BITSAT 2025 May 27 Question Paper

Time Allowed :3 Hours	**Maximum Marks :**160	**Total questions :**160

General Instructions

Read the following instructions very carefully and strictly follow them:

1. **Mode**: Computer-based online test

2. **Duration**: 3 hours (180 minutes)

3. **Sections**: The exam consists of four parts:

    (a) Part I: Physics (30 questions)

    (b) Part II: Chemistry (30 questions)

    (c) Part III: English Proficiency (10 questions) and Logical Reasoning (20 questions)

    (d) Part IV: Mathematics (40 questions) or Biology (for B.Pharm candidates)

4. **Total Marks**: 390

5. **Marking Scheme**: Each correct answer awards 3 marks, and 1 mark is deducted for each incorrect answer

6. **Subjects**:

    (a) Physics: Mechanics, Electromagnetism, Thermodynamics, Modern Physics

    (b) Chemistry: Organic, Inorganic, and Physical Chemistry

    (c) Mathematics: Calculus, Algebra, Geometry (or Biology for B.Pharm candidates)

    (d) English Proficiency: Reading Comprehension, Vocabulary

    (e) Logical Reasoning: Analytical and Problem-solving skills

1. If $x + \frac{1}{x} = 2\cos\theta$, find the value of

$$x^5 + \frac{1}{x^5}$$

in terms of θ.

(A) $2\cos 5\theta$

(B) $5\cos\theta$

(C) $2\cos 4\theta$

(D) $5\cos 5\theta$

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2. Evaluate:

$$\lim_{x \to 0} \frac{\sin 3x - 3\sin x}{x^3}$$

(A) 0

(B) -4.5

(C) -9

(D) 4.5

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3. Two circles with centers O_1 and O_2 touch externally. The radius of the first circle is 4 cm and the second is 9 cm. The distance between their centers is 13 cm. Find the length of the direct common tangent.

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5. Find the number of integers n such that $1 \le n \le 100$ and $n^2 + 3n + 2$ is divisible by 5.

(A) 20

(B) 21

(C) 19

(D) 18

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6. If $z = 2(\cos 60° + i\sin 60°)$, find the value of z^3.

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7. Find the coordinates of the point which divides the line segment joining $(2, -3)$ and $(7, 9)$ in the ratio $3 : 2$.

8. How many 4-digit numbers can be formed using the digits 1, 2, 3, 4, 5 without repetition such that the number is divisible by 5?
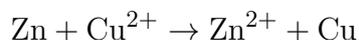
(A) 24

(B) 48

(C) 60

(D) 120

9. For the reaction $N_2 + 3H_2 \rightleftharpoons 2NH_3$, the equilibrium constant K_c is 0.5 at a certain temperature. If initially, 1 mole of N_2 and 3 moles of H_2 are placed in a 1 L container, what is the equilibrium concentration of NH_3?

10. The standard reduction potentials are:

$$Cu^{2+} + 2e^- \rightarrow Cu \quad E^\circ = +0.34\,V$$

$$Zn^{2+} + 2e^- \rightarrow Zn \quad E^\circ = -0.76\,V$$

Calculate the standard cell potential for the reaction:

$$Zn + Cu^{2+} \rightarrow Zn^{2+} + Cu$$

(A) 1.10 V

(B) 0.42 V

(C) -1.10 V

(D) -0.42 V

11. Which of the following reagents can convert an aldehyde to a primary alcohol?

(A) PCC (Pyridinium chlorochromate)

(B) $NaBH_4$ (Sodium borohydride)

(C) $KMnO_4$ (Potassium permanganate)

(D) HNO_3 (Nitric acid)

12. An ideal gas expands from 2 L to 6 L at a constant temperature of 300 K. Calculate the work done by the gas if pressure remains constant at 2 atm. (1 atm = 1.013×10^5 Pa)

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13. A light wave of wavelength 600 nm passes from air into a medium with refractive index 1.5. What is the wavelength of light in the medium?

(A) 400 nm

(B) 450 nm

(C) 500 nm

(D) 600 nm

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14. A wire of length 0.5 m carrying a current of 3 A is placed in a magnetic field of 2 T perpendicular to the wire. What is the force on the wire?

(A) 1 N

(B) 3 N

(C) 0.75 N

(D) 6 N

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15. A solid sphere of mass 2 kg and radius 0.5 m rolls without slipping down an inclined plane of height 3 m. What is its speed at the bottom? (Take $g = 9.8 \, \text{m/s}^2$)

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16. The wavelength of a photon is 500 nm. Calculate its energy. (Planck's constant $h = 6.63 \times 10^{-34}$ J·s, speed of light $c = 3 \times 10^8$ m/s)

(A) 3.98×10^{-19} J

(B) 4.14×10^{-19} J

(C) 5.24×10^{-19} J

(D) 2.48×10^{-19} J

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17. Water flows through a horizontal pipe with a velocity of 2 m/s. The cross-sectional area of the pipe reduces to half. What is the velocity of water in the narrower section?

(A) 1 m/s

(B) 2 m/s

(C) 4 m/s

(D) 8 m/s

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18. Rearrange the following parts to form a coherent sentence:

(A) Despite the challenges faced by scientists,

(B) they continue to make remarkable progress in understanding the universe,

(C) new discoveries in astrophysics and quantum mechanics,

(D) with many groundbreaking theories being developed every year.

(A) A – B – D – C

(B) A – C – B – D

(C) A – B – C – D

(D) B – A – C – D

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19. Rearrange the parts to make a meaningful sentence:

(A) In recent years,

(B) governments around the world have implemented stricter environmental regulations,

(C) to combat the effects of pollution and climate change,

(D) leading to increased awareness and efforts towards sustainability.

(A) A – B – C – D

(B) B – A – C – D

(C) A – C – B – D

(D) C – A – B – D

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20. Choose the word which best expresses the meaning of the underlined word.

The manager showed great <u>pragmatism</u> while resolving the conflict at work.

(A) Idealism

(B) Practicality

(C) Emotion

(D) Ignorance

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21. Find out which part of the sentence has an error. If there is no error, mark part (d) as your answer.

The team **a.** / are planning to launch **b.** / the project next month. **c.** / No error **d.**

(A) a

(B) b

(C) c

(D) d

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