MODEL TEST PAPER

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(B.Tech.)

Q.1. Dimensional formula for force is
(a) MLT^{-2} ☐
(b) MLT^{-1} ☐
(c) MT^{-2} ☐
(d) ML ☐

Q.2. On decreasing the temperature of a liquid its rate of evaporation
(a) increases ☐
(b) decreases ☐
(c) first increases and then decreases ☐
(d) remains unaffected ☐

Q.3. Bernoulli's theorem is based upon
(a) conservation of energy ☐
(b) conservation of charge ☐
(c) conservation of momentum ☐
(d) none of these ☐

Q.4. In an isochoric process
(a) temperature remains constant ☐
(b) pressure remains constant ☐
(c) volume remains constant ☐
(d) no exchange of heat takes place ☐

Q.5. Temperature of two bodies are T_1 and T_2. If they are in thermal equilibrium then
(a) $T_1 >> T_2$ ☐
(b) $T_1 > T_2$ ☐
(c) $T_1 < T_2$ ☐
(d) $T_1 = T_2$ ☐

Q.6. Of the following cases, velocity of sound at 30° will be least through
(a) N_2 ☐
(b) O_2 ☐
(c) SO_2 ☐
(d) CO_2 ☐

Q.7. Two tuning forks have the frequencies 512 Hz and 516 Hz. Number of beats produced by these forks per second will be
(a) 1028 ☐
(b) 4 ☐
(c) 1/4 ☐
(d) 1/1028 ☐

Q.8. Matter waves are
(a) mechanical waves ☐
(b) electromagnetic waves ☐
(c) quantum mechanical waves ☐
(d) none of these ☐

Q.9. A man is sitting on a revolving stool with his arms outstretched. When he pulls his arms suddenly inside then
(a) his angular velocity decreases ☐
(b) his moment of inertia decreases ☐
(c) his angular velocity remains constant ☐
(d) his angular momentum increases ☐

Q.10. A p-type crystal is
(a) positive ☐
(b) negative ☐
(c) neutral ☐
(d) may be positive or negative ☐

Q.11. The resistance of a wire is R. If the length of the wire is doubled, then its resistance will be
(a) 2R ☐
(b) 4R ☐
(c) 8R ☐
(d) 16R ☐

Q.12. Diamagnetism exist in the substances on account of
(a) paired electrons ☐
(b) unpaired electrons ☐
(c) presence of protons ☐
(d) presence of domains ☐

Q.13. You are given a wire of length 50 cm and battery of negligible resistance. In which case the maximum amount of Heat is generated ?
(a) when the wire is connected across the battery directly ☐
(b) hen the wire is div ided into two parts and both the parts are connected across the battery in parallel ☐
(c) when wire is divided into four parts and all the parts are connected across battery in parallel ☐
(d) None of these ☐

Q.14. The temperature of the sun is measured with
(a) platinum resistance thermometer ☐
(b) gas thermometer ☐
(c) vapour pressure thermometer ☐
(d) pyrometer ☐

Q.15. For the production of x-rays of wavelength 0.1 A, the minimum potential difference will be
(a) 12.4 KV ☐

(b) 124 KV ☐
(c) 6.2 KV ☐
(d) 62 KV ☐

Q.16. If the elements of $n > 4$ were not exists in nature, then possible number of elements in nature were
(a) 60 ☐
(b) 32 ☐
(c) 4 ☐
(d) 64 ☐

Q.17. An electron in an atom ($Z = 4$) is in first energy state. The ionization energy of the atom will be
(a) 0 eV ☐
(b) − 13.6 eV ☐
(c) 13.6 eV ☐
(d) 217.6 eV ☐

Q.18. Bohr's Quantum condition is(where $I\omega$ is moment of inertia and ω is angular velocity)
(a) $I\omega = 2\pi/ nh$ ☐
(b) $I\omega = nh/ 2\pi$ ☐
(c) $I\omega 2 = nh/ 2\pi$ ☐
(d) $I\omega = nh/ 4\pi$ ☐

Q.19. N equal resistors are first connected in series and then connected in parallel. Ratio of maximum to the minimum resistance is
(a) N ☐
(b) N^2 ☐
(c) $1/N^2$ ☐
(d) 1/N ☐

