Institute of Eximination

MODEL ENTRANCE EXAM

Section-A

Believe in yourself. Do great! ■

1) Locate the word with sound.

a) question b) parachute c) moustache d) discretion

2) Moot

a) controversial b) debatable c) questionable d) clear

3) When the teacher _____ the student entered the room.

a) was teaching b) is teaching c) taught d) had taught

4) Her father, as well as I, _____ support for the project.

a) want b) wants c) are wanting d) have wanted

5) The equipment _____ for sale.

a) are b) were c) is d) have

6) ____ beds he bought are expensive.

a) A b) An c) The d) None

7) ..... down.

a) Lie b) Lay c) Lied d) Lain

8) He said, “Let’s help the poor.”

a) He suggested to help the poor. b) He suggested helping the poor. c) He suggested let’s help the poor. d) He suggests helping the poor.

9) You like apples and so .....

a) I do b) I like c) do I d) did I

10) It is 6 O’ clock .....my watch.

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

11) Before I went out I _____ my homework.

a) had done b) do c) did d) have done

12) Phosphates .....to most farm lands nowadays.

a) need added b) needs to be added c) need to add d) need to be added

13) If f : A B is a function and distinct elements in A have distinct images in B, then the function is:

a) one to one b) onto c) into d) bijective

14) If log64 = 3, then the value of a =

a) 3 b) 5 c) 4 d) 1

15) If and are the imaginary cube roots of unity, then the value of + + 1 =

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

16) If P(n, 5) = 20 P(n, 3), then n =

a) 8 b) 6 c) 10 d) 4

17) The value of (1 + + + …….. + - (1 + + + …….. + =

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

18) The fourth term of a G.P. is 2. Then, the product of the first seven terms is

a) 2^5 b) 2^6 c) 2^7 d) 2^4

19) The most general value of satisfying the equations and is

a) $2n\pi+\alpha$ b) $2n\pi-\alpha$ c) $n\pi+\alpha$ d) $n\pi-\alpha$

20) If sin(sin 1/5 + cosx) = 1, then x =

a) 1/3 b) 0 c) 1/5 d) 4/5

21) If and then

a) 16 b) 8 c) 3 d) 12

22) Which of the following is not a property of vectors

a) $\mathbf{u}\times\mathbf{v}=\mathbf{v}\times\mathbf{u}$ b) $\mathbf{u}\cdot\mathbf{v}=\mathbf{v}\cdot\mathbf{u}$ c) $(\mathbf{u}\times\mathbf{v})^2=\mathbf{u}^2\cdot\mathbf{v}^2-(\mathbf{u}\cdot\mathbf{v})^2$ d) $\mathbf{u}^2=|\mathbf{u}|^2$

23) The function is

a) Continuous and differentiable at x = 0

b) Neither continuous nor differentiable at x = 0

c) Continuous but not differentiable at x = 0

d) Not continuous but differentiable at x = 0

24) If then

a) $x^2\frac{dy}{dx}+xy=0$ b) $x^2\frac{dy}{dx}+xy=0$ c) $x^2\frac{dy}{dx}-xy+2=0$ d) None of these

25) The two sides of a rectangle are 2x and (15 -x) units. Then, the value of x for which the area of the rectangle is maximum is

a) 15 b) 5 c) $\frac{3}{4}$ d) $\frac{3}{2}$

26) A function f(x) defined by is continuous at . Then,

a) p = 3 b) p = 2 c) p = 1/2 d) p = 3/2

27) If then

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

28) The area under the curve y = and between x = 0 and x = 4 is:

a) $\frac{112}{9}$ b) $\frac{34}{5}$ c) $\frac{16}{3}$ d) $-\frac{64}{3}$

29) For the ellipse , the length of latus rectum is:

a) 3/2 b) 3 c) 8/3 d) $\sqrt{\frac{3}{2}}$

30) The circle passes through the points (1, 0), (- 1, 0) and (0, 1) is:

a) x^2 b) x^2 c) x^2 d) x^2

31) - 6xy + + 4x - 12y + 4 = 0 represents:

a) a pair of perpendicular lines b) a pair of parallel lines c) a pair of coincident lines d) a parabola

