IOE Entrance Mock Test Question

Set III

1. The dimensions of $\frac{1}{\sqrt{\mu_0 \epsilon_0}}$ are

   [1 Marks]

   a) $A^0 M^0 L T^{-1}$

   b) $A^2 M^4 L^{-3} T^{-1}$

   c) $A^{-2} M^2 L^0 T^{-1}$

   d) $A^0 M^0 L^{-1}$

2. The dimensions of $\frac{1}{\sqrt{\mu_0 \epsilon_0}}$ are

   [1 Marks]

   a) $A^0 M^0 L T^{-1}$

   b) $A^2 M^4 L^{-3} T^{-1}$

   c) $A^{-2} M^2 L^0 T^{-1}$

   d) $A^0 M^0 L^{-1}$

3. If the length of wire is doubled, then its Young's modulus

   [1 Marks]

   a) Becomes double

   b) Becomes half

   c) Remains same

   d) Becomes triple

4. The temperature at which centigrade and Fahrenheit scale are equal is

   [1 Marks]

   a) $-40°C$

   b) $273°C$

   c) $-273.15°C$

   d) $impossible$

5. The speed of sound in gas is v. The rms speed of molecules of this gas is c. if $\gamma = \frac{C_P}{C_V}$, the ratio of v to c is
[1 Marks]

a) $\frac{3}{\gamma}$

b) $\frac{\gamma}{3}$

c) $\sqrt{\frac{3}{\gamma}}$

d) $\sqrt{\frac{\gamma}{3}}$

6. The differential equation of wave motion is
[1 Marks]

a) $\frac{d^2y}{dx^2} = \frac{1}{v^2}\frac{d^2y}{dt^2}$

b) $\frac{d^2y}{dx^2} = \frac{1}{v}\frac{d^2y}{dt^2}$

c) $\frac{d^2y}{dx^2} = v^2\frac{d^2y}{dt^2}$

d) $\frac{d^2y}{dx^2} = v\frac{d^2y}{dt^2}$

7. Which of the following does not support the wave nature of light
[1 Marks]

a) Interference

b) Diffraction

c) Photoelectric effect

d) Polarization

8. In case of concave mirror of focal length f, the minimum distance between the real object and real image is
[1 Marks]

a) f

b) $2f$

c) $4f$

d) 0

9. Blue colour of sky is due to
[1 Marks]

a) Dispersion of light

b) Scattering of light

c) Interference of light

d) Sun emits blue only

10. 1C of charge contains:
[1 Marks]

a) 1.6×10^{18} electrons

b) 6.25×10^{18} electrons

c) 6.25×10^{19} electrons

d) 9.1×10^{31} electrons

11. The dimension of resistance is same as those of……. Where h is Planck's constant and e is the charge of electron.
[1 Marks]

a) $\frac{h^2}{e^2}$

b) $\frac{h^2}{e}$

c) $\frac{h}{e^2}$

d) $\frac{h}{e}$

12. The area enclosed by hysteresis loop is a measure of

[1 Marks]

a) Susceptibility

b) Permeability

c) Retentivity

d) Energy loss per cycle

13. The particle which is not be deflected by a magnetic field is
[1 Marks]

a) Proton

b) Neutron

c) Electron

d) Sodium ion

14. The charge to mass ratio of proton to α particle is
[1 Marks]

a) 2:1

b) 1:1

c) 1:2

d) 1:3

15. The ratio of the energy of the orbital electron in first orbit of Bohr and that of second orbit of Bohr is
[1 Marks]

a) 2:1

b) 4:1

c) 1:2

d) 1:4

16. When a nuclei emits α −particle,
[1 Marks]

a) Mass no decreases by 2

b) Atomic number decreases by 2

c) Atomic number decreases by 1

d) No change occurs

17. The velocity of a particle is $v = (3t + 1)$ m/s. When the particle starts from rest, the distance travelled by the particle when $t = 4s$ is
[2 Marks]

a) 7m

b) 14m

c) 21m

d) 28m

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

a) $\sqrt{\frac{3\pi}{\rho G}}$

b) $\sqrt{\frac{\pi}{\rho G}}$

c) $\sqrt{\frac{3\pi}{2\rho G}}$

d) $\sqrt{\frac{\pi}{2\rho G}}$

19. When load a wire is increased from 2kg to 4kg, elongation increases from 0.6mm to 1mm. Work done during this extension of wire is
[2 Marks]

