

**B.Tech.(CSE) Entrance Test (Sample)**

**Name:**

**Roll Number:**

**Total Time :- 1 Hour**

**Questions: 50 MCQs**

**Total Marks :- 100**

**SECTION-A**

**MATHEMATICS QUESTIONS**

1. Tickets numbered 1 to 50 are mixed and one ticket is drawn at random. Find the probability that the ticket drawn has a number which is a multiple of 4 or 7?

- a.  $\frac{9}{25}$                       b.  $\frac{9}{50}$                       c.  $\frac{18}{25}$                       d. None of these

2. Two dice are tossed simultaneously. Find the probability that the total is a prime number.

- a.  $\frac{7}{9}$                       b.  $\frac{5}{12}$                       c.  $\frac{1}{6}$                       d.  $\frac{5}{9}$

3. A class consists of 15 girls and 10 boys. Three students are to be randomly selected. Find the probability that one boy and two girls are picked.

- a.  $\frac{1}{50}$                       b.  $\frac{3}{25}$                       c.  $\frac{21}{46}$                       d.  $\frac{25}{122}$

4. A dice is rolled twice. What is the probability of getting sum 9?

- a.  $\frac{2}{3}$                       b.  $\frac{1}{3}$                       c.  $\frac{1}{9}$                       d.  $\frac{3}{9}$

5. A box has 10 black and 10 white balls. What is the probability of getting two balls of the same color?

- a.  $\frac{10}{19}$                       b.  $\frac{9}{38}$                       c.  $\frac{9}{19}$                       d.  $\frac{5}{38}$

6. Three coins are tossed. What is the probability of getting at most two tails?

- a.  $\frac{7}{8}$                       b.  $\frac{1}{8}$                       c.  $\frac{2}{8}$                       d.  $\frac{4}{8}$

7. What will be total cost of polishing curved surface of a wooden cylinder at rate of \$ 20 per sq.m, if it has 40 cm diameter and 7m height?

- a. \$ 480                      b. \$ 384                      c. \$ 352                      d. \$ 176

8. In a class, there are 200 students, at least 140 of students like Maths, at least 150 like Science and at least 160 like English. What is the minimum number of students who like all three subjects?

- a. 50                      b. 83                      c. 100                      d. 150

***Directions for questions 9-11:***

In a music school, three instruments are taught: Tabla, Violin and Guitar. Out of 278 students in the school, 20 learn Tabla and Violin, 23 learn Violin and Guitar and 21 learn Tabla and Guitar. 9 students learn all three instruments.

It is known that equal number of seats in all three instruments classes. (If a student is learning Guitar as well Tabla, then he occupies two seats: one in Tabla Class and one in Guitar Class)

9. Determine the number of students who have occupied only one seat.

- a. 232                      b. 200                      c. 197                      d. 234

10. Determine the number of students who have occupied seats in Violin or Guitar class but not in Tabla Class.
- a. 160                      b. 153                      c. 175                      d. 167
11. Determine the number of students who have occupied seats in Tabla and Violin Class but not in Guitar Class.
- a. 9                              b. 11                              c. 13                              d. 7
12. Pipe A can fill a tank 5 times faster than Pipe B and takes 32 minutes less than Pipe B to fill the tank. If both the pipes are opened together, then in how much time the tank would be full?
- a.  $32/3$  minutes              b.  $32/5$  minutes              c.  $20/3$  minutes              d.  $5/32$  minutes
13. Two pipes M and N can fill a tank in 22.5 and 15 minutes, respectively. If both the pipes are opened simultaneously, after how much time should N be closed so that the tank is full in 18 minutes?
- a. 4 minutes                      b. 3 minutes                      c. 4.5 minutes                      d. 2.5 minutes
14. Two pipes M and N are opened together to fill a tank. Both the pipes fill the tank in time X minutes. When M alone is filling the tank, it takes 9 minutes more time than X to fill the tank. In a similar manner N takes 16 minutes more time than X to fill the tank. What is the value of X?
- a. 12 minutes                      b. 7 minutes                      c. 25 minutes                      d. 144 minutes
15. Pipe P can fill a tank in 38 hours. Pipe Q alone can fill it in 19 hours. Pipe R can empty the full tank in 133 hours. If all the pipes are opened together, how much time will be needed to make the tank full?
- a. 28 hours                      b. 95 hours                      c. 19 hours                      d. 14 hours
16. Two pipes M and N can fill a pool in 40 minutes and 60 minutes, respectively. The entire pool can completely be emptied by another pipe P in 30 minutes. M, N and P are opened alternatively and each is kept open for just 1 minute. In how much time will the pool be filled?
- a. 180 minutes                      b. 167 minutes                      c. 177 minutes                      d. 165 minutes
17. The present ages of Aman and Nina are 59 and 37 years, respectively. What was the ratio of the ages of Nina and Aman 13 years ago?
- a. 3:2                              b. 46:25                              c. 12:23                              d. 8:3
18. Rohan is as much younger than Ajay as he is older than Meena. The sum of ages of Ajay and Meena is 108 years. How old is Rohan?
- a. 32 years                      b. 64 years                      c. 52 years                      d. 36 years
19. Average age of a family of 4 members was 19 years, 4 years back. Birth of a new child kept the average age of the family same even today. How old is the child today?
- a. 4 years                              b. 1 year                              c. 2 years                              d. 3 years
20. 12 years ago, age of P was 3 times the age of Q. After 12 years, ratio of ages of Q to P will be 2:3. What is the present age of P?
- a. 54 years                      b. 36 years                      c. 24 years                      d. 144 years
21. Chandan buys some sugar at \$ 15 per kg. He mixes it with sugar having price \$ 18 per kg. The final mixture becomes worth \$ 16 per kg. What is the ratio of quantities of type 1 sugar to type 2 sugar?
- a. 2:1                              b. 1:2                              c. 5:6                              d. 6:5