32) The area of formed by the lines y - x = 0, y + x = 0 and x - c = 0 is:

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

33) The angle of contact of liquid on increasing temperature

a) increasing b) decreases c) remain constant d) none

34) A physical parameter a can be determined by measuring the parameters b, c, d and e using the relation . If the maximum errors in the measurement of b, c, d and e are and , then the maximum error in the value of a determined by the experiment is

a) $(b_1 + c_1 + d_1 + e_1)\%$ b) $(b_1 + c_1 - d_1 - e_1)\%$ c) $(\alpha b_1 + \beta c_1 - \gamma d_1 - \delta e_1)\%$ d) $(\alpha b_1 + \beta c_1 + \gamma d_1 + \delta e_1)\%$

35) Moment of inertia is

a) Scalar b) Vector c) Axial vector d) Polar vector

36) A hot body will radiate heat most rapidly if its surface is

a) white and polished b) white and rough c) black and polished d) black and rough

37) In a cyclic process, work done by the system is

a) Zero b) Equal to heat given to the system c) More than the heat given to system d) Independent of heat given to the system

38) The heat is flowing through two cylindrical rods of same material. The diameters of the rods are in the ratio 1 : 2 and their lengths are in the ratio 2 : 1. If the temperature difference between their ends is the same, the ratio of rate of flow of heat through them will be

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

39) Bells are made larger size to

a) produce sound of high pitch b) produce loud sound c) produce sound of high quality d) produce sound of low quality

40) Which of the following is the most important factor which helps to recognize a person by his voice alone?

a) Intensity b) pitch c) quality d) all are equally important factors

41) A ray of light travelling in a transparent medium falls on a surface separating the medium from air at an angle of incidence of 45. The ray undergoes total internal reflection. If n is the refractive index of the medium with respect to air, select the possible value (s) of n from the following

a) 1.3 b) 1.4 c) 1.5 d) 1.6

42) A completely transparent material will be invisible in vacuum when the R.I. is

a) unity b) more than unity c) less than unity d) equal to 1.5

43) In general, metallic ropes are suspended on the carriers which take inflammable material. The reason is

a) There speed is controlled | b) To keep the centre of gravity of the carrier nearer to the earth | c) To keep the body of the carrier in contact with the earth | d) Nothing should be placed under the carrier

44) In order to increase the capacity of a parallel plate condenser one should introduce between the plates a sheet of

a) tin | b) copper | c) steel | d) mica

45) Which of the following causes production of heat when current is set up in the wire

a) interatomic collisions | b) interelectonic collision | c) collision of conduction electrons with atoms/ions . | d) jumping of electrons from higher orbits to lower orbits

46) Two parallel wires carrying currents in the same direction attract each other because of

a) potential difference between them | b) mutual inductance between them | c) electric forces between them | d) magnetic forces between them

47) A nucleus is bombarded with a high speed neutron so that resulting nucleus is a radioactive one. This phenomenon is called

a) Artificial radioactivity | b) Fusion | c) Fission | d) Radioactivity

48) Photo-cells are the devices used to convert

a) light energy into heat energy | b) light energy into chemical energy | c) light energy into mechanical energy | d) light energy into electrical energy

49) In a beryllium atom, if be the radius of the first orbit, then the radius of the second orbit will be in general

a) $2a_0$ b) a_0 c) $4a_0$ d) $\frac{a_0}{4}$

50) The specific charge of proton is then for an -particle it will be

a) $38.4 \times 10^7 C\,kg^{-1}$ b) $19.2 \times 10^7 C\,kg^{-1}$ c) $2.4 \times 10^7 C\,kg^{-1}$ d) $4.8 \times 10^7 C\,kg^{-1}$

51) Which is the correct representation of the solubility product constant of

a) $[Ag^+]^2\,[CrO_4^{-2}]$ b) $[Ag^+]\,[CrO_4^{-2}]$ c) $[2Ag^+]\,[CrO_4^{-2}]$ d) $[2Ag^+]^2\,[CrO_4^{-2}]$

