gun. He fired at the tiger" is….
a) Ram lifted the gun and fired at the tiger
b) Lifted the gun Ram fired at the tiger
c) Lifting the gun Ram fired at the tiger
d) Having lifting the gun Ram fired at the tiger

39. Wh-questions for "Ram wrote a letter" are……..
a) Who wrote a letter?
b) What did Ram write?
c) Who did Ram write and what he wrote?
d) both a and b

40. neither Ram nor his brothers ……guilty
a) are b) am c)is d)be

41. The tag question of 'come here' is…….
a) Will you? b) do you ? c) shall you ? d) won't you?

42. The opposite of ' qualify' is……..

a) unqualify b) disqualify c) misqualify d) nonqualify

43. Do you mind if I…….here?

a) sit b) will sit c) have sit d) sat

44. The tag question for 'I am running a shop nowadays', is …….

a) amn't I? b) are I c) aren't I d) none of these

45. The past participles of "seek" is …….

a) Seeked b) had seeked c) sought d) none of these

46. Carmen…….when she was only four

a) was dying b) died c) had died d) dies

47. The initial sound in the word 'czech' is realized as the initial sound in ……..

a) size b) chain c) zinc d) cell

48. The final consonant in the word 'vase' is the same as the medial consonant in……..

a) raiser b) closure c) bazaar d) motion

49. The number of syllables is 4 in the word……

a) Society b) chocolate c) Zoological d) respected

50. The word …….is stressed on the third syllable

a) respectable b) accidental c)happily d) temporariness

Section II (50x2=100)

51. The set $A = \{x: x \in R,\ x^2 = 16\ and\ 2x = 6\}$ equals ……

a) $\{-4,\ 4,\ 3\}$ b) $\{4,\ 3\}$ c)$\{\ 3\ \}$ d) null set

52. The range of the function $f(x) = x^2 - 6x + 7$ is

a) (-2, 3) b) $(-\infty, -2)$ c) $(-\infty, \infty)$ d) $[-2, \infty)$

53. In any triangle ABC, if $\sin A: sinB: sinC = 1: 2: 3$ and b = 4 , then the perimeter of the triangle is

a) 8 b) 10 c) 12 d) 14

54. If $\cos^{-1} x + \cos^{-1} y = \frac{\pi}{2}$, then $x^2 + y^2 =$

a) 0 b) 1 c) 2 d) 3

55. The general solution of $tan\theta \ tan2\theta = 1$ is

a) $\frac{\pi}{3}$ b) $6n \pm 1$ c) $(4n \pm 1)\frac{\pi}{6}$ d) $(2n+1)\frac{\pi}{6}$

56. The equation of the straight line through the point (1, 2) whose distance from the point (3, 1) has the greatest possible value is

a) y=2x b) y=x c) y= -2x d) y=-x

57. The equation $ax^2 + 3xy - 7y^2 = 0$ represents two straight lines inclined at an angle π if a=

a) $\frac{7}{9}$ b) $\frac{9}{7}$ c) $-\frac{7}{9}$ d) $-\frac{9}{7}$

58. If the circles $x^2 + y^2 - 9 = 0$ and $x^2 + y^2 + 2ax + 2y + 1 = 0$ touch each other externally, then the value of a is

a) $\frac{3}{4}$ b) $\frac{-3}{4}$ c) $-\frac{4}{3}$ d) $\frac{4}{3}$

59. If a focal chord of the parabola $y^2 = ax$ is $2x - y - 8 = 0$, then the equation of directrix is

a) $x = 16$ b) $x = -16$ c) $x = 4$ d) $x = -4$

60. The equation $\frac{(x-2)^2}{10-p} + \frac{(y+3)^2}{4-p} = 1$ represents an ellipse if

a) $p > 4$ b) $p < 4$ c) $4 \leq p$ d) $p \leq 4$

61. The value of $\lim_{x \to 0} \left[\frac{1+2x}{1-3x}\right]^{1/x}$ is

a) e^5 b) e^6 c) e^7 d) e^8

62. If $y = \frac{x\sqrt{x^2+1}}{2} + \frac{1}{2}\log(x + \sqrt{x^2+1})$ then $\frac{dy}{dx} =$

a) $\sqrt{x^2-1}$ b) $\sqrt{x^2+1}$ c) $\sqrt{1-x^2}$ d) $-\sqrt{x^2+1}$

63. The function $y = \tan^{-1} x$ is increasing in

a) $(0,\infty)$ b) $(-\infty, 0)$ c) $(-\infty, \infty)$ d) $(0, \infty)$

64. The value of $\int_0^2 |x-1|dx$ is

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

65. The area bounded by a curve $y = |x|$, x-axis in between x=-1 and x=1 is

a) 1 sq. units b) 2 sq. units c) 3 sq. units d) none

66. In terms of electrical conductivity and electric field, concentration of free electrons in metallic conductor can be written as….

a) $n = \frac{\sigma E}{e v_d}$ b) $n = \frac{\sigma e E}{v_d}$ c) $n = \frac{\sigma}{e E v_d}$ d) $n = \frac{E}{e \sigma v_d}$

67. LCR series circuit having resistance 100Ω, capacitance 10μF and inductance 1mH has quality factor…..

a) 1 b) 0.1 c) 10 d) 100

68. Diamagnetic substances are……..

a) copper, gold & oxygen b) copper, aluminum & oxygen
c) copper, gold & mercury d) gold, mercury & magnesium

69. A coil with 50 turns having dimension 10cm×10cm is rotated in uniform magnetic field of flux density 0.7 T. Maximum e.m.f. induced in it is….

a)10V b)11V c)12V d)13V

70. Decay equation can be written as…….

a) $e^{2\lambda t}\left(N^2 + N\right) = N_0\left(N_0 + 2e^{\lambda t}\right)$ b) $e^{2\lambda t}\left(N^2 - N\right) = N_0\left(N_0 + 2e^{\lambda t}\right)$
c) $e^{2\lambda t}\left(N^2 + N\right) = N_0\left(N_0 - 2e^{\lambda t}\right)$ d) $e^{2\lambda t}\left(N^2 + N\right) = N_0\left(N_0 + e^{\lambda t}\right)$

71. Relation between transistor parameters α & β is…..

a) $\alpha = \frac{\beta}{\beta - 1}$ b) $\alpha = \frac{\beta + 1}{\beta}$ c) $\alpha = \frac{\beta + 1}{\beta - 1}$ d) $\alpha = \frac{\beta}{\beta + 1}$

72. A lamp of 100watt emits 10% of visible light of wavelength 4000×10^{-10}m. The number of visible photons per second is…….

a) 2×10^{19} b) 3×10^{19} c) 3×10^{19} d) 4×10^{19}

73. The ratio of energies of orbital electrons in 2nd and 3rd orbits of hydrogen is…….

a) 3:2 b) 2:3 c) 2:1 d)1:2

74. If magnitude of resultant vector of two vectors of equal magnitude is equal to the magnitude of either vector then angle between two vectors is……

a) 30^0 b) 40^0 c) 60^0 d) 80^0

75. If body falling freely under gravity from top of tower falls 25m during last second of its fall then height of tower is…….

a) 35m b) 45m c) 55m d) 65m

76. Two masses of 10kg and 15kg tied at two ends of light string are suspended from frictionless pulley. If system is released from rest then speed attained by each mass will be…….

a) $2ms^{-1}$ b) $8\ ms^{-1}$ c) $6\ ms^{-1}$ d) $4\ ms^{-1}$

77. Height of parking orbit is nearly…….

a) 26,000km b) 46,000km c) 36,000km d) 52,000km

78. Hollow cylinder rolling down an inclined plane of inclination 30^0 has an acceleration of…..ms^{-2}.

a) 1.5 b) 2.5 c) 3.5 d) 4.5

79. Negatively charged bob of simple pendulum is allowed to oscillate with positively charged metal plate just below it. The time period of pendulum will ….

a) increase b) decrease

c) remains constant d) first increase and then decreases

80. Aircraft having wing area $50m^2$ is flying horizontally with velocity of air above and below wing $150ms^{-1}$ and $140ms^{-1}$ respectively. If density of air is $1.29kgm^{-3}$ then maximum weight of aircraft is……

a) 93525N b) 93625N c) 93725N d) 93825N

81. The common name of CH_3CH_2COOH is…….

a) Propanoic acid b) propionic acid c) propanone d) propanal

82. Which of the following compound is a heterocyclic compound ?

a) Benzene b) Cyclopropane c) Naphthalene d) Furan

83. The compound that decolorizes Baeyers reagent is

a) C_2H_2 b) C_3H_3 c) CH_4 d) $CHCl_3$

84. Addition of HBr to propene in the presence of benzoyl peroxide gives

a) 1,2-dibromopropane b) 1,3-dibromopropane

c) 1-bromopropane d) 2-bromopropane

85. C_4H_3 on ozonolysis gives propanone and methanal . The compound is

a) 2-methyl-2-butene b) 1-butene c) 2-butene d) 2-methylpropene

86. Which one of the following has highest electro negativity

a) N b) Cl c) O d) S

87. Iron belongs to which block of the periodic table?

a) d-block b) f-block c) s-block d) p-block

88. The metallic character in moving from left to right in a period in the periodic table.

a) increases b) remains constant c) first decreases then increases d) decreases

89. Which one of the following has the smallest radius?

a) S^{2-} b) Cl^{-} d) Ca^{2+} d) K^{+}

90. 'x' gm of an element gave 'y' gm of its oxide. The equivalent weight of the element is……

a) $\left\{\frac{x}{y-x}\right\}8$ b) $\left\{\frac{y-x}{y}\right\}8$ c) $\left\{\frac{y}{y-x}\right\}8$ d) $\left\{\frac{x}{y-x}\right\}16$

91. Ammonia can be dried by ……

a) Conc.H_2SO^4 b) Cao c) P_2O_5 d) anhydrous $CaCl_2$

92. When Zinc reacts with cold and very dilute HNO_3, it produces……..

a) NO_2 b) NH_4NO_3 c) H_2 d) NO

93. Which one of the following turns lead acetate paper black?

a) H_2S b) SO_2 c) SO_3 d) CO_2

94. Washing Soda on heating evolves ……

a) CO_2 b) CO c) H_2O d) C_2O_3

95. Copper pyrites are concentrated by:

a) Electromagnetic method b) Gravity method
c) Froath-floatation method d) All of the above methods

Read the passage carefully and answer the questions given below (Q.N. 96-100):

Exploration is one of the oldest and most exiting human activities. The earliest explorers were probably prehistoric hunters who travelled through unfamiliar territories searching for food. Later,

kings and queens of early civilizations sent explorers to unknown lands in order to develop trade, find gold and other riches, or locate sites for settlements. Although the reasons for their expeditions may have differed, all explorers have shared special qualities. They all have had a deep love of adventure and a strong desire to discover the unknown. In addition, they have been willing to face many dangers even death to achieve their goal.