22. One can is completely filled and contains 100% water. Another similar can is completely filled with a solution of 50% wine and 50% water. When both the cans are emptied in a steel vessel, what will be ratio of water to wine in the vessel?

- a. 1:1                      b. 1:3                      c. 2:1                      d. 3:1

23. A solution of honey and water is 28 litres, with honey and water in ratio 4:3. To this a 21 litre honey-water solution is added that has honey to water ratio as 2:1. Again a 51 litre honey-water solution that has honey to water ratio as 9:8 is added to this. After this 10 litre of the solution is replaced with pure honey. What is ratio of water to honey in the final mixture?

- a. 613:387                      b. 15:12                      c. 72:24                      d. 387:613

24. Ramesh mixes 60 litres of Type-1 acid with some litres of Type-2 acid. Type-1 acid rate is \$ 32 per litre while Type-2 rate is \$ 23 per litre. Ramesh sells this acid-mix at rate \$ 28 per litre. How much Type-2 acid is needed to make it a no profit no loss transaction?

- a. 48 litres                      b. 36 litres                      c. 24 litres                      d. 50 litres

25. One glass has juice and water in the ratio 5:2 while other glass has them in ratio 7:4, respectively. If both glasses poured in a vessel, then what will be final ratio of water to juice in the vessel?

- a. 8:35                      b. 52:25                      c. 35:8                      d. 25:52

26. The number of non-zero rows in an echlon form is called ?

- a. rank of a matrix  
b. cofactor of the matrix  
c. reduced echlon form  
d. conjugate of the matrix

27. If  $|A| = 0$ , then A is

- a. 0                      b. zero matrix                      c. singular matrix                      d. non-singular matrix

28. If A is a symmetric matrix, then  $A^t =$

- a. 0                      b. A                      c.  $|A|$                       d. diagonal matrix

29. Additive inverse of a matrix A is

- a.  $\text{adj } A/|A|$                       b.  $A^2$                       c.  $|A|$                       d. A

30. Transpose of a column matrix is

- a. Zero matrix                      b. diagonal matrix                      c. column matrix                      d. row matrix