a) 10^{-3}J

b) 40×10^{-3}J

c) 4×10^{-3}J

d) 14×10^{-3}J

20. 10 gm of ice at -10°C is converted into steam at 100°C. The amount of heat required in calorie is
[2 Marks]

a) 725

b) 7250

c) 350

d) 3000

21. The frequency of tuning fork is 384Hz and the velocity of sound in air is 352m/s. The distance traversed by the sound wave while the fork completes 36 vibrations is
[2 Marks]

a) 33m

b) 36m

c) 352m

d) 72m

22. In Young's double slit experiment, the intensity ratio at a point of observation due to two coherent waves is 4:9. The ratio of the intensity at maxima to the intensity at minima is
[2 Marks]
a) 25:1
b) 81:16
c) 13:4
d) 9:4

23. A convex mirror of focal length f produces an image $\frac{1}{n}th$ of size of object. The distance of object from the mirror is
[2 Marks]
a) $f(n-1)$
b) $\frac{f}{n}$
c) $\frac{f}{n-1}$
d) nf

24. Three charges $-q, Q\ and\ -q$ are placed at equal distances on a straight line. If the total potential energy of the system of three charges is zero, the ratio of $Q: q\ is$
[2 Marks]
a) 1:2
b) 2:1
c) 1:4
d) 4:1

25. The wire of a fuse in an electric circuit melt when the current density increases to $600Am^{-2}$. The diameter of the wire so that it may limit the current to 0.4A is
[2 Marks]
a) 0.04A
b) 0.08A
c) 0.12A
d) 0.16A

26. An α particle of mass 6.65×10^{-27}kg travels at right angles to a magnetic field of strength 0.2T with a speed of 6×10^{5}m/s. The acceleration of α particle is
[2 Marks]

a) $3.84 \times 10^{-14} ms^{-2}$

b) $5.77 \times 10^{14} ms^{-2}$

c) $3.84 \times 10^{-12} ms^{-2}$

d) $5.77 \times 10^{12} ms^{-2}$

27. In Millikan's oil drop experiment, a charge drop of mass 1.8×10^{-14} kg is stationary between its plates. The distance between its plate is 0.9cm and P.D. is 2kilo volts. The no. of electrons on the drop is
[2 Marks]

a) 500

b) 50

c) 5

d) 0

28. In Millikan's oil drop experiment, a charge drop of mass 1.8×10^{-14} kg is stationary between its plates. The distance between its plate is 0.9cm and P.D. is 2kilo volts. The no. of electrons on the drop is
[2 Marks]

a) 500

b) 50

c) 5

d) 0

29. Which of the following is a noun?
[1 Marks]

a) Long

b) Dog

c) Walk

d) The

30. Choose the correct sentence.
[1 Marks]

a) The police is coming.

b) The police coming.

c) The police are coming.

d)The police is come.

31. If he had gone to Agra, he ……. the Taj Mahal.
[1 Marks]

a) Have been seen

b) Saw

c) Had been seen

d) Would have seen

32. If we _____ you 10%, we _____ have any money on it.
[1 Marks]

a) Are giving - will

b) Gives - won't

c) Gave - wouldn't

d) Give – would

33. The indirect speech for “May God pardon your sins” is:
[1 Marks]

a) She said that may God pardon your sins.

b) She prayed that God might pardon your sins.

c) She said that God might pardon your sins.

d) She wished that God might pardon his sins.

34. Identify the complex sentence from the following:
[1 Marks]

a) The cow gives milk.

b) Ram went to the park and played football.

c) The sky is blue.

d) When we went there, we found that he had gone.

