UNIVERSITY OF LUCKNOW

D.Pharm Entrance Examination

Mathematics Group — Model Test Paper Set 12

Total Questions: 100 | Section A: Chemistry & Physics (50) + Section B: Mathematics (50)

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SECTION A — Chemistry & Physics [50]

Chemistry

1. Manganin is an alloy containing:

(a) Mn, CO, Fe (b) Cu, Mn, Ni

(c) Zn, Cu, Mn (d) Ni, Mn, Zn

Answer: (b) Cu, Mn, Ni

2. Half-filled f-shell of lanthanide ion is: ueWLeeveeF[Dee :

(a) Ce4+ (b) Tb4+

(c) Eu3+ (d) Yb2+

Answer: (b) Tb4+

3. Which of the following ions have magnetic moment as 7.9 BM?

(a) Eu3+ (b) Gd3+

(c) Ce4+ (d) Yb2+

Answer: (b) Gd3+

4. Graphite has_____

(a) sp3 (b) sp2

(c) sp3 and sp (d) sp

Answer: (b) sp2

5. Which of the following has the lowest bond angle?

(a) NH (b) NH 3

(c) +NH (d) CH 4

Answer: (a) NH

6. In monochlorination of methane, methyl radical is formed in _____.

(a) Propagation step (b) Termination step

(c) Initiation step (d) None of these options

Answer: (a) Propagation step

7. Chain Initiation :

(a) sp3d 95 YCT (b) sp

(c) sp3 (d) sp2

Answer: (b) sp

8. The resonance hybrid structure of benzene indicated _____

(a) Heptagonal (b) Pentagonal

(c) Hexagonal (d) Tetrahedral

Answer: (c) Hexagonal

9. Benzene is_____.

(a) [6] Annulene (b) [18] Annulene

(c) [3] Annulene (d) [16] Annulene

Answer: (a) [6] Annulene

10. Which of the following :

(a) Vander walls attraction (b) Ionic bonds and Hydrogen bonds

(c) Hydrogen bonds (d) Ionic bonds

Answer: (a) Vander walls attraction

11. Calcium carbide reacts vigorously with water to yield:

(a) Acetylene (b) Carbon

(c) Ethane (d) Ethene

Answer: (a) Acetylene

12. Reaction of alkyne with a solution of an alkali metal in liquid ammonia gives: lejue Deceesefve :

(a) Alkane (b) Cis alkene

(c) Trans alkene (d) Primary amine

Answer: (c) Trans alkene

13. Benzene is less dense than: yeWpeerve efke :

(a) Alkane (b) Both Alkane and Alkene

(c) Water (d) Alkene

Answer: (c) Water

14. Which of the following organic compounds will give fouling smell of isocyanide on heating with trichloromethane and alcoholic potassium hydroxide?

(a) Glycine (b) N-Methylaniline

(c) p-Toluidine (d) N-Methyl-o-methylaniline

Answer: (c) p-Toluidine

15. 'Silver salt' method is used for the determination of molecular mass :

(a) Benzamide (b) Benzoic acid

(c) Aniline (d) Ethyl benzoate

Answer: (b) Benzoic acid

16. A liquid organic compound that decomposes at its boiling point, can conveniently be purified by Ske :

(a) simple distillation (b) vacuum distillation

(c) fractional distillation (d) all the above methods

Answer: (b) vacuum distillation

17. Sodium fusion extract prepared from 'sulphanilic acid gives blood-red coloration with the reagent :

(a) Silver nitrate (b) Ferric chloride

(c) Barium chloride (d) Mohr's salt

Answer: (b) Ferric chloride

18. Natural rubber obtained from the rubber tree, 'Hevea Brasiliensis' consists of 'Hevea Brasiliensis' :

(a) cis-poly (isoprene) (b) poly (isobutylene)

(c) trans-poly (isoprene) (d) poly (chloroprene)

Answer: (a) cis-poly (isoprene)