Q.20. Which of the following is true in case of longitudinal stationary waves?
(a) variation in pressure and density is maximum at nodes ☐
(b) variation in pressure is maximum and variation in density is minimum at nodes ☐
(c) variation in pressure and density is minimum at nodes ☐
(d) variation in pressure is minimum and variation in density is maximum at Nodes ☐

Q.21. In a single throw with two dice, the odds against drawing 7 is
(a) 1 : 6 ☐
(b) 1 : 12 ☐
(c) 1 : 5 ☐
(d) 5 : 1 ☐

Q.22. Two cards are drawn at random from a pack of 52 cards. The probability of getting at least a spade and an ace is
(a) 1/34 ☐
(b) 8/221 ☐
(c) 1/26 ☐
(d) 2/51 ☐

Q.23. A five digit number is formed by the digits 1, 2, 3, 4, 5 without repetition. Find the probability that the number formed is divisible by 4 :
(a) 1/5 ☐
(b) 6/5 ☐
(c) 4/5 ☐
(d) None of these ☐

Q.24. A bag contains 30 balls numbered from 1 to 30. One ball is drawn at random. The probability that the number of the ball drawn will be a multiple of 3 or 7 is :
(a) 14/30 ☐
(b) 40/900 ☐
(c) 13/30 ☐
(d) None of these ☐

Q.25. A probability that a leap year selected at random contains either 53 sundays or 53 mondays, is :
(a) 2/7 ☐
(b) 4/7 ☐
(c) 3/7 ☐
(d) 1/7 ☐

Q.26. The number of 6 digit numbers that can be made with the digits 0, 1, 2, 3, 4 and 5, so that even digit occupy odd places is
(a) 24 ☐
(b) 36 ☐
(c) 48 ☐
(d) None of these ☐

Q.27. Let $f(x) = 2x + 1$. Then the number of real values of x for which the three unequal numbers f(x), f(2x), f(4x) are in G.P. is
(a) 1 ☐
(b) 0 ☐
(c) 2 ☐
(d) None of these ☐

Q.28. The system of simultaneous equations $K x + 2 y - z = 1$, $(K - 1) y - 2 z = 2$, $(K + 2) z = 3$ have a unique solution if K is
(a) -2 ☐
(b) 0 ☐
(c) -1 ☐
(d) 1 ☐

Q.29. The number of values of a for which $(a^2 - 3a + 2) x^2 + (a^2 - 5a + 6) x + a^2 - 4 = 0$ is an identity in x is
(a) 0 ☐
(b) 2 ☐
(c) 1 ☐
(d) 3 ☐

Q.30. Set A has 3 elements and set B has 4 elements. The number of injections that can be defined from A to B is
(a) 144 ☐
(b) 12 ☐
(c) 64 ☐
(d) 24 ☐

Q.31. The value of cos 15° is equal to
(a) $[(\sqrt{3} + 1)/2\sqrt{2}]$ ☐
(b) $[(\sqrt{3} - 1)/2\sqrt{2}]$ ☐
(c) $2 - \sqrt{3}$ ☐
(d) $2 + \sqrt{3}$ ☐

Q.32. The value of tan 10° + tan 35° + tan 10°. tan 35° is equal to:
(a) 0 ☐
(b) 1/2 ☐
(c) -1 ☐
(d) 1 ☐

Q.33. The value of $\sqrt{3}$ cosec 20° – sec 20° is equal to :
(a) 2 ☐
(b) 1 ☐
(c) 4 ☐
(d) None of these ☐

Q.34. In a right angled ABC, $a = 2$, $b = 1 + \sqrt{3}$, $\angle C = 60°$ then the side c is equal to :
(a) $\sqrt{3} - 1$ ☐
(b) $\sqrt{2} + 1$ ☐
(c) $\sqrt{6}$ ☐
(D) None of these ☐

Q.35. If in a triangle PQR, sin P, sin Q, sin R are in A.P. Then :
(a) the altitudes are in A.P. ☐
(b) the altitudes are in H.P. ☐
(c) the medians are in G.P. ☐
(d) the medians are in A.P. ☐

Q.36. The distance between the parallel lines $y = 2x + 4$ and $6x = 3y + 5$ is :
(a) $17/\sqrt{3}$ ☐
(b) 1 ☐
(c) $3/\sqrt{5}$ ☐
(d) $17\sqrt{5} / 15$ ☐

