

IOE Entrance Mock Test Question

Set V

1. If $|\vec{P}| > |\vec{Q}|$, the angle between maximum resultant and minimum resultant is [1 Marks]
 - a) 0°
 - b) 45°
 - c) 90°
 - d) 180°
2. Damping force depends only on [1 Marks]
 - a) Displacement
 - b) Acceleration
 - c) Velocity
 - d) Displacement squared
3. A cable is cut to half of its original length. The maximum load that it can support is [1 Marks]
 - a) Half
 - b) Same as previous
 - c) Double
 - d) One fourth
4. The device that measures the quantity of heat is [1 Marks]
 - a) Thermometer
 - b) Calorimeter
 - c) Sonometer
 - d) Voltmeter

5. An inflated tyre of a bicycle bursts. Which of the following relation between pressure P and temperature T holds good if γ is the ratio of the specific heat capacities of air?
[1 Marks]
- a) $P^{\gamma-1}T^{\gamma} = \text{constant}$
 - b) $P^{\gamma}T^{\gamma-1} = \text{constant}$
 - c) $P^{\gamma}T^{\gamma} = \text{constant}$
 - d) $P^{1-\gamma}T^{\gamma} = \text{constant}$
6. Laplace correction in expression of velocity of sound given by newton is needed because of sound waves
[1 Marks]
- a) Are longitudinal
 - b) Propagate isothermally
 - c) Propagate adiabatically
 - d) Are of long wavelength
7. In Fraunhofer's diffraction at single slit, the light wavefront incident on slit is
[1 Marks]
- a) Spherical
 - b) Cylindrical
 - c) Plane
 - d) Elliptical
8. A glass lens is dipped in water. Its power will be
[1 Marks]
- a) Increases
 - b) Decreases
 - c) Remains same
 - d) Becomes infinite

9. A completely transparent material will be invisible in vacuum when refractive index of material is
[1 Marks]
- a) Unity
 - b) More than unity
 - c) Less than unity
 - d) Infinite
10. A hollow charged sphere does not produce an electric field at any:
[1 Marks]
- a) Inner point
 - b) Outer point
 - c) Surface point
 - d) None of above
11. The quantity in electricity analogous to friction in linear mechanical motion is
[1 Marks]
- a) Resistance
 - b) Potential
 - c) Charge
 - d) Inductance
12. A bar magnet of magnetic moment M is cut into two parts of equal length. The magnetic moment of either part is
[1 Marks]
- a) M
 - b) $2M$
 - c) $M/2$
 - d) Zero

13. A proton moving with a constant velocity passes through a region of space without change in velocity. If E and B represent electric and magnetic fields respectively, this region of space may have

[1 Marks]

a) $E = 0, B \neq 0$

b) $E = 0, B = 0$

c) $E \neq 0, B = 0$

d) $E \neq 0, B \neq 0$

14. A proton moving with a constant velocity passes through a region of space without change in velocity. If E and B represent electric and magnetic fields respectively, this region of space may have

[1 Marks]

a) $E = 0, B \neq 0$

b) $E = 0, B = 0$

c) $E \neq 0, B = 0$

d) $E \neq 0, B \neq 0$

15. The angular momentum of electron in the second orbit of hydrogen atom is

[1 Marks]

a) $\frac{h}{2\pi m}$

b) $\frac{h}{\pi}$

c) $\frac{2\pi}{h}$

d) $\frac{h}{2\pi}$

16. A radioactive element ${}_Z X^A$ emits a particle and changed into ${}_{Z-1} X^A$. The particle emitted is

[1 Marks]

a) Positron

b) Beta-particle

c) Neutron

d) Gamma-particle

17. A train 110m length is traveling at 60km/hr. The time at which a man walking at 6km/hr in opposite direction pass the train is
[2 Marks]
- a) 5.4s
 - b) 6s
 - c) 4.2s
 - d) 8s
18. An artificial satellite moving in a circular orbit at a distance h from the center of earth has total energy E_0 . Its potential energy is
[2 Marks]
- a) $-E_0$
 - b) $1.5E_0$
 - c) E_0
 - d) $2E_0$
19. A wire of cross-sectional area 3 mm^2 having Young's modulus $2 \times 10^{11} \text{ Nm}^{-2}$ is just stretched between two fixed points at a temperature of 20°C . If the coefficient of linear expansion is $10^{-5} \text{ }^\circ\text{C}^{-1}$, then tension on the wire when temperature falls by 20°C is
[2 Marks]
- a) 100N
 - b) 200N
 - c) 120N
 - d) 140N
20. 0.1 m^3 of water at 80°C is mixed with 0.3 m^3 of water at 60°C . The final temperature is
[2 Marks]
- a) 65°C
 - b) 70°C
 - c) 68°C
 - d) 75°C
21. A sound absorber attenuates the sound level by 20dB. The intensity decreases by a factor of
[2 Marks]
- a) 1000
 - b) 10000
 - c) 100
 - d) 10