96. What is considered to be one of the most exciting human activities?

a) developing trade b) search for gold and riches c) exploration d) hunting

97. The earliest explorers were:

a) kings b) queens c) prehistoric hunters d) adventurers

98. What was special about the explorers sent to unknown lands by kings and queens of early civilization was that they all headed there to……..

a) develop trade b) search gold

c) Look for other riches and locate sites for settlements, d) do all of these

99. What was common among all explorers was:

a) They all had a love of the unknown

b) They all had a desire for the riches

c) They all had an idiosyncratic nature

d) They all had a love of adventure and desire to discover the unknown.

100. To achieve their goal, the explorers were willing to:

a) violate any concerned rules b) follow unfair means

c) face even death d) Fall below moral standards

Farwestern University
Faculty of Engineering
Mahendranagar, Kanchanpur, Nepal
B.E. Entrance Examination 2074

Full Marks=150

Time: 3 Hours

Attempt all questions and write down the correct option a, b, c or d in the answer sheet provided. In section I each question carries 1 mark and in Section II each question carries 2 marks.

Section I (50x1=50)

1. The value of the determinant $\begin{vmatrix} 1 & w & w^2 \\ w & w^2 & 1 \\ w^2 & 1 & w \end{vmatrix}$ is

a) 1 b) w c) w^2 d) 0

2. If A and B are square matrices of same order then inverse of AB is

a) $A^{-1}B^{-1}$ b) I c) $B^{-1}A^{-1}$ d) BA

3. The multiplicative inverse of the complex number (p, q) is

a) $\left(\frac{p}{p^2+q^2}, \frac{q}{p^2+q^2}\right)$ b) $\left(\frac{p}{p^2+q^2}, \frac{-q}{p^2+q^2}\right)$ c) $\left(\frac{-p}{p^2+q^2}, \frac{q}{p^2+q^2}\right)$ d) $\left(\frac{-p}{p^2+q^2}, \frac{-q}{p^2+q^2}\right)$

4. The condition that both roots of the equation $px^2 + qx + r = 0$ are of opposite signs is

a) p + r =0 b) p and r must be of opposite signs c) p, q, r must be of same sign d) q = 0

5. Which of the following statements is false?

a) the harmonic mean of any two unequal positive real numbers is smaller than their geometric mean

b) sum of an infinite geometric series exists only when its common ratio is numerically less than one

c) the sum of the cubes of first n natural numbers is equal to the square of their sum

d) if p, q, r form a G.P. then, p^n, q^n, r^n (where n is a non zero real number) also form a G.P.

6. There are four questions in a question paper. In how many ways can a candidate solve one or more questions?

a) 4 b) 1 c) 15 d) 16

7. If $C_0, C_1, C_2, \ldots\ldots, C_n$ are binomial coefficients in the expansion of $(1 + x)^n$, then the value of

$C_0^2 + C_1^2 + C_2^2 + \ldots\ldots + C_n^2$ is

a) $\frac{(2n)!}{(n!)^2}$ b) $\frac{(2n)!}{n!}$ c) $\frac{(n!)^2}{(2n)!}$ d) $\frac{n!}{(2n)!}$

8. The value of $\frac{1}{1\times2}+\frac{1}{3\times4}+\frac{1}{5\times6}+\cdots$ is

a) e b) e^{-1} c) ln 1 d) ln 2

9. The unit vector in the direction of a vector $\underset{p}{\rightarrow}$ is

a) $\underset{p}{\rightarrow}.\underset{p}{\rightarrow}$ b) $\frac{\vec{P}}{\left|\underset{p}{\rightarrow}\right|}$ c) $\underset{p}{\rightarrow}\times\underset{p}{\rightarrow}$ d) none of the above

10. The vectors $\underset{a}{\rightarrow}=2\underset{i}{\rightarrow}+4\underset{j}{\rightarrow}+3\underset{k}{\rightarrow}$ and $\underset{b}{\rightarrow}=4\underset{i}{\rightarrow}-5\underset{j}{\rightarrow}+4\underset{k}{\rightarrow}$ are

a) perpendicular to each other b) parallel to each other

c) neither parallel nor perpendicular to each other d) make an angle of 60^0 with each other

11. The difference in temperature of 25^0C is equivalent to difference of…
a) 25^0F b)32^0F c)45^0F d)72^0F

12. A substance takes 3min to cool from 50^0C to 45^0C and 5min to cool from 45^0C to 40^0C. The time taken to cool from 40^0C to 35^0C is…

a)7min b) 12min c)15min d)18min

13. The r.m.s. speed of gas molecule of density 1.29kgm^{-3} at S.T.P.is…

a) 275ms^{-1} b) 485ms^{-1} c) 670ms^{-1} d)825ms^{-1}

14. The first law of thermodynamics for isochoric process is….

a) $dQ=dU$ b) $dQ=dU+dW$ c) $dQ=dW$ d) $dQ=0$

15. The temperature at which water vapour present in a given sample of air becomes saturated is called…

a) triple point b) freezing point c) dew point d) boiling point

16. Four independent waves are expressed as $y_1=a_1\sin\omega t$, $y_2=a_2\sin2\omega t$, $y_3=a_3\cos\omega t$ & $y_4=a_4\sin(\omega t+\frac{\pi}{3})$. The interference is possible for….

a) y_1 & y_2 b) y_3 & y_2 c) y_1 & y_4 d) not possible for all

17. A plano convex lens of material of refractive index 1.6 having curved surface of radius 60cm has power…
a) +1D b) -1D c) +1.5D d) +0.5D

18. Two progressive wave are represented by the equations $y_1=5\sin2\pi(10t-0.1x)$ & $y_2=10\sin2\pi(20t-0.2x)$. The ratio of their intensities will be….
a) 1:3 b)1:4 c)1:8 d)1:16

19. The phase difference between $y_1 = a_1 \sin(\omega t - kx)$ & $y_1 = a_1 \cos(\omega t - kx)$ is.....

a) 90^0 b) 45^0 c)180^0 d) 270^0

20. Number of beats heard per second by the waves $y_1 = a_1 \sin 200\pi t$ & $y_1 = a_1 \sin 208\pi t$ is...

a) 0 b)1 c)4 d) 8

21. Hydrogen phosphate of certain metal has formula $MHPO_4$. The formula of metal oxide is

a) M_2O b) MO c) MO_2 d) M_2O_3

22. Magnetic quantum number specifies

a) Orbital Orientation b) Orbital Size c) Orbital Shape d) Nuclear Stability

23. The electronic configuration of Fe^{3+} ion is

a) $[Ar]3d^6$ b) $[Ar]3d^5, 4S^1$ c) $[Ar]3d^5$ d) $[Ar]3d^3, 4S^2$

24. Which of the following species contains non-directional bond?

a) NH_3 b) H_2O c) CH_4 d) NaCl

25. When Iron or Zinc is added in $CuSO_4$ solution, copper is precipitated, it is due to

a) Ionization of $CuSO_4$ b) Hydrolysis of $CuSO_4$ c) Reduction of Cu^{2+} d) Oxidation of Cu^{2+}

26. 0.5g of a metal combines with 140ml of Oxygen at NTP. Equivalent weight of the metal is

a) 9.02 b) 12.01 c) 24.03 d) 20.06

27. The number of water molecules in one litre of water is

a) 3.346×10^{25} b)18x1000 c) 6.023×10^{26} d) 6.023×10^{23}

28. The vapour density of certain gas 'A' is 4 times that of 'B'. The molecular mass of 'A' is 'M', the molecular mass of 'B' is

a) 4M b) 0.5M c) 0.25M d) 8M

29. 4g of NaOH is dissolved in 1 litre of water. The P^H value of the solution will be

a) 14 b)13 c)12 d)11

30. The solubility of AgI in NaI solution is less than that in pure water because

a) AgI forms complex with NaI b) of common ion effect

c) Solubility product of AgI is less than that of NaI d) the temperature of the solution decreases

31. The 'collective noun' used to describe a number of 'cattle' is

a) band b) herd c) army d) crowd

32. The word 'class' is a .....noun.

a) common b) proper c) collective d)abstract

33. The parts of speech are .....in number.

a) Six b) Seven c) Eight d) Nine

34. A sentence has two parts called.....

a) complement and adverbial b) subject and adverbial

c) subject and predicate d) predicate and direct object

35. The phrase 'the poor' is used as a/n .....

a) adverb b) adjective c)noun d) conjunction

36. The words: 'myself', 'it,' 'them', 'that' and 'yours' are ....

a) nouns b) verbals c) pronouns d)determiners

37. ' What a shame!' is a/n..... sentence

a) assertive b) interrogative c) imperative d) exclamatory

38. .....honesty is the best policy.

a) An b) A c) The d) None of these.

39. In ' to boat down the stream', boat is .....verb.

a) finite b) non-finite c) Static d) participle

40. The gap in the sentence 'Ram asked..... what brought him there' allows the use of .....

a) that b) if c) whether d) no conjunction

41. The reported /indirect version of 'Hari said, ' will you have done your assignment by Sunday?' is .....

a) Hari asked if he will have done your assignment by Sunday.

b) Hari asked if he would have done my assignment by Sunday

c) Hari asked if he would have done his assignment by Sunday

d) Hari asked that he would have done his assignment by Sunday.

42. The passive form of 'Let them laugh at her' is .....

a) Let them be laughed by her b) Let her be laughed at by them

c) Let them be laughed at by her d) She should be laughed at by them.