19. The isoelectric point of alanine is 6.0. If its pK a1 value is 2.3, then its pK value will be a2 Deuesefveve :

(a) 8.3 (b) 3.7

(c) 9.7 (d) 7.0

Answer: (c) 9.7

20. Which of the following reaction is not possible during catalytic reforming of petrol in petroleum industry?

(a) CH (CH) CH (b) n-Heptane

(c) Methycyclohexane (d) n-Octane

Answer: (a) CH (CH) CH

21. In which of the following molecules, intermolecular hydrogen bonding is possible?

(a) Nitrobenzene (b) N,N-Dimethylaniline

(c) Trimethylamine (d) N-Methylaniline

Answer: (d) N-Methylaniline

22. Arrange the following compounds in the decreasing order of their bond angles:

(a) (iii) > (ii) > (i) (b) (i) > (ii) > (iii)

(c) (ii) > (i) > (iii) (d) (i) > (iii) > (ii)

Answer: (d) (i) > (iii) > (ii)

23. The major product formed when p- chlorotoluene is treated with sodamide in presence of liquid ammonia :

(a) o-Toluidine (b) p-Chlorobenzylamine

(c) m-Toluidine (d) p-Toluidine

Answer: (c) m-Toluidine

24. Arrange the following compounds in the order of their decreasing base-strength. efvecve :

(a) (I) > (II) > (III) > (IV) (b) (II) > (I) > (IV) > (III)

(c) (IV) > (III) > (I) > (II) (d) (III) > (IV) > (II) > (I)

Answer: (c) (IV) > (III) > (I) > (II)

25. Identify the compound E in the following reaction scheme, :

(a) Benzene sulphonic acid (b) Chlorobenzene

(c) p-Nitrophenol (d) Phenol

Answer: (d) Phenol

Physics

26. The ratio of light intensity scattered by two ° ° colours of wavelengths 4000A and 6000A is ?

(a) 5 (b) 2

(c) 7 (d) 1

Answer: (a) 5

27. In case of diffraction due to an opaque circular disc, the centre of the shadow is always ?

(a) coloured (b) bright

(c) none of the above (d) dark

Answer: (b) bright

28. Light is polarized to the maximum, when it is incident on a glass surface at an angle of incidence ?

(a) 570 (b) 670

(c) 370 (d) 530

Answer: (a) 570

29. The Clausius – Mossotti relation holds best for ?

(a) Solids (b) Polar molecules

(c) Concentrate solutions (d) Gases and dilute solutions

Answer: (b) Polar molecules

30. In Young's experiment the distance between 10-3 the slits was obtained as m, the distance between the slits and the screen as 3.0 m. The 2.1×10-3 width of the fringe is obtained as m. The colour of light used in the experiment will be ?

(a) Green (b) Violet

(c) Yellow (d) Red

Answer: (d) Red

31. Two lenses of powers +4D and –2D are kept in contact. The combinations focal length will be ?

(a) 50cm (b) 100cm

(c) 25cm (d) 75cm

Answer: (a) 50cm

32. A person hears an explosion 17.7 s after it took 140 place. If the atmospheric–temperature is C, the approximate distance of the place of explosion from the person is:

(a) 6.0 km (b) 3.0 km

(c) 4.0 km (d) 2.0 km

Answer: (a) 6.0 km

33. For diffraction at a single slit, the width of the central maximum is_____ the wavelength of light ?

(a) Independent of (b) Proportional to the square of

(c) Proportional to (d) Inversely proportional

Answer: (c) Proportional to

34. Which of the following has least surface area for a given volume?

(a) Sphere (b) Cube

(c) Cylinder (d) Cone

Answer: (a) Sphere

35. A heat engine is operating between termperatures 500 K and 400 K. What is the efficiency of the engine?

(a) 1.25 (b) 0.80

(c) 0.20 (d) 0.50

Answer: (c) 0.20

36. A gas is kept in a rigid container. Heat equal to 500 J is supplied to the gas. Change in the internal energy of the gas is:

(a) 23.8 J (b) 50 J

(c) 500 J (d) 11.9 J

Answer: (c) 500 J

37. In a potentiometer experiment, two cells connected in series get balanced at 8 m length on wire. It the connection of the terminal of cell of lower emf are reversed, the balance length is obtained at 4 m. The ratio of emf's of two cells is ?

(a) 2 : (b) 4 :

(c) 1 : (d) 3 :

Answer: (d) 3 :

38. There is a diode connected to an external resistance and an e.m.f. source as shown in figure. Assuming that potential barrier developed in diode – is 0.5 V, the value of current in the circuit is ?