Q.37. The line segment joining the points $(-3, -4)$ and $(1, -2)$ is divided by y - axis in the ratio
(a) 1 : 3 ☐
(b) 2 : 3 ☐
(c) 3 : 1 ☐
(d) 3 : 2 ☐

Q.38. The curve represented by $x = 3(\cos t + \sin t)$, $y = 4(\cos t - \sin t)$ is
(a) Ellipse ☐
(b) Parabola ☐
(c) Hyperbola ☐
(d) Circle ☐

Q.39. Which of the following is the equation of a plane?
(a) $lx + my = n$ ☐
(b) $z = 0$ ☐
(c) $2x + 3y = 0$ ☐
(d) $y = -x$ ☐

Q.40. The eccentricity of the ellipse $9x^2 + 5y^2 - 30y = 0$ is
(a) 1/3 ☐
(b) 2/3 ☐
(c) 3/4 ☐
(d) None of these ☐

Q.41. The function $f(x) = 1/x$ on its domain is
(a) increasing ☐
(b) decreasing ☐
(c) constant ☐
(d) information insufficient ☐

Q.42. The maximum value of x y subject to $x + y = 8$ is
(a) 8 ☐
(b) 16 ☐

(c) 20 ☐
(d) 24 ☐

Q.43. $\int [\cos 2x / \cos x] dx$ is equal to
(a) $2 \sin x + \log(\sec x - \tan x) + c$ ☐
(b) $2 \sin x - \log(\sec x - \tan x) + c$ ☐
(c) $2 \sin x + \log(\sec x + \tan x) + c$ ☐
(d) $2 \sin x - \log(\sec x + \tan x) + c$ ☐

Q.44. If $\sqrt{(x+y)} + \sqrt{(y-x)} = c$ where c is a constant then d^2y/dx^2 is equal to
(a) $2 / c$ ☐
(b) $-2 / c^2$ ☐
(c) $2 / c^2$ ☐
(d) None of these ☐

Q.45. The area of the region bounded by $y = |x-1|$ and $y = 1$ is
(a) 1 ☐
(b) 2 ☐
(c) 1/2 ☐
(d) None of these ☐

Q.46. If a, b, c are three non zero vectors then the equation $a \cdot b = a \cdot c$ implies
(a) $b = c$ ☐
(b) a is orthogonal to $b - c$ ☐
(c) both (i) and (ii) ☐
(d) None of these ☐

Q.47. If i, j and k are unit orthonormal vectors then $i \cdot (j \times k) + j \cdot (K \times i) + k \cdot (i \times j)$ is equal to
(a) 1 ☐
(b) 3 ☐
(c) -3 ☐
(d) 0 ☐

Q.48. The points with position vectors $10i + 3j$, $12i - 5j$ & $ai + 11j$ are collinear if a is equal to
(a) -8 ☐
(b) 4 ☐
(c) 8 ☐
(d) 12 ☐

Q.49. If $|a| = 7$, $|b| = 11$, $|a + b| = 10\sqrt{3}$ then $|a - b|$ is equal to
(a) 10 ☐
(b) $\sqrt{10}$ ☐
(c) $2\sqrt{10}$ ☐
(d) 20 ☐

Q.50. If a, b and c are three non-coplanar vectors then $(a + b + c) \cdot \{(a + b) \times (a + c)\}$ equals
(a) 0 ☐
(b) [a b c] ☐
(c) 2 [a b c] ☐
(d) $-$ [a b c] ☐

Q.51. A train of length 200 m. travelling at 30 m./sec. overtakes another of length 300 m. travelling at 20 m. /sec. The time taken by the first train to pass the second is
(a) 30 sec. ☐
(b) 50 sec. ☐
(c) 10 sec. ☐
(d) 40 sec. ☐

Q.52. The resultant of the forces 4, 3, 4 and 3 units acting along sides AB, BC, CD and DA of square ABCD of side a respectively is
(a) a null force ☐
(b) a force of magnitude $5\sqrt{2}$ through centre of square ☐
(c) a couple of moment 7 a ☐
(d) none of these ☐