52) The values of dissociation constants of some acids (at 25oC) are as follows. Indicate which is the strongest acid in water

a) 1.4*10-2 | b) 1.6*10-4 | c) 4.4*10-10 | d) 4.3*10-7

53) According to Hess's law the charge in enthalpy in the chemical reaction depends on the

a) intermediate state | b) Initial state | c) initial and final state | d) final state

54) The number of orbitals in the fourth principal quantum number will be

a) 4 | b) 8 | c) 12 | d) 16

55) Which one of the following acids is the weakest ?

a) HClO | b) HBr | c) HClO3 | d) HCl

56) Bromine water reacts with to form

a) H_2O and HBr b) H_2SO_4 and HBr c) HBr and S d) S and H_2O

57) The roasting is done is case of

a) Oxide ores | b) Carbonates | c) Sulphide ores | d) Silicate ores

58) Ozonolysis of which one of the following will give two molecules of acetaldehyde

a) 1-butene b) 2-butene c) 1-pentene d) 2-pentene

59) Poisonous gas is

a) Lewisite b) phosgene c) mustard gas d) all of these

60) Name the compound, that is not isomer with diethyl ether

a) n-propylmethyl ether b) Butane-1-ol c) 2-methylpropane-2-ol d) Butanone

61) The solution of the equation, is:

a) $x = 2$ b) $x = -4$ c) $x = 4$ d) none of these

62) If a root of the equation is 4, while the roots of the equation are same, then the value of will be

a) 4 b) 4/49 c) 49/4 d) None of these

63) The sum of the series

a) $\log(2/e)$ b) $\log(e/2)$ c) e d) e/2

64) If for complex numbers and , then is equal to

a) $|z_1| + |z_2|$ b) $|z_1| - |z_2|$ c) $||z_1| - |z_2||$ d) 0

65) For the complex number , which is true about and ?

a) one of them is real b) one of them is purely imaginary c) both are real numbers d) both are purely imaginary numbers

66) If then general values of are

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

67) The unit vector perpendicular to both the vectors and and making an acute angle with the vector is

a) $-\frac{1}{\sqrt{26}}(4\hat{i} - \hat{j} - 3\hat{k})$ b) $\frac{1}{\sqrt{26}}(4\hat{i} - \hat{j} - 3\hat{k})$ c) $\frac{1}{\sqrt{26}}(4\hat{i} - \hat{j} + 3\hat{k})$ d) $-\frac{1}{\sqrt{26}}(4\hat{i} - \hat{j} + 3\hat{k})$

68) =

a) $\left(\frac{a}{bc}\right)$ b) 1 c) x d) log (abc)

69) Smaller area enclosed by the circle x + y = 4 and the line x + y = 2 is:

a) π b) π c) π d) π

70) (e + sinx)cosx dx =

a) $sinx$ b) $\frac{1}{4}$ c) $\frac{x^2}{2}$ d) $-xsinx + cosx$

71)

a) $\ln(\sin ax + \cos ax) + c$ b) $\frac{2}{a}(\sin ax - \cos ax) + c$ c) $\frac{1}{a}(\sin ax - \cos ax) + c$ d) $\frac{1}{a}\ln(\sin ax - \cos ax) + c$

72) The line x cos + y sin = a cuts the circle + =

a) in two distinct points b) in two coincident points c) at no point d) α

73) The pair of straight lines joining the origin to the intersection of the curve = 1 by the line x + my + n = 0 are coincident if:

a) a^2 b) a^2 c) a^2 d) none of these

74) The diagonals of a parallelogram PQRS are the lines x + 3y = 4 and 6x - 2y = 7. Then, PQRS must be a:

a) rectangle b) square c) cyclic quadrilateral d) rhombus

75) Two circles + - 6x - 2y + 1 = 0 and + + 2x - 8y + 13 = 0

a) touch each other internally b) touch each other externally c) cut each other orthogonally d) does not cut each other