35. My family _____ coming to the city tomorrow.
[1 Marks]

a) is

b) are

c) be

d) am

36. Sita is afraid _____ spiders.
[1 Marks]

a) of

b) about

c) in

d) from

37. Time and tide _____ for no man.
[1 Marks]

a) Wait

b) Waits

c) Do not wait

d) Is waiting

38. What is the synonym for Drag?
[1 Marks]

a) Push

b) Pull

c) Close

d) Open

39. Which of the following contains the words beginning with the same consonant?
[1 Marks]

a) Charm-choice

b) Church-chemistry

c) Cheap-keep

d) Ship-chip

40. _____ refers to the emphasis laid on specific syllables of a word or a specific word in a sentence.
[1 Marks]
a) Syllables
b) Phonemes
c) Stress
d) Letters

41. The number of carbon atoms in 1.12 liters of ethane gas at STP is
[1 Marks]
a) $0.1N_A$
b) $0.05N_A$
c) $0.15N_A$
d) $1.2N_A$

42. Which of these set represents electron with least energy?
[1 Marks]
a) n = 2, l = 1, m = -1, s = +1/2
b) n = 3, l = 0, m = 0, s = -1/2
c) n = 3, l = 1, m = -1, s = +1/2
d) n = 3, l = 2, m = +1, s = -1/2

43. The addition of HCOONa to a solution of HCOOH makes the pH of the solution to
[1 Marks]
a) Increase
b) Decrease
c) No change
d) Cannot be predicted

44. Which of these can act as both oxidant and reductant?
[1 Marks]
a) H_2S
b) O_3
c) SO_2
d) NH_3

45. The indicator used for titration of CH_3COOH and NH_4OH is:
[1 Marks]
a) Phenolphthalein
b) Methyl orange
c) Both a and b
d) None

46. Bleaching by SO_2 is:
[1 Marks]
a) Due to oxidation and is permanent.
b) Due to reduction and is permanent.
c) Due to oxidation and is temporary.
d) Due to reduction and is temporary.

47. Which of the following gives precipitate with NH_4OH in the presence of NH_4Cl?
[1 Marks]
a) $ZnSO_4$
b) $Al_2(SO_4)_3$
c) $CuSO_4$
d) $CaCl_2$

48. What is manufactured by the electrolysis of aqueous sodium chloride?
[1 Marks]
a) NaOH
b) NaClO
c) Na
d) $NaClO_3$

49. The secondary suffix for the compound $CH_3COCH_2CH_2OH$ is:
[1 Marks]
a) – ol
b) – al
c) – one
d) – omol

50. Which of these is an electrophile?
[1 Marks]
a) NH_3
b) $AlCl_3$
c) CO_3^{--}
d) NO

51. Which of these can be used to prepare methane gas?
[1 Marks]
a) Wurtz rxn
b) Kolbe's electrolysis
c) Decarboxylation of fatty acid
d) All of these

52. When potassium dichromate reacts with reducing agent in the presence of H_2SO_4, $Cr_2(SO_4)_3$ is obtained. The eq. wt. of potassium dichromate is:
[2 Marks]
a) M/2
b) M/3
c) M/5
d) M/6

53. The volume of Cl_2 gas obtained at STP during electrolysis of NaCl by passing 0.5A current for 30 minutes. Assume current efficiency to be 80%,
[2 Marks]
a) 54.42 ml
b) 68.14 ml
c) 74.12 ml
d) 83.56 ml

54. The volume of HCl gas at STP required to reduce the strength of 400 ml of N NaOH to 0.5N NaOH is
[2 Marks]
a) 2.82 liters
b) 3.58 liters
c) 4.16 liters
d) 4.48 liters

55. The Ksp of $Mg(OH)_2$ is 5×10^{-11}. The pH of saturated $Mg(OH)_2$ solution is:
[2 Marks]
a) 3.33
b) 4.33
c) 10.67
d) 11.67

56. Which of the following mixture liberates Nitrogen gas on heating?
[2 Marks]
a) $NH_3 + HCl$
b) $NH_4Cl + CaO$
c) Zn + dil. HNO_3
d) $NH_4Cl + NaNO_2$

57. According to electrochemical theory, rust of iron contains
[2 Marks]
a) Fe^{++}
b) Fe^{+++}
c) OH^-
d) Both b and c

58. A haloalkane (X), reacts with KCN to produce a nitrile, which on acidic hydrolysis gave propanic acid, the compound (X) must be:
[2 Marks]
a) ethyl halide
b) iso propyl halide
c) methyl halide
d) n – propyl halide