22. The path difference between two interfering waves at a point on the screen is $\frac{1}{8}^{\text{th}}$ of a wavelength. The ratio of intensity at this point to that at the center of bright fringe is
[2 Marks]
a) 0.853
b) 1.17
c) 0.99
d) 1.01
23. A disc is placed on the surface of a pond having refractive index $\frac{5}{3}$. A source of light is placed 4m below the surface of liquid. The minimum area of disc needed so that light is not coming out of the liquid is
[2 Marks]
a) $32.45m^2$
b) $28.28m^2$
c) $24.54m^2$
d) $17.27m^2$
24. A certain charge Q is divided into q and $Q-q$. The relation between q and Q so that q and $Q-q$ placed at a certain distance apart experience maximum electrostatic repulsion is
[2 Marks]
a) $Q = q$
b) $Q = 2q$
c) $Q = \frac{1}{2}q$
d) $Q = \frac{1}{3}q$
25. A parallel combination of three resistances takes a current of 7.5A from a 30V battery. If the two resistances are 10Ω and 12Ω , the third resistance is
[2 Marks]
a) 4Ω
b) 9Ω
c) 15Ω
d) 21Ω

26. A coil of cross-sectional area A lies in a uniform magnetic field B with its plane perpendicular to the field. In this position the normal to the coil makes an angle of 0° with the field. The coil rotates at a uniform rate with period T . The induced emf in the coil during the interval when the coil rotates from 270° to 360° is [2 Marks]

a) $-\frac{4BA}{T}$

b) $\frac{4BA}{T}$

c) $-\frac{BA}{T}$

d) $\frac{BA}{T}$

27. In Millikan's oil drop experiment, a drop of charge Q and radius r is kept constant between two plates of P.D. 800V. Then the charge on other drop of radius $2r$ which is kept constant with a P.D. of 3200V is [2 Marks]

a) Q

b) $2Q$

c) $3Q$

d) $4Q$

28. If two ions of same charge and energy but different masses m_1 & m_2 are passing through a uniform magnetic field, the ratio of radii of their paths is [2 Marks]

a) $\sqrt{\frac{m_1}{2m_2}}$

b) $\frac{m_1}{m_2}$

c) $\sqrt{\frac{m_1}{m_2}}$

d) $\sqrt{\frac{2m_1}{m_2}}$

29. Which of the following is an adjective?

[1 Marks]

- a) Call
- b) Blue
- c) Box
- d) Shirt

30. Choose the correct sentence.

[1 Marks]

- a) The family hikes the Mardi trail every year.
- b) The family has been hiking the Mardi trail every year.
- c) The family have been hiking the Mardi trail every year.
- d) The family is hiking the Mardi trail every year.

31. For the last six months, he Ayurvedic medicine for asthma.

[1 Marks]

- a) Takes
- b) Has taken
- c) Has been taking
- d) Is taking

32. If you spoke less and listened more, you _____ more aware of what people really felt.

[1 Marks]

- a) Will be
- b) Are being
- c) Would be
- d) Be

33. The direct speech for “The father warned his son that he should be aware of him” is:

[1 Marks]

- a) The father warned his son, "Beware of him!"
- b) The father warned his son, "Watch that chap!"
- c) The father warned his son, "Be careful about him."
- d) The father warned his son, "Don't fall into the trap."

34. Choose the sentence that conveys the same meaning as the given sentence.

‘After the party started, Mary had been relatively quiet in her speech.’

[1 Marks]

- a) Mary had not spoken much after the party began.
- b) In the beginning, Mary did not speak much.
- c) Mary said many words at the end of the party.
- d) The party began and Mary tried not to speak much.