(a) 0.02 A (b) 0.03 A

(c) 0.025 A (d) 0.05 A

Answer: (a) 0.02 A

39. A bulb is stamped as 60 W/240 V. The resistance when lighted by 240 volt is:

(a) 560 ohm (b) 480 ohm

(c) 960 ohm (d) 240 ohm

Answer: (c) 960 ohm

40. Internal resistance of a cell depends on ?

(a) Area of the electrode (b) Distance between electrode

(c) Nature of electrode (d) All of these

Answer: (d) All of these

41. The population inversion in He-Ne laser is produced by ?

(a) chemical reaction (b) inelastic atomic collisions

(c) electron excitation (d) Photon excitation

Answer: (c) electron excitation

42. The total energy of a particle executing simple harmonic motion depends upon its ?

(a) amplitude only (b) frequency only

(c) initial state (d) frequency and amplitude both

Answer: (d) frequency and amplitude both

43. At a given temperature, mean free path of a gas is ?

(a) Inversely proportional to the pressure (b) Independent of pressure

(c) None of the above (d) Directly proportional to the pressure

Answer: (a) Inversely proportional to the pressure

44. When a perfect gas is supposed to expand freely against vacuum in an insulated vessel, the gas undergoes:

(a) a change in phase (b) a change in temperature

(c) a change in pressure and phase both (d) a change in pressure

Answer: (b) a change in temperature

45. The dimensions of Planck's constant are equivalent to which of the following ?

(a) Linear momentum (b) Energy

(c) Angular momentum (d) Force

Answer: (c) Angular momentum

46. A star is emitting yellow light. If it is accelerated towards earth, then to an observer on earth it will appear :

(a) shining yellow (b) gradually changing to red

(c) unchanged (d) gradually changing to blue

Answer: (d) gradually changing to blue

47. When water freezes, the distance between its molecules :

(a) decreases (b) becomes zero

(c) increases (d) not changes

Answer: (c) increases

48. Which thermometer is preferred for rapidly changing temperature ?

(a) Gas thermometer (b) Thermo couple thermometer

(c) Resistance thermometer (d) Liquid in glass

Answer: (b) Thermo couple thermometer

49. Heat transfers by the process of convection occurs:

(a) Only in liquids and gases (b) Only in liquids

(c) Only in solids (d) In solids, liquids and gases

Answer: (a) Only in liquids and gases

50. If the density of aluminium is 2600 and its Young modulus is 7.8 × 1010 N/m², the speed of sound in aluminium will be :

(a) 340 m/s (b) 5477 m/s

(c) 3000 m/s (d) 6431 m/s

Answer: (b) 5477 m/s

SECTION B — Mathematics [50]

51. The following sentences are steps involved in finding the H.C.F. of 29 and 24 by using Euclid's Division algorithm. Arrange them in sequential order from first to last (A) 5=1 ?

(a) B, C, A (b) A, B, C

(c) C, A, B (d) B, A, C

Answer: (a) B, C, A

52. A number of three digits in scale of 7 when expressed in scale of 9 has its digits reversed in order. Find the number expressed in scale of 10 ?

(a) 245 (b) 246

(c) 248 (d) 247

Answer: (c) 248

53. A 6 feet tall man finds that the angle of elevation of the top of a 24 feet height pillar and the angle of depression of its base are complementary angles. The distance of the man from the pillar is:

(a) 8 3 feet (b) None of these

(c) 2 3 feet (d) 6 3 feet

Answer: (d) 6 3 feet

54. Two hemispherical vessels can hold 10.8 liters and 50 liters of liquid respectively. The ratio of their minor curved surface area is:

(a) 16 : 25 (b) 25 : 9

(c) 9 : 25 (d) 4 : 3

Answer: (c) 9 : 25

55. The number of real solutions of equation x^2 ?

(a) 1 (b) 2

(c) 3 (d) 4

Answer: (d) 4

56. The ratio of the radius of two cylinders is 2:3 and the ratio of their heights is 5:3. The ratio of their volumes will be:

(a) 27 : 20 (b) 9 : 4

(c) 4 : 9 (d) 20 :27 =

Answer: (d) 20 :27 =

57. If the roots of quadratic equation $x^2+px+q=0$are tan30 ?

(a) 3 (b) 0

(c) 1 (d) 2

Answer: (a) 3

58. A metallic cone of diameter 32 cm and height 9 cm is melted and made into identical spheres each of radius 2 cm. How many such spheres can be made?