43. There are some cows.....that filed.

a) in b) on c) at d) into

44. The punctuation mark (:) is used for .....

a) listing b) omission c) underlining d) separation of words

45. The idiom 'Kick the bucket' means.....

a) to kick the bucket referred to b) to die c) to sleep d) to show temper

46. If you help me, I .....help you.

a) would b) must c) should d) will

47. I don't look down.....others.

a) in b) upon c) up d) below

48. The sentences 'Ram saw a dead deer. He picked it up' can be combined into a compound form as .....

a) Ram saw a dead deer when he picked it up.

b) When Ram saw a dead deer, he picked it up.

c) Ram saw a dead deer and picked it up.

d) Ram saw a dead deer and then he picked it up.

49. The pair of words having the same initial consonant sounds is.....

a) cat, chaos b) kite, chump c) chaos, chore d) keen, cello

50. Which of these pairs of words are stressed on the second syllable?

a) begin, happy b) ballon, deny c)India, Japan d) pleasant, prefer

Section II (50x2=100)

51. There are 32 subsets of a certain given set. The cardinal number of this set is

a) 2 b) 0 c) 3 d) 5

52. A function f: A $\rightarrow$ B is defined by $f(x) = \frac{x^2}{6}$ with A = {-2, -1, 0, 1, 2} and B = {0, 1/6, 2/3}. Then the range of f is

a) A b) φ c) B d) A U B

53. The value of $\sin^{-1} \cos \cot^{-1} \tan \sin^{-1} \frac{1}{2}$ is

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

54. The all possible values (general values) of θ given by the equation $\sin\theta - \cos\theta = 0$ are

a) $n\pi + (-1)^n \frac{\pi}{4}$ b) $2n\pi \pm \frac{\pi}{4}$ c) $n\pi - \frac{\pi}{4}$ d) $n\pi + \frac{\pi}{4}$

55. In a triangle ABC, the value of $\left(\frac{b-c}{a}\right) cos^2 \frac{A}{2} + \left(\frac{c-a}{b}\right) cos^2 \frac{B}{2} + \left(\frac{a-b}{c}\right) cos^2 \frac{C}{2}$ is

a) $\sin\frac{A}{2} + \sin\frac{B}{2} + \sin\frac{C}{2}$ b) 1 c) 0 d) a + b + c

56. The slope of the line $\frac{x}{p} + \frac{y}{q} = 1$ is

a) 0 b) $-\frac{q}{p}$ c) 1 d) 3

57. The conditions under which the equation $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ represents a pair of perpendicular lines is

a) $abc + 2fgh - af^2 - bg^2 - ch^2 = 0$ b) $abc + 2fgh - af^2 - bg^2 - ch^2 = 0$; $a + b = 0$

c) $a + b = 0$ d) $abc + 2fgh + af^2 + bg^2 + ch^2 = 0$

58. The centre and the radius of a circle represented by the equation $4x^2 + 4y^2 + 3x - 32 = 0$ are

a) $\left(-\frac{3}{8}, 0\right)$ and $\frac{\sqrt{521}}{8}$ b) $\left(\frac{3}{8}, 0\right)$ and $\frac{\sqrt{521}}{8}$ c) $\left(0, \frac{3}{8}\right)$ and $\frac{\sqrt{506}}{8}$ d) $\left(0, -\frac{3}{8}\right)$ and $\frac{8}{\sqrt{506}}$

59. The locus of point of intersection of any two tangents to a parabola which are at right angles to each other is

a) the axis of the parabola
b) the latus rectum of the parabola
c) the directrix of the parabola
d) none of the above

60) If α, β, γ be the angles made by a line with coordinate axes, then the value of $\cos 2\alpha + \cos 2\beta + \cos 2\gamma$ is

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

61. The value of $\lim_{x\to 0}\left(\frac{\tan 3x - x}{2x - \sin x}\right)$ is

a) 1 b) 2 c) 0 d) ∞

62. The derivative of $2\tanh^{-1}\left(\tan\frac{x}{2}\right)$ with respect to x is

a) tan x b) tanh x c) sec x d) sech x

63. The rectangle of greatest area for a given perimeter is

a) a square b) a circle c) an equilateral triangle d) a cylinder

64. The value of $\int\sqrt{\frac{1+x}{1-x}}$ is

a) $\cos^{-1}x + \sqrt{1-x^2} + c$
b) $\sqrt{1-x^2} - \sin^{-1}x + c$
c) $\sqrt{1+x^2} + \cos^{-1}x + c$
d) $\sin^{-1}x - \sqrt{1-x^2} + c$

65. The area of the region between the curves $y = x^2$ and $x = y^2$ is

a) 0 b) 1 c) $\frac{1}{3}$ d) 2

66. Relation for angle of banking $Tan\theta = \frac{v^2}{rg}$ is.....

a) numerically correct only
b) dimensionally correct only
c) both numerically and dimensionally correct
d) none of these

67. A body of mass m is pulled by a rope which makes angle θ with the horizontal. The coefficient of friction between body and ground is μ then tension on the rope to make the body just to move is....

a) μmg b) $\frac{\mu mg}{Cos\theta}$ c) $\frac{\mu mg}{Cos\theta + Sin\theta}$ d) $\frac{\mu mg}{Cos\theta + \mu Sin\theta}$

68. A block of mass 400kg kept on horizontal surface just begin to move when a force of 100kg wt is applied. The coefficient of static friction is.....

a)0.25 b)0.5 c)0.75 d)0.8.

69. A man hold a body of weight 60N and walks 7m along horizontal and then 5m vertical. Amount of work done by man is…

a) 300J b) 420J c)720J d)840J

70. A cyclist is taking turn with 18kmhr^{-1} along circular path of radius 15m.The angle with which he must lean with vertical is….

a) $Tan^{-1}\left(\frac{1}{4}\right)$ b) $Tan^{-1}\left(\frac{1}{6}\right)$ c) $Tan^{-1}\left(\frac{1}{3}\right)$ d) $Tan^{-1}\left(\frac{1}{2}\right)$

71. The minimum kinetic energy of body of mass m on the surface of earth to reach at infinity is….

a) mgR b) $\frac{mgR}{2}$ c) $\frac{mgR}{4}$ d) $4mgR$

72. In S.H.M., velocity of body when displacement is half of amplitude r is..

a) ωr b) $\frac{\omega r}{2}$ c) $\frac{\omega r}{\sqrt{2}}$ d) $\frac{\sqrt{3}}{2}\omega r$

73. The number of electrons contained in one coulomb of charge is……..

a) 6.25×10^{18} b) 1.25×10^{18} c) 6.25×10^{17} d) 6.25×10^{19}

74. A parallel plate air capacitor charged by 10V battery is disconnected and insulating medium having dielectric constant 2 is placed between plates. The potential difference becomes….

a)10V b)8V c)5V d)2V

75. Correct form of Biot-Savart Law is

a) $d\vec{B}=k\frac{I\left(d\vec{l}\times\vec{r}\right)}{r^3}$ b) $d\vec{B}=k\frac{I\left(\vec{r}\times d\vec{l}\right)}{r^3}$

c) $d\vec{B}=k\frac{I\left(d\vec{l}\times\vec{r}\right)}{r^2}$ d) $dB=k\frac{I\left(d\vec{l}\times\vec{r}\right)}{r^3}$

76. Formula for quality factor is…

a) $\frac{RL}{\pi\omega}$ b) $\frac{RL}{\omega}$ c) $\frac{R}{\omega L}$ d) $\frac{\omega L}{R}$

77. The half-life of radium is 1600 years. The fraction of sample undecayed after 6400years is

a)1:2 b)1:4 c)1:8 d)1:16

78. The largest distance between inter atomic planes of a crystal is $10\overset{0}{A}$. The upper limit for wavelength of X-rays which can be used to study this crystal is…

a) $20\overset{0}{A}$ b) $30\overset{0}{A}$ c) $40\overset{0}{A}$ d) $50\overset{0}{A}$

79. Paschen series of hydrogen atom lies in…….region.

a) ultraviolet b) infra-red c) visible d) ultraviolet or infra-red

80. Use of X-rays in Millikan oil's drop experiment is to....
a) see oil drop b) ionize oil drop

c) produce electric field d) move oil drop with uniform velocity

81. Temporary and permanent hardness of water can be simultaneously removed

(a) by boiling (b) by Clark's method (c) using washing Soda (d) by soda-lime process.

82. In Habers process for the manufacture of ammonia , the catalyst used is

(a) Mo (b) Fe (c) Pt (d) Ni

83. Which of the following metals can liberate Hydrogen gas on treatment with cold and very dilute HNO^3 ?

(a) Mg (b) Zn (c) Fe (d) Al

84. Which of the following turns Lead Acetate paper black?

(a) SO_2 (b) SO_3 (c) H_2S (d) CO_2

85. The poison for platinum catalyst in contact process for the manufacture of sulphuric acid is

(a) Sulphur (b) phosphorus (c) carbon (d) Arsenic

86. Which of the following species is amphoteric in nature?

(a) HSO_4^- (b)H_3O^+ (c) Cl^- (d) CO_3^{2-} .

87. The process in which ore is heated in excess of air below its melting point is known as

(a) calcinations (b) roasting (c) distillation (d) reduction

88. The purest form of iron is

(a) cast iron (b) wrought iron (c) steel (d) stainless steel

89. The formula of calamine is

(a) $ZnSO_4 .7H_2O$ (b) ZnS (c) ZnO (d) $ZnCO_3$.

90. Washing Soda on heating evolves

(a) CO_2 (b) CO (c) H_2O (d) C_3O_2 .

91. Which of the following is not a heterocyclic compound?

(a) Benzene (b) Furan (c) Thiophene (d) Pyridine

92. IUPAC name of tert-butyl alcohal is

(a) butan-1-ol (b) butan-2-ol (c) 2-methylpropan-1-ol (d) 2-methylpropan-2-ol

93. Acetylene reacts with water in the presence of $HgSO_4$ and dilute H_2SO_4 to give

(a) ethanol (b) ethane (c) ethanal (d) propanal

94. The compound which forms only ethanal upon ozonolysis is

(a) but-1-ene (b) but-2-ene (c) ethene (d) propene

95. When benzene is treated with ethanoic anhydride in the presence of anhydrous $AlCl_3$ the compound formed is

(a) acetophenone (b) benzophenone (c) etylebenzene (d) tolune

Read the passage carefully and answer the questions that follow (for Q.N. 96-100).