59. Which of the following is tear producing?
[1 Marks]
a) Ester
b) Ketone
c) Acid Chloride
d) Amide

60. The coefficient of the middle term in the expansion of $(2 + 3x)^4$ is:
[1 Marks]
a) 5!
b) 6
c) 216
d) 8!

61. Roots of the equation $x^2 + 7x + 12 = 0$ are
[1 Marks]
a) $\{3, -4\}$
b) $\{-3, 4\}$
c) $\{3, 4\}$
d) $\{-3, -4\}$

62. Let Matrix $A = [\ a_{ij}\ ]$ be a square matrix of order n. If $a_{ij} = 0$ for all $i \neq j$ and $a_{ij} = 1$ for all $i = j$, then A is
[1 Marks]

a) scalar matrix

b) identity matrix

c) null matrix

d) symmetric matrix

63. For a positive integer n
[1 Marks]

a) $n! = n(n+1)$

b) $n! = n(n+1)!$

c) $n! = n(n-1)$

d) $n! = n(n-1)!$

64. A function whose domain is a subset of natural numbers is called
[1 Marks]

a) Identity function

b) sequence

c) onto function

d) series

65. $\int \frac{dx}{e^{-x}+e^{x}}$ is
[1 Marks]

a) $\tan^{-1} e^{x} + c$

b) $\tan^{-1} e^{-x} + c$

c) $\log(e^{x} - e^{-x}) + c$

d) $\log(e^{x} + e^{-x}) + c$

66. The area bounded by the curves $y^2 = 4x$ and $y = x$ is equal to
[1 Marks]

a) 1/3

b) 8/3

c) 35/6

d) None of these

67. If a function f is increasing within $[a, b]$, then slope of tangent to its graph within $[a, b]$ remains
[1 Marks]
a) Positive
b) Negative
c) Zero
d) Undefined

68. The derivative of $\frac{1}{1+x}$ is:
[1 Marks]
a) x
b) $1 + x$
c) $(1 + x)^2$
d) $-(1 + x)^{-2}$

69. $\lim_{x\to 2} \frac{x^2-4}{x^2+4}$ is
[1 Marks]
a) 1
b) 0
c) $-\frac{1}{2}$
d) -1

70. The length of the y-intercept made by the circle $x^2+y^2-8x+y-20=0$ is
[1 Marks]
a) 5
b) 7
c) 6
d) 9

71. The graph represented by the equation $x=\sin^2 t$ and $y=2\cos t$ is
[1 Marks]
a) parabola
b) hyperbola
c) ellipse
d) circle

72. The separate lines represented by $4x^2-4xy+y^2-1=0$ are

[1 Marks]

a) (x+y)(3x-4y+1)=0

b) (2x-y+1)(x+3y)=0

c) (4x+2y)(3x-2y+1)=0

d) (2x-y+1)(2x-y-1)=0

73. The co-ordinate of the points which divide the line segment joining the points (-2,6) and (-6,18) in the ratio 1:3 externally are

[1 Marks]

a) (2,-6)

b) (6,-18)

c) (1,-3)

d) (-4,12)

74. The locus of the points which is equidistance from the point (1,2,3) and (3,2,-1) is

[1 Marks]

a) x-2y=0

b) 2x-y=0

c) x-2z=0

d) 2x-z=0

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

[1 Marks]

a) $\mathbb{R}$

b) $\mathbb{Z}$

c) $\mathbb{R}^+$

d) Negative real numbers including zero.

76. Domain of cosecx is

[1 Marks]

a) R

b) $R - \{x \mid x = n\pi, n \in Z\}$

c) negative real numbers

d) none of these

77. Probability of getting prime number on dice is _____

[1 Marks]

a) 1⁄2

b) 1/4

c) 1/3

d) 1

78. The sum of 10 items is 12 and the sum of their squares is 18. The standard deviation is

[1 Marks]

a) 1/5

b) 2/5

c) 3/5

d) 4/5

79. If $x^3 + ax^2 - a^2x - a^3$ is divided by $x + a$, then the remainder is

[2 Marks]

a) 0

b) a^3

c) $2a^3$

d) $-2a^3$

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

[2 Marks]

a) rational

b) irrational

c) complex

d) none of these

81. If the matrix $\begin{bmatrix} k & 4 \\ 3 & 2 \end{bmatrix}$ is singular then $k =$

[2 Marks]

a) 2

b) 6

c) 4

d) 8

82. 8.7.6.5 is the factorial form of

[2 Marks]

a) $\frac{8!}{4!}$

b) 8!

c) $\frac{1}{4!}$

d) 4!