(a) 52 (b) 48

(c) 64 (d) 72

Answer: (d) 72

59. X is a non-negative integer valued random ?

(a) 2 & 2 (b) 2 & 3

(c) 4 & 2 (d) 2 & 4

Answer: (d) 2 & 4

60. For what values of m the equations (m+2)x+(2m+1)y=2(m ?

(a) 4 (b) 5

(c) 3 (d) 2

Answer: (a) 4

61. P (3, 1), Q (6, 5) and R (x, y) are three points such that the angle ?

(a) 4 (b) 1

(c) 0 (d) 2

Answer: (d) 2

62. The system of equations 2x+4y=6and 4x+8y=6has:

(a) a unique solution (b) no solution

(c) infinitely many solutions (d) exactly two solutions

Answer: (b) no solution

63. The terms of the two series 3+10+17+...and 63+65+67+...are equal, then the value of n is:

(a) 13 (b) 19 nth

(c) None of these (d) 9

Answer: (a) 13

64. The number of values of k for which the system of equations x+y=2, kx+y=4, x+ky=5has at least one solution is:

(a) 1 (b) 0

(c) 2 (d) 3

Answer: (a) 1

65. The minimum value of the sum of real numbers a ?

(a) 7 (b) 6

(c) 8 (d) 9

Answer: (c) 8

66. What is the dimension of the vector space formed by the solution of the system of following equations?

(a) 0 (b) 1

(c) 2 (d) 3

Answer: (b) 1

67. Find the number of integers between 1 and 250, that are divisible by any of the integer 2, 3 and 7 ?

(a) 179 (b) 185

(c) 170 (d) 182

Answer: (a) 179

68. The value of k for which the pair of linear equations 4x+6y ?

(a) k=4 (b) k=2

(c) k=3 (d) k=

Answer: (c) k=3

69. For any positive integers 'a' and 3, there exist unique 'q' and 'r' such that a = 3q + r, where r must satisfy:

(a) 0 < r < 3 (b) 0

(c) 1 < r < 3 (d) 0 < r

Answer: (b) 0

70. The HCF of 4052 and 12576 is:

(a) 3 (b) 2

(c) 4 (d) 6

Answer: (c) 4

71. The order of 2 modulo 101 is:

(a) 99 (b) 100

(c) 97 (d) 98

Answer: (b) 100

72. The diagonal of a rectangular plot is 60 m more than the shorter side 'b'. If the longer side 'a' is 30 m more than the shorter side, then the size 'a ?

(a) 90 m (b) 120 m

(c) 180 m (d) 60 m

Answer: (b) 120 m

73. The sum of the first '2n' terms of the A.P. 2, 5, 8,... is equal to the sum of the first 'n' terms of the A.P. 57, 59, 61 ?

(a) 13 (b) 11

(c) 12 (d) 10

Answer: (b) 11

74. Section : Discipline-3 41. How many numbers must be selected form the set {1, 2, 3, 4, 5, 6} to guarantee that at least one pair of these numbers add up to 7?

(a) 4 (b) 3

(c) 2 (d) 5

Answer: (a) 4

75. How many positive integers less than 200 are NOT divisible by three or more primes?

(a) 168 (b) 197

(c) 65 YCT (d) 122

Answer: (a) 168

76. How many positive integers not exceeding 1000 are divisible by 7 or 11 ?

(a) 90 (b) 142

(c) 220 (d) 12

Answer: (c) 220

77. If the function f(x) = |x| ?

(a) 0.5, 0.5 (b) 1,

(c) 0.5, 1.5 (d) 1, 2

Answer: (c) 0.5, 1.5

78. In a histogram, each class rectangle is constructed with base as:

(a) size of the class (b) frequency

(c) class interval (d) range

Answer: (c) class interval

79. If the median of the distribution given below is 28.5, Class: 0 ?

(a) 8, 7 (b) 8, 5

(c) 2, 5 (d) 3, 7

Answer: (a) 8, 7

80. Construction of a cumulative frequency table is useful in determining the:

(a) mean (b) median

(c) mode (d) all the three given measures

Answer: (b) median

81. If sec 4A = cosec (A ?

(a) 21 (b) 24

(c) 22 (d) 20

Answer: (c) 22

82. The wheels of a taxi are of diameter 80 cm each. How many complete revolutions does each wheel make is 10 minutes when the taxi is traveling at a speed of 66 km ?