## **SECTION-B**

### **PHYSICS QUESTIONS**

31. The size of some bacteria and living cells is in the order of \_\_\_\_\_.  
a. centimeter      b. millimeter      c. nanometer      d. micrometer
32. Three grams of sulphur dissolved in 200 g of naphthalene  $C_{10}H_8$ , was found decreasing the freezing point of the solvent to  $0.72^\circ C$ . Find the molecular weight of the solute. ( $K_f C_{10}H_8 = 6.9^\circ C/molar$ )  
a. 351.16 g/mole      b. 115.32 g/mole      c. 135.61 g/mole      d. 151.23 g/mole
33. What refers to the sensation in the ear which depends on the energy in the sound wave?  
a. Pitch      b. Intensity      c. Loudness      d. Timbre
34. The “Doppler effect” is named after which scientist?  
a. Christopher Jacques Doppler  
b. Christian Jacques Doppler  
c. Christopher Jason Doppler  
d. Christian Johann Doppler
35. Which one is equivalent to the unit “watt”?  
a. Newton-second  
b. Newton-meter  
c. Newton-meter per second  
d. Newton-meter per second squared
36. The idea of secondary wavelets for the. propagation of a wave was first given by  
a. Newton      b. Huygens      c. Maxwell      d. Fresnel
37. The “kilowatt-hour” is a unit of \_\_\_\_\_.  
a. work      b. energy      c. power      d. work or energy
38. Why is sound wave travel faster in water than in air?  
a. Because water has greater density than air.  
b. Because water has greater bulk modulus than air.  
c. Because water has more in terms of number of molecules than air.  
d. Because water has more in volume than air.
39. The English unit “slug” is a unit of \_\_\_\_\_.  
a. mass      b. weight      c. force      d. energy
40. How is sound intensity measured?  
a. In beats      b. In decibels      c. In phons      d. In sones
41. An electron volt is the energy required by an electron that has been accelerated by a potential difference of how many volts?



- a. 1 volt                      b. 0.1 volts                      c. 10 volts                      d. 0.01 volts
42. What is a vector with a magnitude of one and with no unit?  
a. Single vector              b. Unit vector              c. Dot vector              d. Scalar vector
43. What is the purpose of a unit vector?  
a. To describe the direction in space  
b. To indicate a magnitude without reference to direction  
c. To serve as comparison with other vectors  
d. To set a standard among vectors
44. Which of the following has the smallest wavelength band?  
a. Blue                      b. Indigo                      c. Green                      d. Yellow
45. What is dispersion?  
a. It is the scattering of white light behind an obstruction.  
b. It is the separation of white light into its component colors.  
c. It is the merging of component colors into white light.  
d. It is the absorption of white light in the atmosphere

## SECTION-C

### CHEMISTRY QUESTIONS

46. A reaction was found to be second order with respect to the concentration of carbon monoxide. If the concentration of carbon monoxide is doubled, with everything else kept the same, the rate of reaction will
- a. remain unchanged    b. triple    c. increase by a factor of 4    d. double
47. HBr reacts with  $\text{CH}_2 = \text{CH} - \text{OCH}_3$  under anhydrous conditions at room temperature to give
- a.  $\text{CH}_3\text{CHO}$  and  $\text{CH}_3\text{Br}$   
b.  $\text{BrCH}_2\text{CHO}$  and  $\text{CH}_3\text{OH}$   
c.  $\text{BrCH}_2 - \text{CH}_2 - \text{OCH}_3$   
d.  $\text{H}_3\text{C} - \text{CHBr} - \text{OCH}_3$
48. The IUPAC name for the complex  $[\text{Co}(\text{NO}_2)(\text{NH}_3)_5]\text{Cl}_2$  is
- a. nitrito-N-pentaamminecobalt (III) chloride  
b. nitrito-N-pentaamminecobalt (II) chloride  
c. pentaammine nitrito-N-cobalt (II) chloride  
d. pentaammine nitrito-N-cobalt (III) chloride
49. The term anomers of glucose refers to
- a. isomers of glucose that differ in configurations at carbons one and four (C-1 and C-4)  
b. a mixture of d.-glucose and (L)-glucose  
c. enantiomers of glucose  
d. isomers of glucose that differ in configuration at carbon one (C-1)
50. Phenyl magnesium bromide reacts with methanol to give
- a. a mixture of anisole and  $\text{Mg}(\text{OH})\text{Br}$ .  
b. a mixture of benzene and  $\text{Mg}(\text{OMe})\text{Br}$   
c. a mixture of toluene and  $\text{Mg}(\text{OH})\text{Br}$ .  
d. a mixture of phenol and  $\text{Mg}(\text{Me})\text{Br}$

**Answer Key**

- 1 A
- 2 d
- 3 c
- 4 c
- 5 c
- 6 a
- 7 c
- 8 a
- 9 a
- 10 d
- 11 b
- 12 c
- 13 b
- 14 a
- 15 d
- 16 b
- 17 c
- 18 c
- 19 d
- 20 b
- 21 a
- 22 d
- 23 d
- 24 a
- 25 d
- 26 a
- 27 c
- 28 b
- 29 a
- 30 d
- 31 b
- 32 c
- 33 c
- 34 b
- 35 c
- 36 b
- 37 d
- 38 b
- 39 a
- 40 b
- 41 a
- 42 b
- 43 a
- 44 b
- 45 b
- 46 c



- 47 d
- 48 d
- 49 d
- 50 b