Few men have influenced the development of American English to the extent that Noah Webster did. In response to the need for truly American textbooks, Webster published 'A grammatical Institute of the English language' a three volume work that consisted of a speller, a grammar, a reader. The first volume, which was generally known as the American speller book, was so popular that eventually it sold more than 80 million copies and provided him with a considerable income for the rest of his life.

In 1807, Noah Webster began his greatest work, An American dictionary of the English language. In preparing the manuscripts he devoted ten years to the study of English and its relationship to other languages and seven more years to the writing itself, published in two volumes in 1828, An American dictionary of the English language has become the recognized authority for usage in the United States. Webster's purpose in writing it was to demonstrate that the American language was developing distinct meaning, pronunciations, and spelling from those of British English.

96. Which of the following would be the best title for the passage?

a) Webster's work b) Webster's dictionaries c) Webster's school d) Webster's life

97. From which publication did Webster earn a life time income?

a) An American dictionary of the English language b) A grammatical institute of the English language

c) The American spelling book d) Webster's dictionary of the English language

98. Why did Webster write a grammatical institute of the English language?

a) He wanted to supplement his income

b) In response to the need for truly American textbooks

c) The children didn't know how to spell

d) He felt that British books were not appropriate for American children

99. What was Webster's purpose in writing an American dictionary of the English language?

a) To respond to the need for new school books

b) To demonstrate the distinct development of the English language in America

c) To promote spelling forms based upon British model

d) to influence the pronunciation of the English language

100. Why was Webster famous in English language?

a) He developed new dictionaries

b) He developed new words

c) He wrote American English book

d) He gave some differences between American and British English.

Far-western University
School of Engineering
Bachelor of Civil Engineering (B.E. Civil)
Entrance Examination

Full Marks: 150
Time: 3 hours

Attempt all questions

Read the following questions and write down the correct option **a, b, c,** or **d** in the answer sheet provided. In section I each question carries one mark and in section II each question carries two marks.

Section I (50x1=50)

1. The value of k for which one root of the equation $5x^2 - kx + 3 = 0$ will be 3 is …….

(a) 5 (b) 3 (c) 0 (d) 16

2. The value of the determinant $\begin{vmatrix} 5 & 10 & 15 \\ 222 & 1 & 78 \\ 16 & 32 & 48 \end{vmatrix}$ is ……..

(a) 1 (b) 0 (c) 2 (d) 111

3. The amplitude (argument) of the complex number $-3 - 3i$ is ……
(a) 135° (b) 45° (c) 225° (d) 315°

4. If A is a square matrix then $A + A^T$ (where A^T is transpose of A) is……

(a) a symmetric matrix (b) a skew symmetric matrix

(c) neither a symmetric matrix nor a skew symmetric matrix (d) nothing can be said about it

5. The number of ways in which 7 different colored beads be strung on a necklace is……..

(a) 7 (b) 180 (c) 5040 (d) 360

6. The sum of the infinite series $1 - \frac{1}{2} + \frac{1}{4} - \frac{1}{8} + \cdots$ is…..

(a) 2 (b) $\frac{1}{2}$ (c) $\frac{2}{3}$ (d) doesn't exist

7. If C_0, C_1, C_2, C_3, …, C_n are coefficients of successive terms in the expansion of $(1+x)^n$, then the value of $C_1 + C_2 + C_3 + \ldots + C_n$ is

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

8. Out of the following quantities, the quantity representing e is

(a) $\frac{1}{1!}+\frac{1}{2!}+\frac{1}{3!}+\cdots$ (b) $\frac{1}{1!}-\frac{1}{2!}+\frac{1}{3!}-\cdots$ (c) $1+\frac{1}{2!}+\frac{1}{4!}+\cdots$ (d) $\lim_{x\to\infty}\left(1+\frac{1}{x}\right)^x$

9. The angle between the vectors $\vec{i}-2\vec{j}+5\vec{k}$ and $3\vec{i}+19\vec{j}+7\vec{k}$ is

(a) 30^o (b) 45^o (c) 90^o (d) 45^o

10. The unit vector in the direction of the vector $2\vec{i}+6\vec{j}+3\vec{k}$ is

(a) $\frac{2\vec{i}}{7}+\frac{6\vec{j}}{7}+\frac{3\vec{k}}{7}$ (b) $\frac{2\vec{i}}{49}+\frac{6\vec{j}}{49}+\frac{3\vec{k}}{49}$ (c) $\vec{i}+\vec{j}+\vec{k}$ (d) $2\vec{i}+6\vec{j}+3\vec{k}$

11. Mass of ice that can be melted at 0^0C by 3360J of heat energy is……

(a) 1g (b) 10g (c) 100g (d) 1000g

12. If a gas in a cylinder is heated by 8^0C then pressure increases by 1%. The initial temperature of gas is……

a) 327^0C b) 427^0C (c) 527^0C (d) 627^0C

13. Factor by which r.m.s. speed of particular gas molecule increases when temperature is increased from 100^0C to 200^0C is…….

(a) 1.13 (b) 1.31 (c) 1.03 (d) 1.33

14. Whole amount of heat supplied is used to increase internal energy of gas during…….process.

(a) isothermal (b) isobaric (c) isochoric (d) adiabatic

15. Efficiency of petrol engine is given as…….

(a) $1-\left(\frac{1}{\rho}\right)^{\gamma-1}$ (b) $1-\left(\frac{1}{\rho}\right)^{1-\gamma}$ (c) $1-\left(\frac{1}{\rho}\right)^{1+\gamma}$ (d) $1-\left(\frac{1}{\rho}\right)^{\gamma+1}$

16. Source of sound and listener are moving in the same direction with same speed. The apparent frequency received by the listener is……..

(a) greater than the frequency of source (b) less than frequency of source

(c) equal to frequency of source (d) none of these

17. A ray of light incident on transparent medium of refractive index 1.5 at polarizing angle. The angle of refraction is…….

(a) $\tan^{-1}(1.5)$ (b) $\tan^{-1}(1.5)-90^0$ (c) $\tan^{-1}(1.5)+90^0$ (d) $90^0-\tan^{-1}(1.5)$

18. Snell's law is not valid for…….

(a) grazing incidence (b) oblique incidence (c) normal incidence (d) grazing emergence

19. During dispersion of light by prism, order of color in the spectrum from bottom to top is…….

(a) VIBGYOR (b) VIBGOYR (c) VBIGYOR (d) VIGBYOR

20. At constant temperature, velocity of sound in air is…….

(a) directly proportional to change in pressure

(b) inversely proportional to change in pressure

(c) independent of change in pressure

(d) directly proportional to square of change in pressure

21. Formation of ammonia by combination of hydrogen and nitrogen is an example of ……..

(a) synthesis reaction (b) isomerisation reaction (c) decomposition reaction

(d) displacement reaction

22. Who gave the nuclear model of atoms?

(a) Dalton (b) Thomson (c) Rutherford (d) Neils Bohr

23. The correct ground state electronic configuration of Chromium is…….

(a) [Ar] $3d^4 4s^2$ (b) [Ar] $3d^5 4s^1$ (c) [Ar] $3d^6 4s^0$ (d) [Ar] $4s^1 4p^5$

24. Azimuthal quantum number of last electron of $_{11}$ Na is

(a) 1 (b) 2 (c) 3 (d) 0

25. Which of the following has a co-ordinate covalent bond?

(a) H_3O^+ (b) H_2O (c) NaOH (d) CO_2

26. Oxidation number of 'S' in Marshall's acid ($H_2S_2O_8$) is……

(a) + 4 (b) + 6 (c) + 7 (d) + 5

27. Equivalent weight of H_3PO_4 in the following reaction is…….

$$2NaOH + H_3PO_4 \longrightarrow Na_2HPO_4 + 2H_2O$$

(a) 98 (b) 32.66 (c) 49 (d) 24.5

28. The total number of atoms in 8.5 gram of NH_3 is…….

(a) 6.023×10^{23} (b) 1.2046×10^{23} c) 3.0115×10^{23} d) 9.0345×10^{23}

29. p^{OH} of 10^{-8} M solution of NaOH will be……

(a) between 7 and 8 (b) between 6 and 7 (c) 8 (d) below 6

30. The volume of water to be added to 200 ml of decinormal HCl solution to make it decinormal is…

(a) 200 ml (b) 400 ml (c) 600 ml d) 800 ml

31. It is I who …….right

(a) is (b) am (c) be (d) none of these

32. He as well as his sisters ……non-veg food.

(a) eat (b) eating (c)eats (d) to eat

33. The passive of 'Go there' is ……..

(a) You should go there (b) You are ordered to go there

(c) Come here (d) You are requested to come here

34. I shall provide ……. your education

(a) with (b) an (c) to (d) for

35. Which of the following is correct?

(a) I, you and he are friends (b) You, he and I are friends

(c) I , he and you are friends (d) He, you and I are friends

36. The more he labours, the ……..he progresses

(a) little (b) less (c) a little (d) least

37. Everything that …….. is not gold.

(a) is glittering (b) glitters (c) glitter (d) none of these

38. They as well as he ……..hard.

(a) works (b) work (c) working (d) has worked

39. "Ram said, 'what's your name?' " is in……

(a) indirect speech form (b) direct speech form

(c) passive form (d) active form

40. ……when fell down.