35. The doctor and the nurse _____ together.

[1 Marks]

- a) working
- b) work
- c) is working
- d) works

36. I am envious _____ them.

[1 Marks]

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

37. Blood is _____ than the water.

[1 Marks]

- a) Thin
- b) Thick
- c) Thicker
- d) Thinner

38. What is the synonym for Anxious?

[1 Marks]

- a) Bright
- b) Shiny
- c) Impolite
- d) Nervous

39. Identify the word in which the final sound is different from other words.

[1 Marks]

- a) Sleep
- b) Reap
- c) Teach
- d) Deep

40. "Kick the bucket" is an Euphemism that describes:

[1 Marks]

- a) Death of a person
- b) Illness of a person
- c) That the person is not available at the moment.
- d) Kicking the bucket

41. Total no. of molecules of O_2 at NTP required to burn 1 mole of propane completely is
[1 Marks]
- a) $5 \times N_A$
 - b) 5
 - c) $\frac{N_A}{2}$
 - d) N_A
42. The maximum number of orbitals in a shell is:
[1 Marks]
- a) $2(2l + 1)$
 - b) $2l + 1$
 - c) n^2
 - d) n
43. Which acid has more strength?
[1 Marks]
- a) HOCl
 - b) HOClO
 - c) HOClO₂
 - d) HOClO₃
44. Which of this have – O – O – linkage?
[1 Marks]
- a) SO_4^{2-}
 - b) $S_2O_3^{2-}$
 - c) $S_2O_7^{2-}$
 - d) $S_2O_8^{2-}$
45. Representative elements are those which belongs to
[1 Marks]
- a) p and d block
 - b) s and d - block
 - c) s and p block
 - d) s and f – block
46. Oil of vitriol is:
[1 Marks]
- a) H_2SO_3
 - b) H_2SO_4
 - c) H_2SO_5
 - d) $H_2S_2O_8$

47. Temporary hard water is:

[1 Marks]

- a) acidic
- b) alkaline
- c) neutral
- d) amphoteric

48. Which of these is soluble in water?

[1 Marks]

- a) BaCO_3
- b) BaSO_4
- c) BaCl_2
- d) PbSO_4

49. The IUPAC name of glyoxal is

[1 Marks]

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

50. The formula $\text{C}_n\text{H}_{2n}\text{O}_2$ (where $n \geq 3$) represents

[1 Marks]

- a) carboxylic acid
- b) aldehyde
- c) acid and ester
- d) aldehyde and ketone

51. The product formed by passing acetylene through hot Cu^- tube is

[1 Marks]

- a) Poly acetylene
- b) Vinyl acetylene
- c) benzene
- d) toluene

52. Two element X (At. Wt. = 75) and Y (At. Wt. = 16) forms a compound which contains 75.8% of X. The formula of the compound is:
[2 Marks]
- a) XY
 - b) X_2Y_3
 - c) X_3Y_2
 - d) XY
53. 0.975 grams of metal were deposited by passing 193C charge through Mn^{+} ion. The value of n is (Atomic weight of M = 195) :
[2 Marks]
- a) 1
 - b) 2
 - c) 3
 - d) 4
54. 2.5 liters of 1 M NaOH solution are mixed with another 3 liters of 0.5 M NaOH solution. Then the molarity of the resulting solution is
[2 Marks]
- a) 1.08M
 - b) 1.0M
 - c) 0.73M
 - d) 0.50
55. The pH of a solution required to precipitate $Zn(OH)_2$ form a solution containing 0.05 M Zn^{++} ion is:
 K_{sp} for $Zn(OH)_2 = 1.29 \times 10^{-9}$
[2 Marks]
- a) 9.2
 - b) 10.2
 - c) 11.2
 - d) 8.2
56. Which of this forms a ppt with a gas formed by reacting FeS with dilute H_2SO_4 ?
[2 Marks]
- a) Acidified $ZnSO_4$
 - b) Acidified $MnSO_4$
 - c) Acidified $FeCl_3$
 - d) Acidified $CdSO_4$

57. The tough cake copper is the copper obtained after purification of blister copper by
[2 Marks]

- a) electrorefining
- b) poling
- c) liquation
- d) distillation

58. A hydrocarbon formed by electrolysis of potassium acetate on ozonolysis gives :
[2 Marks]

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

59. The largest coefficient in the expansion of $(1 + x)^{10}$ is:

[1 Marks]