(a) 4735 (b) 4375

(c) 4325 (d) 4355

Answer: (b) 4375

83. The perimeter of a triangle right angled at C is 70, and the in radius is 6. Then |a ?

(a) 9 (b) 8

(c) 1 (d) 2

Answer: (c) 1

84. If sign of > 0, then what can you say about nature of f?

(a) f is increasing (b) f increases as well as decreasing

(c) f neither increases nor decreasing (d) f is decreasing

Answer: (a) f is increasing

85. If a,b,c are vertices of an equilateral triangle, then $a^2 + b^2 + c^2$ = ...?

(a) ab (b) a

(c) ab + bc (d) ab + bc + ca

Answer: (d) ab + bc + ca

86. When per capitarate increases, we take same positive value we get ... growth?

(a) exponential (b) linguistics

(c) Carrying capacity (d) logistic

Answer: (a) exponential

87. According to which model, top down approach focuses on existing theory and begins with hypothesis is based on?

(a) Dynamic static model (b) dynamic model

(c) static model (d) deductive model

Answer: (d) deductive model

88. In engineering problems, there are some statements in which we have to use mathematical expression in terms of variable, function and equation , such expression are termed as...?

(a) ring solutions (b) models of time

(c) terms of continuity (d) mathematical models

Answer: (d) mathematical models

89. Which of the following is not a type of mathematical model?

(a) presumptions (b) insilicators

(c) heuristics (d) abstractions

Answer: (a) presumptions

90. What kind of information is given to us in mathematical models?

(a) estimated results (b) wrong results

(c) accurate results (d) approximate wrong results

Answer: (a) estimated results

91. Which growth curve indicates that, "living organisms is growing in natural environment "?

(a) logistic curve (b) parametric curve

(c) t curve (d) sigmoid growth curve

Answer: (d) sigmoid growth curve

92. Which theorem states that,"Between any two distinct numbers, there lies at least on rational number and hence there lies many rational numbers YCT ?

(a) Archimedean property (b) Hahn Banach theorem

(c) Density theorem (d) Cantor's theorem

Answer: (c) Density theorem

93. Find the terms of the sequence given by < 1 + 1 ?

(a) < 1, 2, 3,... > (b) < 1, 1, 1,... >

(c) < 2, 5 (d) < 1, 1

Answer: (c) < 2, 5

94. Which of the following is not a component of mathematical model?

(a) noise parameters (b) constants

(c) factors (d) variables

Answer: (c) factors

95. Taylor's theorem is mainly used in expressing the function as a sum with _____terms?

(a) finite (b) complete

(c) infinite (d) partial

Answer: (c) infinite

96. Find the limit of sin(y) ?

(a) 0 (b) 1

(c) doesn't exist (d) infinite

Answer: (c) doesn't exist

97. Find the value of integral of f; where f(x, y) = (x2y (x^2 y^2)dy + xy)dx + + over the limits ?

(a) 0 (b) 1

(c) 2 (d) 3

Answer: (a) 0

98. If u and v are continuous on [a, b] and have equal finite derivatives in [a, b], then u ?

(a) g (b) f

(c) finite (d) constant

Answer: (d) constant

99. Check about the continuity of function given by f(x) = x in interval [0, 2] ?

(a) discontinuous everywhere (b) it is uniformly continuous

(c) can't say about continuity of f (d) it is not uniformly continuous

Answer: (b) it is uniformly continuous

100. Check about the nature of continuity of f(x) = x ?

(a) not continuous (b) uniformly continuous

(c) not uniformly continuous (d) Continuous but not uniformly continuous

Answer: (b) uniformly continuous