(a) Ram played (b) Ram was playing (c) Ram lays (d) Ram has been playing

41. The sentence 'It surprises me' can be turned into passive as:

(a) It is surprised by me (b) I am surprised at it

(c) I was surprised by it (d) none of these

42. He investigated ……the matter.

(a) in (b) on (c) into (d) at

43. 'Please, set your watch' is an example of:

(a) request (b) order (c) recommendation (d) none of these

44. Either you or he ……my money

(a) steal (b) steals (c) stealing (d) do steal

45. The antonym of 'Self -centered' is …….

(a) Selfish (b) Other-centered (c) egoist (d) liberal

46. The synonym of 'Acute' is……..

(a) tolerable (b) intolerable (c) mild (d) tense

47. The word 'Whine' means……

(a) sleep (b) complain (c) criticize (d) none of these

48. The correct pronunciation of 'precis' is

(a) /presis/ (b) /prisais/ (c) /presi:/ (d) none of these

49. Which of the following pairs of words has the same vowel?

(a) shed-shade (b) put-but (c) they-key (d) hi-shy

50. Sweater is made…….wool.

(a) with (b) of (c) in (d) by

Section II (50x2=100)

51. The quantity $\frac{1}{2}ab\sin c$ is also equal to……

(a) $\frac{abc}{R}$ (b) $s(s-a)(s-b)(s-c)$

(c) $\frac{1}{2}ca\cos b$ (d) $\frac{1}{4}\sqrt{2b^2c^2+2c^2a^2+2a^2b^2-a^4-b^4-c^4}$

52. If $\tan^{-1}x+\tan^{-1}y+\tan^{-1}z=\frac{\pi}{2}$, then the quantity $xy+yz+zx$ is equal to ……..

(a) 0 (b) 1 (c) $x+y+z$ (d) none of these

53. The limiting value of $\frac{\sin 5x+7x}{5x+\sin 7x}$ when $x\to 0$ is ……..

(a) 5 (b) 0 (c) 1 (d) doesn't exist

54. The value of $\frac{dy}{dx}$ when $x = at^2$, $y = 2at$ is ……

(a) $\frac{1}{t}$ (b) $\frac{1}{t^2}$ (c) t (d) a

55. A function $f(x)$ becomes maximum at a point $x = c$ if

(a) $f'(c) = 0$ and $f''(c) = 0$ (b) $f'(c) = 0$ and $f''(c) > 0$
(c) $f'(c) = 0$ and $f''(c) < 0$ (d) $f'(c) \neq 0$ and $f''(c) = 0$

56. The value of $\int f'(x)\{f(x)\}^n dx$ is …….

(a) $n\{f(x)\}^{n-1} + k$ (b) $\ln f(x) + k$ (c) $\frac{\{f(x)\}^{n-1}}{(n-1)} + k$ (d) $\frac{\{f(x)\}^{n+1}}{(n+1)} + k$

57. The area bounded by the curve $x^2 - 3y + 5 = 0$, the ordinate $x = 1$, the ordinate $x = 3$ and x-axis is..

(a) 2 sq. units (b) $6\frac{2}{9}$ sq. units (c) $\frac{10}{3}$ sq. units (d) 10 sq. units

58. If A = {1, 2, 3} and B = {3, 4, 5} then A Δ B is …….

(a) {1, 2, 3, 4, 5} (b) {3} (c) {1, 2, 4, 5} (d) ϕ

59. If $f(x) = 2x^2 - 3x + 1$, then the value of $\frac{f(x+h) - f(x)}{h}$ is ……..

(a) $4x + 2h - 3$ (b) $2x + 4h - 3$ (c) $4x - 2h + 3$ (d) $4x - 2h - 3$

60. The combined equation of the bisectors of the angles between coordinate axes is……..

(a) $x^2 - y^2 = 0$ (b) $x^2 + y^2 = 0$ (c) $x^2 - y^2 = 1$ (d) $x^2 + y^2 = 1$

61.The condition that the line $lx + my + n = 0$ may be a normal to the circle $x^2 + y^2 + 2gx + 2fy + \alpha = 0$ is……

(a) $gl + mf + n = 0$ (b) $gl - mf + n = 0$ (c) $n = gl + mf$ (d) $n = gl - mf$

62. The eccentricity of the ellipse $\frac{x^2}{9} + \frac{b^2}{4} = 1$ is ……..

(a) $\frac{\sqrt{5}}{3}$ (b) $\frac{3}{\sqrt{5}}$ (c) $\frac{5}{9}$ (d) $\frac{5}{\sqrt{3}}$

63. If the coordinates of the extremities of the latus rectum of a parabola are (5, 4) and (15, 8) then the coordinates of its focus are……

(a) (5, 8) (b) (10, 5) (c) (10, 6) (d) (4, 15)

64. If α, β, γ are the direction angles of a line, then the value of $\sin^2\alpha + \sin^2\beta + \sin^2\gamma$ is

(a) 0 (b) 2 (c) 3 (d) 1

65. The solution of the equation $\sin x + \cos x = 2$ is…….

(a) $x = n\pi + (-1)^n \frac{\pi}{4}$ (b) $x = 2n\pi \pm \frac{\pi}{2}$ (c) $x = n\pi + \frac{\pi}{3}$ (d) doesn't exist

66. Taking force, length and time as fundamental quantities, dimensional formula of density is……

(a) $\left[FLT^{-2}\right]$ (b) $\left[FL^2T^{-2}\right]$ (c) $\left[FL^{-4}T^{-2}\right]$ (d) $\left[FL^{-4}T^2\right]$

67. If $\vec{A} = (3\hat{i} + 4\hat{j} + 5\hat{k})$ and $\vec{B} = (x\hat{i} + 4\hat{j} - 5\hat{k})$ are perpendiculars then value of x is…….

(a) 3 (b) -3 (c) 4 (d) 5

68. The maximum speed with which car can take turn safely on level curved road is…….

(a) μrg (b) $\sqrt{rg}$ (c) $rg \tan\theta$ (d) $\sqrt{\mu rg}$

69. A body having S.H.M. has maximum velocity 10cms^{-1} and maximum acceleration 15cms^{-2}. Its time period will be……..

(a) $\frac{4\pi}{3}s$ (b) $\frac{3\pi}{4}s$ (c) $\frac{\pi}{4}s$ (d) $\frac{\pi}{3}s$

70. During upward motion of lift with acceleration 2ms^{-2}, spring balance shows a reading of ……for a body of mass 2kg suspended on it.

(a) 16N (b) 20N (c) 24N (d) 28N

71. Acceleration of body rolling down an inclined plane is…….

(a) $\frac{gSin\theta}{\left(1+\frac{K^2}{R^2}\right)}$ (b) $\frac{gSin\theta}{\left(1-\frac{K^2}{R^2}\right)}$ (c) $\frac{gSin\theta}{\left(1+\frac{K^2}{R}\right)}$ (d) $\frac{gSin\theta}{\left(1+\frac{K}{R^2}\right)}$

72. If force required to increase the length of wire by 4mm is 20N then force required to increase the length of wire by 6mm is……..

(a) 25N (b) 30N (c) 35N (d) 40N

73. Energy stored in an inductor of 100mH carrying a current of 1ampere is……..

(a) 0.05J (b) 0.5J (c) 0.1J (d) 0.01J

74. Vector form of Biot-Savart law is…..

(a) $d\vec{B} = \frac{\mu_0}{4\pi} I \frac{\left(d\vec{l} \times \vec{r}\right)}{r^2}$ (b) $d\vec{B} = \frac{\mu_0}{4\pi} I \frac{\left(\vec{r} \times d\vec{l}\right)}{r^2}$

(c) $d\vec{B} = \frac{\mu_0}{4\pi} I \frac{\left(d\vec{l} \times \vec{r}\right)}{r^3}$ (d) $d\vec{B} = \frac{\mu_0}{4\pi} I \frac{\left(\vec{r} \times d\vec{l}\right)}{r^3}$

75. Uniform wire having resistance 'R' is stretched to double of its original length. The new resistance of wire becomes……

(a) R/2 (b) 2R (c) R/4 (d) 4R

76. Force between two charges in air is 20N. If medium with dielectric constant 2 is introduced between them then force will be……

(a) 10N (b) 5N (c) 20N (d) 40N

77. Accelerating potential 'V' and velocity 'v' of electron are related as…..

(a) $v \alpha V$ (b) $v \alpha \sqrt{V}$ (c) $v \alpha \frac{1}{V}$ (d) $v \alpha \frac{1}{\sqrt{V}}$

78. The relation between half life and decay constant is…….

(a) $\lambda = \frac{\log_{10} 2}{T_{\frac{1}{2}}}$ (b) $\lambda = \frac{\log_e 2}{T_{\frac{1}{2}}}$ (c) $\lambda = \frac{\log_2 10}{T_{\frac{1}{2}}}$ (d) $\lambda = \frac{\log_2 e}{T_{\frac{1}{2}}}$

79. Radius 'R' of nucleus is related with its mass number 'A' as……..

(a) $R = R_0 A^2$ (b) $R = R_0 A^3$ (c) $R = R_0 A^{\frac{1}{2}}$ (d) $R = R_0 A^{\frac{1}{3}}$

80. ${}_6C^{14}$ and ${}_8O^{16}$ are……

(a) isotopes (b) isobars (c) isotones (d) mirror nuclei

81. Bordeaux is the mixture of…….

(a) $CuSO_4$ and $ZnSO_4$ (b) $CuSO_4$ and $Ca(OH)_2$

(c) $CuSO_4$ and $HgCl_2$ (d) $CuSO_4$ and $Zn(OH)_2$.

82. Calamine lotion is used to treat……

(a) eye infections (b) skin diseases (c) baldness (d) bodyache

83. In metallurgical process, the flux used to remove acidic impurities is…….

(a) SiO_2 (b) Na_2CO_3 (c) NaCl (d) CaO.