- a) $10! / (5!)^2$
- b) $10! / 5!$
- c) $10! / (5! \times 4!)^2$
- d) $10! / (5! \times 4!)$

60. $x^4 - 3x^3 + 4x^2 - 3x + 1 = 0$ is called

[1 Marks]

- a) reciprocal eq
- b) exponential eq
- c) radical eq
- d) none of these

61. The transpose of a rectangular matrix is a

[1 Marks]

- a) square matrix
- b) rectangular matrix
- c) row matrix
- d) column matrix

62. $n_p n_n =$

[1 Marks]

- a) $n!$
- b) 0
- c) 1
- d) none of these

63. $-2, 1, 4, 7, \dots$ is

[1 Marks]

- a) harmonic sequence
- b) arithmetic sequence
- c) geometric sequence
- d) arithmetic series

64. $\int_1^2 (x^2 + 1) dx =$

[1 Marks]

- a) $\frac{10}{3}$
- b) $\frac{3}{10}$
- c) π
- d) $\frac{\pi}{2}$

65. The area enclosed between the graph of $y = x^3$ and the lines $x = 0, y = 1, y = 8$ is

[1 Marks]

- a) 7
- b) 14
- c) $45/4$
- d) None of these

65. $f(x) = \sin x$ is

[1 Marks]

- a) Linear function
- b) Odd function
- c) even function
- d) identity function

66. $x = at^2$ and $y = 2at$ are parametric equation of:

[1 Marks]

- a) parabola
- b) ellipse
- c) circle
- d) hyperbola

67. If $[x]$ is the greatest integer not greater than x , then $\lim_{x \rightarrow \frac{1}{2}} [x]$ is

[1 Marks]

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

68. The equation of the normal to the circle $x^2 + y^2 = 25$ at point (3,4) is

[1 Marks]

- a) $3x + 4y + 1 = 0$
- b) $3x - 4y + 1 = 5$
- c) $3y - 4x = 0$
- d) $3x - 4y = 0$

69. The focus of the parabola $y^2 = 4y - 4x$ is

[1 Marks]

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

70. The lines joining the points of intersection of the line $x + y = 1$ and the curve

$x^2 + y^2 - 2y + \lambda = 0$ to the origin are perpendicular. Then, the value of $\lambda =$

[1 Marks]

- a) $1/2$
- b) $-1/2$
- c) $1/\sqrt{2}$
- d) 0

71. The distance between the parallel lines $3x+4y = 9$ and $6x+8y = 15$ is

[1 Marks]

- a) $5/7$
- b) $2/5$
- c) $7/10$
- d) $3/10$

72. If O is the origin and P(2,3,4) and Q(1,-2,1) are any two points, then two lines OP and OQ are

[1 Marks]

- a) Parallel
- b) Perpendicular
- c) Skewed
- d) Intersecting

73. The graph of the binary relation $y = x^2 - 6x + 5$ represents

[1 Marks]

- a) line
- b) circle
- c) parabola
- d) ellipse

74. Range of cosecx is

[1 Marks]

- a) $[-1,1]$
- b) R
- c) negative real no.
- d) $R - \{x \mid -1 < x < 1\}$

75. If 4 bulbs are there each of which can be defective or non-defective then what is the total number of possible outcomes?

[1 Marks]

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

76. If mode of a series exceeds its mean by 12, then mode exceeds the median by

[1 Marks]

- a) 4
- b) 8
- c) 6
- d) 12

77. If \vec{a} , \vec{b} and \vec{c} Are three mutually perpendicular unit vectors, then $|\vec{a} + \vec{b} + \vec{c}|$ is equal to

[1 Marks]

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

78. The nth term of a G.P. is

[1 Marks]

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

79. If $x - 2$ is a factor of $ax^2 - 12x + 4$, then $a =$

[2 Marks]

- a) -5
- b) 5
- c) 0
- d) 1

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

[2 Marks]

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

81. How many 3 digit numbers can be formed by using each one of the digits 2,3,5,7,9 only once

[2 Marks]

- a) 120
- b) 60
- c) 24
- d) 15

82. The 6th term of the arithmetic sequence whose 1st term is 3 and common difference is zero is

[2 Marks]

- a) 18
- b) 6
- c) 3
- d) 0

83. $\int x^x(1 + \log x) dx$ is equals to

[2 Marks]