76) A man moves on a cycle with a velocity of 4 km/hr. The rain appears to fall to him with a velocity of 3 km/hr vertically downwards. The actual velocity of rain is

a) 5 km/hr b) $\sqrt{7}$ c) $\frac{3}{4}$ d) 7 km/hr

77) The KE of a body is changed by 2% then momentum changes by

a) 1% b) 2% c) 3% d) 4%

78) Poisson's ratio is 0.4. If force is applied on material then the decrease in cross sectional area is 2% then % increase in length is

a) 3% b) 2.5 % c) 1% d) 0.5%

79) The displacement of body from a fixed point at any instant is given by = 5t + 6t + 4 then acceleration after 3 sec will be

a) 2 b) 2 c) 2 d) 2

80) The temperature of a body is 10 C then the temperature in Fahrenheit scale will be

a) 0 b) 0 c) 0 d) 0

81) The efficiency of carnot engine operating between 300K and 500K is

a) 2/3 b) 2/5 c) 0.3 d) 3/5

82) Beats are produced by two waves and . The number of beats heard per second is:

a) zero b) one c) four d) eight

83) A square of side 3cm is located at a distance 25cm from a concave mirror of focal length 10cm. The centre of square is at the axis of the mirror and plane is normal to axis of mirror. The area enclosed by image of the square is

a) 2 b) 2 c) 2 d) 2

84) The equivalent capacitance between and is

a) C b) C c) C d) C

85) If a wire is stretched such that its area of cross-section becomes 1/ times, then its resistance will become

a) n b) n c) n d) n

86) Calculate the current in the circuit.

a) 2 A b) 1 A c) 3 A d) 4 A

87) Electrons moving with velocity 210m/s describe a circle in magnetic field of strength 2 10T. The diameter of circle is

a) 1.1m b) 1.1cm c) 1.1mm d) 11cm

88) The energy required to take an electron from ground state to first excited state of hydrogen atom is

a) -10.2 eV. b) +10.2 eV c) 3.4 eV d) 13.6 eV

89) At a certain instant, a piece of radioactive material contains 10 atoms. The half of the material is 30 days. The number of disintegrations is first second is

a) b) c) d)

90) 1.0gm of a piece of metal was allowed to react with 25ml of 4N-HCl. When the reaction was over, 0.1gm of the metal remained unreacted. The eq.wt of metal is

a) 9 b) 12 c) 18 d) 24

91) At the dissociation constant of a base is The concentration of Hydroxyl ions in 0.01 aqueous solution of the base would be

a) $2.0 \times 10^{-6}\ \text{mol}\ L^{-1}$ b) $1.0 \times 10^{-5}\ \text{mol}\ L^{-1}$ c) $1.0 \times 10^{-6}\ \text{mol}\ L^{-1}$ d) $1.0 \times 10^{-7}\ \text{mol}\ L^{-1}$

92) What volume of at NTP will be liberated by the action of 100ml of 0.2N HCl on

a) 112ml b) 224ml c) 448ml d) 1120ml

93) about

a) 7 b) 4.7 c) 5.3 d) 1.4

94) How many atoms of calcium will be deposited from a solution of by a current 0.25 following for 60 seconds ?

a) 4.68×10^{18} b) 4.68×10^{15} c) 4.68×10^{12} d) 4.68×10^{9}

95) when heated with conc. gives

a) HI b) I_2 c) HIO_3 d) KIO_3

96) A Grignard's reagent may be obtained when magnesium reacts with

a) Ethyl iodide b) Diethyle ether c) Methyl amine d) Ethylene

97) A British survey found that 44 percent of the firms, which started to use robots, met with initial failure and 22 percent abandoned them altogether, mainly because of inadequate technological know-how and skills at all plant levels. Robotization is, by and large, a viable proposition. The machines can work round the clock, raise output, protect quality and industrial competitiveness. One robot can replace between two and five production workers, while providing cheaper labour. In the US the car industry, an-hour costs around $ 23 but a robot hour costs only $6. Certain jobs, mostly simple or hazardous ones, are irretrievably lost to robotics. Thus spot welders, press operators, spray painters, cleaners, machine loaders, grinding and polishing machine operators are endangered species.

a) b) c) d)