84. The process in which 'ore' is heated in absence or limited supply of air below its melting point is known as …….

(a) Calcination (b) Distillation (c) Roasting (d) Reduction

85. The property which regularly increases down the group in periodic table is……..

(a) Ionization energy (b) Electro-negativity (c) reducing nature (d) electron affinity

86. The correct order of increasing radii of the elements Na, Rb, K and Mg is……..

(a) Mg<K<Na<Rb (b) Mg<Na<K<Rb (c) Na<K<Rb<Mg (d) Na<Rb<K<Mg

87. Oxygen and Ozone are ……...

(a) isomers (b) isotopes (c) isobars (d) allotropes

88. Ammonia gas can be dried over……..

(a) anhydrous $CaCl_2$ (b) Conc.H_2SO_4 (c) P_2O_5 (d) quick lime

89. Hot conc. HNO3 oxidizes phosphorus to…….

(a) H_3PO_2 (b) H_3PO_3 (c) H_3PO_4 (d) P_2O_5

90. A solution of KBr is treated with each of the following reagent separately. Which of these will librate Br_2 gas?

(a) HI (b) Cl_2 (c) I_2 (d) dil. HCl

91. The 'Vital force theory ' was proposed by……

(a) Berzelius (b) Wohler (c) Dalton (d) Avogadro

92. Metamerism is shown by ……..

(a) acid halides (b) alcohols (c) aldehydes (d) ethers

93. The IUPAC name of picric acid is ……..

(a) 2,4,6-trinitrotoluene (b) 2,4,6-tribromotoluene

(c) 2,4,6-trinitrophenol (d) 2,4,6-trobromophenol

94. Kerosene oil is a mixture of ……

(a) alkanes (b) alkenes (c) alkynes (d) arenes

95. Which of the following compounds is a heterocyclic compound?

(a) Benzene (b) pyridine (c) cyclopropane (d) Naphthalene

Read the passage carefully and answer the questions given below (Q.N. 96-100):

I want to begin this class on the history of film making with a discussion of a film maker. You have all heard of Walt Disney. No one has ever delighted more children or adults than Disney, the winner of 31 academy awards. Almost everyone has heard of Mickey Mouse and Donald Duck and his other popular characters like Minnie Mouse, Pluto and Goofy. He started creating cartoon animation in 1920 , but it was 1928 when his best known character Mickey Mouse came to life. Disney also created the first sound cartoon which he called Steamboat Willie. It was in this cartoon that he introduced Mickey to the public. In 1937 he made movie history again with the first full length cartoon film, Snow White and Seven Dwarfs. In the 1950s Disney, created a series of nature films. He was always planning something. In 1955, he opened Disney land and, 'The magic kingdom' in Anaheim California. Even at his death in 1966 he was planning another massive project. Florida's Walt Disney World. Since his death, the film company has continued to grow and attract the public even producing new cartoons by computer animation.

96. Disney managed to win …….. Academy Awards.

(a) 28 (b) 29 (c) 30 (d) 31

97. Disney's best character Mickey Mouse was animated in……

(a) 1929 (b) 1829 (c) 1930 (d) 1928

98. The name of Disney's first full length film was……..

(a) Steamboat Willie (b) Disney World

(c) Mickey Mouse (d) Snow White & the Seven Dwarfs

99. Which of the following was not planned by Disney?

(a) Nature film (b) Mickey Mouse

(c) Computerized cartoon (d) Disney land

100. What is the speaker mainly discussing?

(a) The life and time of Walt Disney

(b). Disney characters

(c) Disney's work

(d) The importance of Disney's work.

Name..... Roll No.....

Far-western University
Faculty of Science and Technology
Bachelor in Civil Engineering (B.E. Civil)
Entrance Examination
2071

Full Marks: 150
Time: 3 hours

Attempt all the questions.

Read the following questions and tick (✓) or circle (o) the best answer in the answer sheet provided.

Mathematics (40 x1 = 40)

1. The value of $\sin 50^0 - \sin 70^0 + \sin 10^0$ is.....
   (a) 1 (b) 0 (c) -1 (d) 2
2. The value of $\sin a + \sin b + \sin c$ in terms of area of triangle is.....
   (a) $\frac{\Delta s}{2R}$ (b) $\frac{4\Delta s}{abc}$ (c) $\frac{4\Delta}{abc}$ (d) $\frac{4s}{abc\Delta}$
3. All values of x satisfying the equation $\tan ax = \cot bx$ are given by.....
   a) $x = n\pi + (a+b)\pi$ (b) $x = n\pi - (a+b)\pi$
   (c) $x = \frac{n\pi}{a+b}$ (d) $x = \frac{(2n+1)\pi}{2(a+b)}$
4. In a triangle ABC, the value of $\frac{a\sin(B-C)}{b^2-c^2}$ is.....
   (a) $2R$ (b) $\frac{1}{2R}$ (c) $2R^2$ (d) $\frac{1}{2R^2}$
5. If $(3,3)$ lies on the line joining the points $(h,0)$ & $(0,k)$ then....
   (a) $h+k=3$ (b) $\frac{1}{h}+\frac{1}{k}=\frac{1}{3}$ (c) $hk=3$ (d) $3h-3k=1$
6. The equation of a straight line in double intercept form is.....
   (a) $bx+ay=ab$ (b) $y=mx+c$ (c) $y-y_1=m(x-x_1)$ (d) $y-y_1=\frac{y_2-y_1}{x_2-x_1}(x-x_1)$
7. The circum centre of the triangle whose vertices are (2,-1), (1,2) and (-2,1) is.....
   (a) $\left(\frac{1}{2},\frac{2}{3}\right)$ (b) $\left(-\frac{1}{2},\frac{3}{2}\right)$ (c) $(0,0)$ (d) none of the above
8. The points of intersections of the lines represented by $3x^2-7xy+2y^2+9x+2y-12=0$ are .....
   (a) (2,3) (b) (3,2) (c) (-3,2) (d) (1,2)
9. The angle between the pair of lines $x^2-2xy-\cot\theta-y^2=0$ is.....
   (a) 0 (b) $\frac{\pi}{2}$ (c) $\tan^{-1}(\pm 2)$ (d) $\tan^{-1}\left(\pm\frac{1}{2}\right)$
10. Which of the following is the equation of hyperbola?
    (a) $x^2+4y^2-4x+24y+24=0$ (b) $x^2+y^2-12x-6y-9=0$
    (c) $x^2-5yx-4y^2+x+2y-2=0$ (d) $9x^2-16y^2-18x-64y-199=0$

11. The straight lines $y = 2x \pm 3\sqrt{5}$ are always tangent to the circle....

(a) $x^2 + y^2 = 4$ (b) $x^2 + y^2 = 9$ (c) $x^2 + y^2 = 25$ (d) $x^2 + y^2 = 16$

12. The angle between the lines whose direction ratios are 2, 3, 4 and 1, -2, 1 is.....

(a) $\frac{\pi}{2}$ (b) $\frac{\pi}{3}$ (c) $\frac{\pi}{4}$ (d) $\frac{\pi}{6}$

13. $\lim_{x \to 2} \frac{|x-2|}{x-2}$ is equal to.....

(a)1 (b) -1 (c) 0 (d) does not exist

14. $\lim_{x \to a} \frac{\sin(x-a)}{x^3 - a^3}$ is equal to.....

(a) $\frac{1}{2a}$ (b) $2a^2$ (c) 1 (d) $\frac{1}{3a^2}$

15. $\lim_{x \to 0} \frac{\sin x^0}{x}$ is equal to.....

(a) 1 (b) $\frac{\pi}{180}$ (c) $\frac{180}{\pi}$ (d) none of the above

16. If $ax^2 + 2hxy + by^2 = 1$, then $\frac{dy}{dx}$ is equal to.....

(a) $-\frac{ax+by}{hx+by}$ (b) $-\frac{2ax}{by}$ (c) $\frac{-hx+by}{ax+by}$ (d) $hx+by$

17. The derivative of $f(x) = |x|$ at $x = 0$ is .....

(a) 1 (b) 0 (c) -1 (d) none of the above

18. The value of $\int \frac{3x^2}{x^6+1}\,dx$ is.....

(a) $\frac{x^3}{x^2+1} + c$ (b) $\tan^{-1} x^3 + c$ (c) $\sin^{-1} x^3 + c$ (d) $\cos^{-1} x^3 + c$

19. $\int \log x\,dx$ is equal to.....

(a) $x \log x - x + c$ (b) $\log x + x + c$ (c) $\frac{x^2}{2} \log x - x + c$ (d) $2\log x - x + c$

20. The maximum value of $f(x) = 5 + 4x - x^2$ is .....

(a) 3 (b) 6 (c) 5 (d) 9

21. The solution of the equation $\frac{dy}{dx} = \frac{2x+1}{5y^4+1}$ is .....

(a) $x^2 + x - y^5 - y = c$ (b) $2x^2 + x - 4y^3 - y = c$

(c) $x^2 - x + y^5 + y = c$ (d) $2x^2 - x + 4y^3 + y = c$

22. The area of the ellipse $\frac{x^2}{4} + \frac{y^2}{9} = 1$ is.....

(a) 2π (b) 4π (c) 6π (d) 12π

23. If $\vec{a} = 2\vec{i} + 3\vec{j}$, then $|2\vec{a}|$ is.....

(a) $\sqrt{13}$ (b) $\sqrt{26}$ (c) $2\sqrt{26}$ (d) $2\sqrt{13}$

24. $(\vec{a} - \vec{b}) X (\vec{a} + \vec{b})$ is equal to.....

(a) 0 (b) $\vec{a} \times \vec{b}$ (c) $2(\vec{b} \times \vec{a})$ (d) $|\vec{a}|^2 + |\vec{b}|^2$

25. The area of parallelogram whose diagonals are $(2,3,-3)$ & $(2,-3,3)$ is.... ...

(a) $6\sqrt{2}$ sq. units (b) $12\sqrt{2}$ sq. units (c) 6 sq. units (d) 12 sq. units

26. The vectors $(2,1,-1)$ & $(\lambda,-2,2)$ are collinear if the value of λ is ....

(a) 2 (b) 4 (c) -4 (d) -2

27. If $n(\cup) = 360, n(A) = 240, n(B) = 160,$ then the maximum value of $n(A \cap B)$ is.....

(a) 360 (b) 240 (c) 160 (d) 300

28. Which of the following is false?

(a) $|x+y| \geq |x| + |y|$ (b) $|x-y| \geq |x| - |y|$ (c) $|x+y| \leq |x| + |y|$ (d) all of these

29. The range of the function $f : \mathbb{R} \to \mathbb{R}$ defined by $f(x) = x^2 - 6x + 6$ is...

(a) $[3,\infty)$ (b) $[-3,\infty)$ (c) $[-\infty,3)$ (d) $(-\infty,-3]$

30. The function $f : \mathbb{R} \to \mathbb{R}$ defined by $f(x) = x^3$ is...

(a) odd function (b) injective function (c) surjective function (d) All

31. The set $A - (B \cap C)$ is equal to the set ...

(a) $A \cup B \cup C$ (b) $(A-B) \cup (A-C)$ (c) $(A-B) \cap (A-C)$ (d) $A \cap B \cap C$

32. The inequality $-4 < x < 3$ can also be expressed in the form...

(a) $|x| < 5$ (b) $x \geq 11$ (c) $|2x+1| < 7$ (d) $x = 7$

33. The domain of the function given by $f(x) = \sqrt{6 - x - x^2}$ is the set..

(a) $\{x : -3 < x < 2\}$ (b) $\{-3,2\}$ (c) $[-3,2]$ (d) none of the above

34. The value of $(1 + \omega - \omega^2) - (1 - \omega + \omega^2)$ is .....

(a) 1 (b) 0 (c) ω (d) ω^2

35. The quadratic equation having one root as $2 + \sqrt{3}$ is... ...

(a) $x^2 + 4x - 1 = 0$ (b) $x^2 - 4x - 1 = 0$ (c) $x^2 + 4x + 1 = 0$ (d) $x^2 - 4x + 1 = 0$

36. The sum of the n term of the series $6 + 66 + 666 + ...$ is.....

(a) $6666n$ (b) $\frac{2}{27}\left[10(10^n - 1) - 9n\right]$

(c) $\frac{2}{27}\left[10(10^n - 1) + 9n\right]$ (d) $\frac{2}{27}\left[10(10^n + 1) - 9n\right]$

37. If x, y, z are in G.P. and $x^{\frac{1}{p}} = y^{\frac{1}{q}} = z^{\frac{1}{r}}$, then p, q, r are in...

(a) H.P. (b) G.P. (c) G.P. and H.P. both (d) A.P.