- a) $x^x + c$
- b) $x^{-x} + c$
- c) $x \log x + x$
- d) $\log x + x$

84. If $f(x) = \sin x$ then $f'(\cos^{-1}3x) =$

[2 Marks]

- a) $\cos x$
- b) $\frac{-3}{\sqrt{1-9x^2}}$
- c) $\frac{3}{\sqrt{1-9x^2}}$
- d) $3x$

85. $\lim_{x \rightarrow 0} \frac{\sin x^\circ}{x} =$

[2 Marks]

- a) $\frac{\pi}{180^\circ}$
- b) $\frac{180^\circ}{\pi}$
- c) 180π
- d) 1

86. $\lim_{x \rightarrow \infty} \frac{5x^3 + 27}{20x^2 + 10x + 9}$ is

[2 Marks]

- a) ∞
- b) $\frac{1}{4}$
- c) 3
- d) 0

87. The solution of the differential equation $\cos x \sin y \, dx + \sin x \cos y \, dy = 0$ is

[2 Marks]

- a) $\frac{\sin x}{\sin y} = c$
- b) $\sin x \sin y = c$
- c) $\sin x + \sin y = z$
- d) $\cos x \cos y = c$

88. The straight line $y = 2x + \lambda$ does not meet the parabola $y^2 = 2x$ if

[2 Marks]

- a) $\lambda < 1/4$
- b) $\lambda = 1/4$
- c) $\lambda > 1/4$
- d) $\lambda = 4$

89. The area of the square ABCD whose two sides are $5x + 12y - 26 = 0$ and $5x + 12y + 39 = 0$ are

[2 Marks]

- a) 125
- b) 100
- c) 169
- d) 25

90. The planes $3x - 4y = 6, x = 0, y = 0$ meet

[2 Marks]

- a) in a line
- b) in a unique point
- c) taken two at a time in parallel lines
- d) none

91. The value of coefficient of correlation lies between

[2 Marks]

- a) 0 to 1
- b) 0 to -1
- c) **-1 to 1**
- d) 1 to -1

92. Period of $\sin \frac{x}{3}$ is

[2 Marks]

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

93. If $ABCDEF$ is a regular hexagon, then $AB \cdot AF$ is equal to

[2 Marks]

- a) $\frac{1}{2}BC^2$
- b) $-\frac{1}{2}BC^2$
- c) $\frac{1}{2}AC^2$
- d) $-\frac{1}{2}AC^2$

94. A metal oxide contains 40.05% of oxygen. 0.8L of the metal chloride vapour at STP weighs 6.782gm. The formula of the metal chloride is

[2 Marks]

- a) MCl
- b) MCl_2
- c) MCl_3
- d) MCl_4

95. The thickness of silver coat on a copper vessel of surface area $80 \text{ cm} \times 10 \text{ cm}$ applied by passing 0.2 A current for 3 hrs. (ρ of silver = 10.47 gm/cc)

[2 Marks]

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

96. Which of these has more no. of molecules?

[1 Marks]

- a) 6.4 gm of oxygen
- b) 2.2 litre of CO₂ at NTP
- c) 4 gm of hydrogen
- d) 1 litre of water

97. Read the following passage and answer the questions that follow

Teaching, more even than most other professions, has been transformed during the last hundred years from a small highly skilled profession concerned with a minority of the population, to a large and important branch of the public service. The profession has a great and honourable tradition, extending from the dawn of history until recent times, but any teacher in the modern world who allows his predecessors is likely to be made sharply aware that it is not his function to teach what he thinks, but to instill such beliefs and prejudices as are thought useful by his employers.

Q. In ancient times the teaching profession was:

[2 Marks]

- a) reserved for the upper class
- b) reserved for a privileged few
- c) open to all
- d) limited to a highly skilled minority

98. What has transformed teaching into an important branch of public service is

[1 Marks]

- a) teaching skills
- b) technical developments
- c) utilitarian philosophy
- d) the demand of the employing industry

99. According to this passage in modern times a successful teacher is primarily supposed to –

[1 Marks]

- a) impart knowledge
- b) impart new and the latest skills
- c) toe the lines preferred by those is authority
- d) instill values he cherishes the most

100. The modern teacher is not able to follow the ideals of his predecessors because

[1 Marks]

- a) of tremendous advancement in professional skills.
- b) of social and financial constraints
- c) the students are not serious about studies
- d) the modern teacher has more interest in politics than in academic activity

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