83. If $a_n = \frac{1}{2^n}$, then first four terms are

[2 Marks]

a) $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}$

b) 2,4,8,16

c) 1,2,4,8

d) $1, \frac{1}{2}, \frac{1}{4}, \frac{1}{8}$

84. Area enclosed between the curves $y = x^3$ and $y = \sqrt{x}$ is

[2 Marks]

a) $\frac{5}{3}$

b) $\frac{5}{4}$

c) $\frac{5}{12}$

d) $\frac{12}{5}$

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

[2 Marks]

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

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

c) -1

d) 0

86. $\lim_{x\to-\infty} \frac{-5}{\sqrt{x}} =$

[2 Marks]

a) 0

b) $-\infty$

c) $+\infty$

d) Not exists

87. $\lim_{x\to-\infty} \frac{4-x^2}{x^2-1}$ is

[2 Marks]

a) 1

b) 0

c) -4

d) -1

88. Integrating factor of the differential equation $\frac{dy}{dx} + y\,tan\,x - sec\,x = 0$ is

[2 Marks]

a) $\cos x$

b) $secx$

c) e

d) e^{tanx}

89. The vertex of the parabola $x^2+8x+12y+4=0$ is

[2 Marks]

a) (-4,1)

b) (4,-1)

c) (-4,-1)

d) (4, 1)

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

[2 Marks]

a) $\pi/2$

b) $\pi/3$

c) $\pi/4$

d) $\pi/6$

91. The length of the projection of the segment joining P(-1,2,0) and Q(1,-1,2) on the planes 2x-y-2z = 4 is
[2 Marks]

a) $2\sqrt{2}$

b) 4

c) $2\sqrt{3}$

d) 3/2

92. Correlation refers to

[2 Marks]

a) The causal relationship between two variables

b) The association between two variables.

c) The proportion of variance that two variables share.

d) A statistical method that can only be used with a co relational research design

93. Period of sin3x is
[2 Marks]

a) $\frac{\pi}{3}$

b) $\frac{2\pi}{3}$

c) π

d) 2π

94. An oxide of an element contains 16.46% of Oxygen. 0.8L of the vapours of element chloride at STP weighs 8.152g. The atomic weight of the element is:
[2 Marks]

a) 114.7

b) 118.4

c) 121.7

d) 127.6

95. What current strength in ampere will be required to liberate 10g of copper from copper sulphate solution in one hour?
[2 Marks]

a) 507.4

b) 8.5

c) 304

d) 0.85

96. 0.5 g of NaOH is added to 100ml of 0.25N HCl solution. The pH of the resulting solution is

[Option]

a) 0.3
b) 0.9
c) 1.3
d) 1.2

A. Read the following passage and answer the questions that follow:

One of the most famous works of art in the world is Leonardo da Vinci's Mona Lisa. Nearly everyone who goes to see the original will already be familiar with it from reproductions, but they accept that fine art is more rewardingly viewed in its original form. However, if Mona Lisa was a famous novel, few people would bother to go to a museum to read the writer's actual manuscript rather than a printed reproduction. This might be explained by the fact that the novel has evolved precisely because of technological developments that made it possible to print out huge numbers of texts, whereas oil paintings have always been produced as unique objects. In addition, it could be argued that the practice of interpreting or 'reading' each medium follows different conventions. With novels, the reader attends mainly to the meaning of words rather than the way they are printed on the page, whereas the 'reader' of a painting must attend just as closely to the material form of marks and shapes in the picture as to any ideas they may signify.

96. According to the passage, Monalisa is:
[2 Marks]

a) Da Vinci's masterpiece
b) One of the famous works of art
c) Just another painting
d) The only work on art

97. Why do people want to view art in its original form?
[2 Marks]

a) They can appreciate art better in its original form.
b) They are tired of viewing duplicates.
c) both A & B
d) None of the above

98. According to the passage, what is the difference between a novel and a painting?
[2 Marks]

a) No difference
b) Novels are unique.
c) Paintings are unique objects.
d) None of the above

100. What is the difference between reading a novel and a painting?
[2 Marks]

a) No difference.
b) In a novel, they have to carefully observe the way they are printed and, in a painting, it is just reading the meaning.
c) In a painting, they have to carefully observe the way they are printed and, in a novel, it is just reading the meaning.

d) None of the above