38. The value of $C_0^{\,2} + C_1^{\,2} + C_2^{\,2} + ... + C_n^{\,2}$ is .....

(a) $\frac{(2n)!}{(n!)^2}$ (b) $\frac{(n!)^2}{(2n)!}$ (c) $\frac{(2n)!}{n!}$ (d) $\frac{n!}{(2n)!}$

39. Number of ways of selecting one or more objects out of n object is.....

(a) 2^n (b) 2^n-1 (c) 2^n+1 (d) n^2

40. $1+\frac{1}{3}+\frac{1.3}{3.6}+\frac{1.3.5}{3.6.9}+$..... is equal to.....

(a) $\sqrt{3}$ (b) $\frac{3}{2}$ (c) $\sqrt{5}$ (d) $\frac{1}{2}$

Physics (20X1 = 20)

41. A concave mirror forms a real image at 25 cm from the mirror surface along the principal axis. If the corresponding object is at a 10.0 cm distance, what is the mirror's focal length?

(a) 1.4 cm (b)7.1 cm (c)12 cm (d)17 cm

42. The bottom of a pond or lake appears closer than it actually is, and seems to ripple. This "bending" of light due to the water is defined as .....

(a) interference (b) diffraction (c) refraction (d)reflection

43. A person can't see objects clearly beyond 50cm. The power of the lens to correct the vision is .....

(a) +0.5D (b) -0.5D (c) +2D (d) -2D

44. White light is passed through a prism of angle 5^0. If the refractive indices for the red and blue colors are 1.641 and 1.659 respectively, the angle of dispersion will be.....

(a) 2^0 (b) 0.09^0 (c) 0.9^0 (d) 4^0

45. The dimension formula for the Plank's constant is.....

(a) $M^1L^2T^1$ (b) ML^2T^{-1} (c) $M^1L^2T^2$ (d) $M^1L^2T^{-1}$

46. A stone is dropped from the top of the tower. If it covers 24.5m in the last second of its motion, the height of the tower is.....

(a) 49m (b) 44.1m (c) 88.4m (d) 72m

47. The kinetic energy needed to project a body of mass m from the surface of (radius R) to infinite is ...

(a) $\frac{mgR}{2}$ (b) 2mgR (c) mgR (d) $\frac{MgR}{4}$

48. A ball is dropped from a 45 m high platform. Neglecting air resistance, how much time will it take for this ball to hit the ground?

(a) 1.0 s (b) 2.0 s (c) 3.0 s (d)4.0 s

49. If two masses of 4Kg and 16Kg are moving with equal kinetic energy, the ratio of their momentum will be.....

(a) 1:4 (b) 1:2 (c) 4:1 (d)1: $\sqrt{2}$

50. Time period for a simple pendulum inside a satellite orbiting the earth is.....

(a) 0 (b) infinite (c) 1sec (d) 9.8sec

51. The radius of the circular path of a particle is double but its frequency of rotation remains constant. If the initial centripetal force be F, then the final centripetal force will be.....

(a) F (b) 2F (c) 4F (d) $\frac{F}{2}$

52. A sphere is rolling. The ratio of the rotational energy to total kinetic energy is given by.....

(a) 7:10 (b) 2:5 (c) 10:7 (d) 2:7

53. If the liquid does not wet the solid surface, the angle of contact is.....
(a) acute (b) obtuse (c) 90^0 (d) Zero

54. If a wire of young's modulus Y, longitudinal strain X is produced, then the value of potential energy stored in its unit volume will be .....
(a) YX^2 (b) $2YX^2$ (c) $0.5Y^2X$ (d) $0.5YX^2$

55. Temperature of a body recorded by a Celsius thermometer is -50^0C; its temperature recorded by Kelvin scale is .....
(a)223K (b) 323K (c) 23K (d) -50K

56. 1 gm of ice at 0^0 and 1gm of steam at 100^0 are mixed. The resulting temperature is.....
(a) 0^0 C (b) 230^0C (c) 50^0 C (d) 100^0 C

57. A black body when it is hot emits heat radiation of .....
(a) IR wavelength (b) UV wavelength
(c) Particular wavelength (d) All wave lengths

58. A sample of the gas expands from volume V_1 to V_2. The amount of work done by the gas is greatest when the expansion is .....
(a) isothermal (b) isobaric (c) adiabatic (d) equal in all cases

59. An ideal heat engine operates in a Carnot cycle between 227^0C and 127^0C. It absorbs 6KJ of heat at the higher temperature. The amount of heat converted into work is.....
(a) 1.2KJ (b1.6KJ (c) 3.5KJ (d) 4.8 KJ

60. A certain mass of gas at 273K is expanded to 81 times its volume under adiabatic condition. If γ =1.25 for the gas, then final temperature is .....
(a) 0^0C (b) -91^0C (c) -182^0C (d) -235^0C

61. The frequency of an organ pipe is *f*. If half part of the organ pipe is dipped into water, its frequency will be.....
(a) f (b) $\frac{f}{2}$ (c) $2f$ (d) $\frac{f}{4}$

62. The minimum distance between the source and the reflector, so that an echo is heard is approximately equal to.....
(a)10m (b) 17m (c)34m (d)50m

63. Bats detect the obstacles in their path by receiving the reflected.....
(a) infrasonic waves (b) radio waves
(c) electro-magnetic waves (d) Ultrasonic waves

64. When the prongs of tuning forks are made thinner, the frequency of vibration.....
(a) increases (b) decreases (c) remains constant (d) none of above

65. The magnetic field lines inside a coil .....
(a) are straight (b)point at the same direction
(c) all of the above (d)none of the above

66. An iron nail can be turned into a temporary magnet if it is held in a strong magnetic field. This method of magnetization is called .....
(a) induction (b) charging (c) saturation (d) convection

67. The electric or magnetic field can't accelerate.....
(a) alpha particle (b) beta particle (c) protons (d) neutrons

68. Charged particles enter a magnetic field at an angle of 45^0 with the magnetic field intensity. The path of the particle will be.....
(a) straight line (b) a circle (c) an ellipse (d) a helix

69. A toy train set has a resistance of 20.0Ω and uses a current of 250 mA. If it ran for one hour, what is the power of the train?
(a) 1.2 W (b) 2.2 ×102W (c) 5.0 W (d)4.5 ×103 W

70. To give an electrically neutral object a positive charge, you must .....
(a) add electrons to it (b) remove electrons from it
(c) add protons to it (d) remove protons from it

71. The terminal potential difference when the short circuit is.....
(a) E (b) $\frac{E}{3}$ (c) $\frac{E}{2}$ (d) 0

72. How many seconds will it take for 10.0 C of charge to pass through a 12.0 a circuit?
(a)120 s (b) 100 s (c) 0.120 s (d) 0.833 s

73. Which voltage source converts chemical energy to electrical energy?
(a) Electrical generator (b) Battery
(c) Solar cell (d) Electronic power supply

74. The value of α for a given transistor is 0.99. What is the value of current transfer ratio β ?
(a) 49 (b) 50 (c) 90 (d)99

75. A particle of mass 5m at rest decays into two particles of masses 2m and 3m having none zero velocities. The ratio of Debroglie wavelength of particle is.....
(a) $\frac{3}{2}$ (b) $\frac{2}{3}$ (c) $\frac{1}{3}$ (d)none of above

76. Which of the following digital logic gates are used to build a single transistor?
(a) AND gates (b) OR gates (c) NOT gates (d)NAND gates

77. Which digital system translates coded characters into a more intelligible form?
(a)Encoder (b) Display (c) Counter (d) Decoder

78. Charge carrier in semiconductor is due to .....
(a) electrons and holes (b) electrons only (c) holes only (d) none

79. The radius of first Boh'r orbit H-atom is .....
(a) 0.53nm (b) $0.53A^0$ (c) $53A^0$ (d) $5.3A^0$

80. Which of the photon of radius has the highest energy?
(a) Photon of blue light (b) Photon of red light
(c) Photon of green light (d) Photon of violet light

Chemistry (40X1 = 40)

81. Which of the following statements is correct?
(a) Sodium nitride has the formula NaN_3 (b) K reacts with N_2 to give K_3N
(c) Lithium nitride forms when Li reacts with N_2S (d) All are incorrect

82. What is the formula of copper sulphate crystal?
(a) $CuSO_4$ (b) $CuSO_4\ 5H_2O$ (c) $CuCO_3$ (d) $CuSO_43H_2O$

83. The molecular formula of Ammonia solution is.....
(a) NH_3 (b) $(NH_4)_2SO_4$ (c) NH_4OH (d) NH_2CONH_2

84. Which of these has the least boiling point?
(a) HF (b)HCL (c) HBr (d) HF

85. Which of these is both Bronsted acid and Lewis acid ?
(a) BF_3 (b) HCl (c) HS_4^- (d) NH_4^+

86. The reactive species present in Aqua-regia is.....

(a) nascent oxygen (b) nascent hydrogen (c) NO_2 (d) nascent Cl

87. Which of these is the strongest reducing agent?

(a) HF (b) HCl (c) HBr (d) HI

88. Which of these is an ore of zinc?

(a) siderite (b) malachite (c) franklnite (d) tincal

89. The raw material used in the manufacture of sodium carbonate by Solvay's process is.....

(a) NH_3 and CO_2 (b) NaCl and CO_2

(c) NaCl, $CaCO_2$and CO_2 (d) NaCl, $CaCO_2$and CO_2

90. The number(s) of orbital in 'd 'sub-shell is/ are.....

(a) 1 (b) 2 (c) 5 (d) 4

91. Which one of these forms precipitates on passing H_2S gas?

(a) acidified $Al_2(SO_4)_3$ (b) acidified $CuSO_4$

(c) acidified $ZnSO_4$ (d) acidified $ZnSO_4$

92. An element of atomic number 37 belongs to.....

(a) s-block (b)p-block (c) d-block (d) f-block

93. The types of the bonds present in the hydrogen peroxide is.....

(a) only covalent (b) covalent and ionic

(c) covalent and co-ordinate (d) none of the above

94. $CH_4 + O_2 \longrightarrow CO_2 + H_2O$, the reaction that occurs here is.....

