

BITSAT 2025 May 27 Question Paper

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

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

- (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.

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

- (A) 20
 - (B) 21
 - (C) 19
 - (D) 18
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6. If $z = 2(\cos 60^\circ + i \sin 60^\circ)$, find the value of z^3 .

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
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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:



Calculate the standard cell potential for the reaction:



- (A) 1.10 V
 - (B) 0.42 V
 - (C) -1.10 V
 - (D) -0.42 V
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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)
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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)

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 $g = 9.8 \text{ m/s}^2$)

16. The wavelength of a photon is 500 nm. Calculate its energy. (Planck's constant

$h = 6.63 \times 10^{-34} \text{ J}\cdot\text{s}$, speed of light $c = 3 \times 10^8 \text{ m/s}$)

- (A) $3.98 \times 10^{-19} \text{ J}$
 - (B) $4.14 \times 10^{-19} \text{ J}$
 - (C) $5.24 \times 10^{-19} \text{ J}$
 - (D) $2.48 \times 10^{-19} \text{ J}$
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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 pragmatism while resolving the conflict at work.

- (A) Idealism
 - (B) Practicality
 - (C) Emotion
 - (D) Ignorance
-

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