Q.53. A man wishes to cross a river to an exactly opposite point on the other bank, if he can swim with twice the velocity of the current, then the inclination to the current of the direction in which he should swim is
(a) 1 : 1 ☐
(b) $\sqrt{2} : 1$ ☐
(c) $1 : \sqrt{2}$ ☐
(d) 3 : 2 ☐

Q.54. A rod can turn freely about one of its ends which is fixed. At the other end, a horizontal force equal to half of the weight of the rod is acting. In the position of equilibrium, the rod is inclined to the vertical at an angle
(a) 30° ☐
(b) 45° ☐
(c) 60° ☐
(d) None of these ☐

Q.55. Forces 7, 5 and 3 acting on a particle are in equilibrium. The angle between the last pair of forces is
(a) 120° ☐
(b) 90° ☐

(c) 60° ☐
(d) 30° ☐

Q.56. The mean marks of 100 students were found to be 40. Later on, it was discovered that a score of 53 was misread as 83. The correct mean is
(a) 35.3 ☐
(b) 36.9 ☐
(c) 41.2 ☐
(d) 39.7 ☐

Q.57. The measure which takes into account all the data items is
(a) Mean ☐
(b) Median ☐
(c) Mode ☐
(d) None of these ☐

Q.58. The scores of a batsman in ten innings are 38, 70,48, 34, 42, 55, 63, 46, 54, 44. The mean deviation about the median is
(a) 9.2 ☐
(b) 8.6 ☐
(c) 7.4 ☐
(d) 6.6 ☐

Q.59. The sum of 10 items is 12 and sum of their squares is 18.Therefore the standard deviation will be
(a) 5/3 ☐
(b) 3/5 ☐
(c) 9/25 ☐
(d) 25/9 ☐

Q.60. One of the methods of determining mode is
(a) Mode = 2 Median – 3 Mean ☐
(b) Mode = 2 Median + 3 Mean ☐
(c) Mode = 3 Median – 2 Mean ☐
(d) Mode = 3 median + 2 Mean ☐

Q.61. The minimum value of $4^x + 4^{1-x}, x \varepsilon R$ is
(a) 1 ☐
(b) 2 ☐
(c) 4 ☐
(d) None of these ☐

Q.62. The sum of all odd proper divisors of 360 is
(a) 77 ☐
(b) 78 ☐
(c) 81 ☐
(d) None of these ☐

Q.63. If $f(x) = \cos^2 x + \sec^2 x$, its value always is
(a) less than 1 ☐
(b) equal to 1 ☐
(c) between 1 and 2 ☐
(d) greater than or equal to 2 ☐

Q.64. $(\sin \theta + i \cos \theta)^4$ is equal to
(a) $\cos 4\theta - i \sin 4\theta$ ☐
(b) $\sin 4\theta + i \cos 4\theta$ ☐
(c) $\sin 4\theta - i \cos 4\theta$ ☐
(d) $\cos 4\theta + i \sin 4\theta$ ☐

Q.65. If $\tan p\theta = \tan q\theta$ then the values of θ form a series in
(a) A.P. ☐
(b) G.P. ☐
(c) H.P. ☐
(d) None of these ☐

Q.66. Choose the appropriate Antonym of ***'Undertaking'***
(a) Resignation ☐
(b) Trial ☐
(c) Refusal ☐
(d) Denial ☐

Q.67. Choose the appropriate Antonym of ***'Sympathy'***
(a) Enmity ☐
(b) Cruelty ☐
(c) Abhorrence ☐
(d) Apathy ☐

Q.68. Choose the appropriate Antonym of ***'Host'***
(a) Arranger ☐
(b) Visitor ☐
(c) Manager ☐
(d) Entertainer ☐

Q.69. Choose the appropriate Synonym of ***'ABASH'***
(A) Strike ☐
(b) Deduct ☐
(c) Forsake ☐
(d) Confound ☐

Q.70. Choose the appropriate Synonym of ***'HARASS'*** ☐
(a) rave ☐
(b) shelter ☐
(c) torment ☐
(d) pierce

Q.71. Choose the appropriate Synonym of ***'Ghastly'***
(a) Terrible ☐
(b) Pleasant ☐
(c) Pretty ☐
(d) Sanction ☐

Q.72. Choose the letter of the correctly spelt word.
(a) pernicious
(b) parnicious ☐
(c) pernishes ☐
(d) pernecious ☐
☐