(a) reduction (b) combustion

(c) single displacement (d) double displacement

95. Nitrous acid is .....

(a) reducing agent (b) bleaching agent

(c) both a and b (d) none of above

96. During electrophilic substitution, nitro group in nitrobenzene is.....

(a) ortho para directors (b) meta directors

(c) neither ortho nor meta (d) group director

97. Alkaline $KMnO_4$ is called .....

(a) Hoffmann's reagent (b) Tollen's reagent

(c) Bayer's reagent (d) group reagent

98. Unsaturated hydrocarbons contains.....

(a) Carbon-carbon multiple bonds (b) covalent bond

(c) Carbon-carbon single bonds (d) homogenous solution

99. The correct IUPAC names of the compound with molecular formula $(CH_3)_3C\text{-}CH_3$ is.....

(a) 2,3-dimethyl butane (b) 2,2-dimethyl propane

(c) iso-propane (d) trimethylpropanr

100. An example of disaccharide is .....

(a) sucrose (b) glucose (c) fructose (d) starch

101. The distillation of phenol with zinc dust gives.....

(a) toluene (b) aniline (c) benzene (d) benzaldehyde

102. Glucose is converted into ethyl C_2H_5OH and CO_2 during fermentation by .....

(a) Zymase (b) invertase (c) maltase (d) KOH

103. Among the amines,.....

(a) 1^0amine is most basic (b) 2^0amine is most basic

(c) 3^0amine is most basic (d) Amines are not basic

104. Formaldehyde when reacts with Grignard reagent followed by hydrolysis gives .....

(a) 1^0 alcohols (b) 2^0 alcohols (c) 3^0 alcohols (d) none of these

105. C_nH_{2n+2} is general formula of .....

(a) alkynes (b) alcohols (c) alkanes (d) none of these

106. The mean speed of oxygen molecules in air at 25 °C is .....

(a) 482 m s^{-1} (b) 444 m s^{-1} (c) 14.0 m s^{-1} (d) 129 m $^{s-1}$

107. A perfect gas expands reversibly at a constant temperature of 298 K so that its volume doubles. What is the change in the molar internal energy of the gas?

(a) +2.27 kJ mol^{-1} (b) 0 J mol^{-1} (c) 1.72 kJ mol^{-1} (d) -2.27 kJ mol^{-1}

108. The correct combined gas equation is.....

(a) $P_1V_1 = P_2V_2$ (b) $PV = nRT$ (c) $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$ (d) none of above

109. 0.2 gm of a metal gives 68.4 ml of hydrogen measured at NTP on treatment with dilute HCl. The equivalent weight of the metal is .....

(a) 12 (b) 32.78 (c) 36 (d) 53

110. 1 gram mole of sodium hydroxide (NaOH) is.....

(a) 53 gm of NaOH (b) 32 gm NaOH (c) 40 gm of NaOH (d) none of the above

111. Which of the following is the equivalent conductivity of .12N solution of an electrolyte whose specific conductance is 0.024 S cm^{-1}?

(a) 200 S cm^2mole^{-1} (b) 50 S cm^2mole^{-1} (c) 300 S cm^2mole^{-1} (d) none of the above

112. The molality of 4% by weight of NaOH solution is.....

(a) 0.104 m (b) 0.402 m (c) 1.04 m (d) 4.01 m

113. 1.7 gm of silver salt of an acid on heating gave 1.08 gm of silver. The equivalent weight of acid is .....

(a) 46 (b) 49 (c) 60 (d) 63

114. Volume of the 4.4 gm of CO_2 at STP is.....

(a) 2.24L (b) 22.4L (c)4.48L (d) 4.4L

115. The number of atoms in 4.25 gm of NH_3 is.....

(a) $1x10^{23}$ (b) $2x10^{23}$ (c) $4x10^{23}$ (d) $6x10^{23}$

116. Percentage of gold in 21.6 carat gold is.....

(a) 21.6% (b) 90% (c) 10% (d) 70%

117. The amount of the NaOH required to prepare N/10 solution of sodium hydroxide in 500ml volumetric flask is.....

(a) 2gm (b) 1gm (c) 20gm (d) 40gm

118. If 2gm of sulphur is completely burnt in oxygen to form SO_2, what is the volume (in litre) of oxygen consumed at NTP?

(a) 2.8 (b) 1.4 (c) 1.2 (d) 0.2

119. The outer shell configuration of most electronegative element is .....

(a) ns^2np^3 (b) ns^2np^4 (c) ns^2np^5 (d) ns^2np^6

120. 340 K when converted into Celsius scale is equal to.....

(a) 67^0c (b) 413^0 (c) -67^0C (d) none

English (30x1 = 30)

Read the following passage and tick the best answers

The brain of the average human weighs approximately 14 kilograms and consists of three main parts-the cerebrum, the cerebellum and the brain stem. The cerebrum is by far the largest of the three parts, taking up 85% of the brain by weight. The outside layer of the cerebrum, the cerebral cortex, is a grooved and bumpy surface covering the nerve cells beneath. The various sections of the cerebrum are the sensory cortex, which is responsible for receiving and decoding sensory messages from throughout the body; the motor cortex, which sends action instructions to the skeletal muscles; and the association cortex, which receives, monitors, and processes information. It is in the association cortex that the processes that allow humans to think take place. The cerebellum, located below the cerebrum in the back part of the skull, is the section of the brain that controls balance and posture. The brain stem connects the cerebrum and the spinal cord. It controls various body processes such as breathing and heartbeat.

Questions:

121. The passage states that the most massive part of the brain is the .....
(a) cerebrum (b) cerebellum (c) cerebral cortex (d) brain stem

122. How does the passage describe the appearance of the cerebral cortex?
(a) As smooth (b) As 85% of the brain by weight
(c) As a layer of the cerebellum (d) As ridged

123. According to the passage, which part of the brain analyzes information?
(a) The sensory cortex (b) The association cortex
(c) The cerebellum (d) The brain stem

124. Which of the following is true about the cerebellum?
(a) It is located above the cerebrum. (b) It controls breathing.
(c) It is responsible for balance. (d) It is the outside layer of the cerebrum.

125. What is the author's main purpose of writing this paragraph?
(a) To describe the function of the parts of the brain.
(b) To explain how the brain processes information.
(c) To demonstrate the physical composition of the brain.
(d) To give examples of human body functions.

126. The doctor..... to us that there had been financial problems earlier in the year.
(a) concluded (b) offered (c) revealed (d) told

127. That's very sad news. If ..... sooner, I would have tried to help.
(a) I know (b) I'll know (c) I knew (d) I'd known

128. There ..... to be serious flaws in the design.
(a) claimed (b) reported (c) were said (d) were told

129. If you borrow something from someone, make sure you give .....
(a) them back to it. (b) it back to them (c) back it to them (d) it to them back

130. I was born in Nepal and .....
(a) so my parents were (b) so were my parents
(c) so were born my parents (d) my parents were born so

131. We haven't got ..... on holiday at the moment.
(a) money enough to go (b) enough money to go
(c) money enough for going (d) enough money for going

132. No sooner .....one of the engines caught fire.

(a) had we taken off when (b) had we taken off than

(c) we had taken off when (d) we had taken off than

133. It was inevitable that women would be sent into space along with men.

(a) unlikely (b) influential (c) fantastic (d) unavoidable.

134. Where.....? Which hair dresser did you go to?

(a) did you cut your hair (b) have you cut your hair

(c) did you have cut your hair (d) did you have your hair cut.

135. The police officer stopped us and asked us where.....

(a) were we going (b) are we going (c) we are going (d) we were going.

136. The view was wonderful. If ..... a camera with me, I would have taken some photographs.

(a) I'd had (b) I would have (c) I would have had (d) I had

137. I had no ..... a place to live. In fact, it was surprisingly easy.

(a) difficulty to find (b) difficulty finding

(c) trouble to find (d) trouble to found

138. ..... a hotel, we looked for somewhere to have dinner.

(a) Finding (b) After found (c) Having found (d) We found

139. What's name of the man .....?

(a) you borrowed his car (b) which car you borrowed

(c) whose car you borrowed (d) his car you borrowed

140. I am not good ..... repairing things.

(a) at (b) for (c) in (d) about

141. If you're worried about the problem, you should do something ..... it.

(a) for (b) about (c) against (d) with

142. Our flat is ..... the second floor of the building.

(a) in (b) at (c) on (d) to

143. . ..... during the storm.

(a) The fence collapsed (b) They collapsed the fence

(c) The fence was collapsed (d) They were collapsed the fence

144. The traffic lights ..... green and I pulled away.

(a) become (b) turned (c) got (d) went

145. They directed that the building.....

(a) is to be pulled down (b) pulled down

(c) should pulled down (d) to be pulled down

146. What have we got .....?

(a) for a dinner (b) for the dinner (c) for dinner (d) to dinner

147. The word 'festivity' has the stress on the..... syllable.

(a) first (b) second (c) third (d) fourth

148. Scientists measure the microscopic distances between atoms in microns.

(a) visible (b) tiny (c) machine-like (d) unmeasured

149. In a hot balloon, the altitude is determined by the amount of fuel fed to the burner.

(a) height (b) speed (c) length (d) magnitude

150. The correct pronunciation of the word 'abacus' is.....

(a) /'æbəkəs/ (b) /abə'kəs/ (c) /əb'ækəs/ (d) /'æbəkas/

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