Q.73. Choose the letter of the correctly spelt word.
(a) marrygible ☐
(b) marriageable ☐
(c) marriagable ☐
(d) marriageble ☐

Q.74. Choose the most suitable **One Word-**
'A workman who fits and repairs pipes'
(a) Mechanic ☐
(b) Blacksmith ☐
(c) Plumber ☐
(d) Technocrat ☐

Q.75. Choose the most suitable **One Word-**
'Study of books in regard to their outward form, authors, subjects, editions, etc.'
(a) autobiography ☐
(b) biography ☐
(c) bibliography ☐
(d) philately ☐

Q.76. Fill in the blank selecting correct **Preposition** from the alternatives given below sentence -
He aspires ….. the post of a professor.
(a) about ☐
(b) for ☐
(c) to ☐
(d) on ☐

Q.77. Fill in the blank selecting correct **Preposition** from the alternatives given below sentence -
I do not know how to manage ……. four hundred francs.
(a) with ☐
(b) without ☐
(c) by ☐
(d) for ☐

Q.78. Fill in the blank selecting correct **Preposition** from the alternatives given below sentence -
'I am fond ……. vegetables.'
(a) into ☐
(b) since ☐
(c) of ☐
(d) for ☐

Q.79. Fill in the blank with a suitable **Article**
'The man is …… social animal.'
(a) a ☐
(b) an ☐
(c) the ☐
(d) None of these ☐

Q.80. Fill in the blank with a suitable **Article**

'Mohan gave me …… useful book.'
(a) a ☐
(b) an ☐
(c) the ☐
(d) None of these ☐

Q.81. Fill in the blank with a suitable **Article:**

'Cold on …… Himalayas is terrible.'
(a) a
(b) an ☐
(c) the ☐
(d) None of these ☐

Q.82. Fill in the blank with a suitable **Article:**

…….Taj is an historical building.
(a) A ☐
(b) An ☐
(c) The ☐
(d) None of the above ☐

Q.83. Complete the sentence:
All of us should abide _____ the laws of our country.
(a) on ☐
(b) to ☐
(c) by ☐
(d) in ☐

Q.84. **Fill in the blank:**
Vaccination will make people immune _____ certain diseases for a given period. ☐
(a) against ☐
(b) to

(c) with ☐
(d) for ☐

Q.85. **Direction:** In this section has a sentence with three **Bold** part labelled (A), (B) and (C). Read each sentence to find out whether there is any error in any **bold** part and indicate your response in the Answer Sheet against the corresponding letter *i.e.*, (A) or (B) or (C). If you find no error, your response should be indicated as (D).

(a) She said that **she was under standing (A)** ☐
(b) **his point of view (B)** ☐
(c) **very well. (C)** ☐
(d) **No error (D)** ☐

Q.86. **Direction:** In this section has a sentence with three **Bold** part labelled (A), (B) and (C). Read each sentence to find out whether there is any error in any **bold** part and indicate your response in the Answer Sheet against the corresponding letter *i.e.*, (A) or (B) or (C). If you find no error, your response should be indicated as (D).

(a) All the houses **having been washed away (A)** ☐
(b) **by the floods, (B)** ☐
(c) **the villagers sought shelter** in the panchayat office (C) ☐
(d) **No error** (D) ☐

Q.87. **Directions :** *Select from the lettered word or sets of words, the word or words which best complete the meaning of the statement as a whole.*

His _____ nature will aid him in attaining success in this difficult job.
(a) imitative ☐
(b) lackadaisical ☐
(c) persevering ☐
(d) rotund ☐

Q.88. **Directions :** *Select from the lettered word or sets of words, the word or words which best complete the meaning of the statement as a whole.*

Since he is a teacher of English, we would not expect him to be guilty of a _____
(a) solecism ☐
(b) schism ☐
(c) stanchion ☐
(d) freshet ☐

Q.89. Choose the letter of the correctly spelt word.
(a) ignominus ☐
(b) ignominous ☐
(c) ignominious ☐
(d) ignomanius ☐

Q.90. One would expect a serf to _____ a lord.
(a) arrogate ☐
(b) apprize ☐
(c) circumscribe ☐
(d) truckle ☐

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