SAMPLE PAPER - USAT PRE-ENGINEERING

FULLY SOLVED VERSION

with Correct Answers Highlighted & Explanations

Prepared for exam practice — includes Verbal Reasoning, Quantitative Reasoning, Physics, Chemistry, Mathematics and Essay sections.

VERBAL REASONING

1. I imagine Sally was about _____ when I asked her to type a letter for me.

A. having left

B. to be leaving

C. to have left

✔ **D. to leave (Correct Answer)**

Explanation: *The idiomatic structure "be about to + base verb" expresses an action that is on the point of happening. "Was about to leave" correctly conveys that Sally was on the verge of leaving at that moment. The other choices use incorrect or non-idiomatic verb forms after "about."*

2. It is widely believed ___ watching television too much isn't healthy for children.

✔ **A. that (Correct Answer)**

B. when

C. where

D. which

Explanation: *The word "that" is used to introduce a noun clause acting as the subject/complement of the belief ("It is believed that..."). "When," "where," and "which" do not fit grammatically because the clause that follows is a complete statement of fact, not a reference to time, place, or a specific noun.*

3. UNIQUE : UNCOMMON :: (choose the pair with the most similar relationship)

A. bitter : delicious

✔ **B. disgusting : unpleasant (Correct Answer)**

C. pleasant : unkind

D. spicy : powerful

Explanation: *UNIQUE and UNCOMMON are near-synonyms, with UNIQUE being a stronger/more specific version of UNCOMMON (something unique is rare in an absolute sense). "Disgusting" and "unpleasant" show the same relationship — disgusting is an intensified form of unpleasant. The other pairs are opposites or unrelated in degree.*

4. SUGGEST : DEMAND :: (choose the pair with the most similar relationship)

A. deny : request

B. give : receive

C. question : answer

✔ **D. take : grab (Correct Answer)**

Explanation: *SUGGEST and DEMAND both relate to asking for something, but DEMAND is a much more forceful version of SUGGEST — same action, different intensity. "Take" and "grab" mirror this: both mean to acquire something, but "grab" is the more forceful, urgent version of "take."*

5. The jury was BIASED and not _____.

A. educated

B. expert

✔ **C. neutral (Correct Answer)**

D. qualified

Explanation: *"Biased" means having an unfair preference or prejudice. Its most direct opposite is "neutral," meaning impartial and without favoritism — exactly the quality a fair jury should have. The other options describe knowledge or competence, not fairness.*

6. In school he is known to be a CRUEL and often behaves _____.

A. badly

B. consistently

C. greedily

✔ **D. violently (Correct Answer)**

Explanation: *"Cruel" describes a willingness to cause pain or harm to others. "Violently" is closest in meaning, describing behaviour marked by aggressive force, which aligns with cruelty. "Badly" is too general, and "consistently" and "greedily" describe unrelated qualities.*

Reading comprehension — passage about the lion and the clever rabbit (refer to the original paper for the full passage).

7. What is this story about?

✔ **A. How a clever rabbit tricked a cruel lion (Correct Answer)**

B. How a rabbit pleased an angry lion

C. How rabbits learned to hide from lions

D. How to be safe when you hunt in the forest

Explanation: *The passage centers on a rabbit who outwits a cruel lion by leading it to a well, tricking it into attacking its own reflection. This makes option A, which captures both the cleverness of the rabbit and the cruelty of the lion, the best summary of the story.*

8. Why did the rabbit take the lion to the well in the middle of the forest?

A. So a lot of animals could see the rabbit walking with the lion

✔ **B. So the lion could attack the "other" lion (Correct Answer)**

C. So the lion could drink water

D. So the other animals would be afraid of the rabbit

Explanation: *The rabbit deliberately led the lion to the well so that the lion would see its own reflection in the water, mistake it for a rival lion, and attack it — which caused the real lion to fall into the well and never return.*

QUANTITATIVE REASONING

9. Evaluate [31 + (-48)] + 2[-16 - (-120)] = _____.

A. -289

B. -191

✔ **C. 191 (Correct Answer)**

D. 289

Explanation: *First bracket: 31 + (-48) = -17. Second bracket: -16 - (-120) = -16 + 120 = 104, and 2 × 104 = 208. Adding the two results: -17 + 208 = 191.*

10. A train moving at 60 km/h crosses a pole in 9 seconds. Find the length of the train.

A. 25m

B. 140m

✔ **C. 150m (Correct Answer)**

D. 175m

Explanation: *Convert speed to m/s: 60 km/h × (1000/3600) = 16.67 m/s. Since crossing a stationary pole means the train covers a distance equal to its own length: length = speed × time = 16.67 × 9 ≈ 150 m.*

11. The sum of roots of equation $x^2 + 8x + 9 = 0$ is _____.

A. -9

✔ **B. -8 (Correct Answer)**

C. 8

D. 9

Explanation: *For a quadratic $ax^2 + bx + c = 0$, the sum of roots equals -b/a. Here a = 1, b = 8, so the sum of roots = -8/1 = -8.*

12. The interior angles of a hexagon are in ratio 1:3:5:7:2:6. Find the measure of the smallest angle.

A. 15°

✔ **B. 30° (Correct Answer)**

C. 60°

D. 90°

Explanation: *The sum of interior angles of a hexagon = (6-2) × 180° = 720°. The ratio parts add up to 1+3+5+7+2+6 = 24, so one part = 720/24 = 30°. The smallest angle (ratio 1) = 1 × 30° = 30°.*

13. If B:A = 3:7 and A:C = 4:3, then A:B:C = _____.

✔ **A. 28 : 12 : 21 (Correct Answer)**

B. 12 : 21 : 28

C. 12 : 28 : 21

D. 21 : 28 : 12

Explanation: *To combine ratios we make the common term (A) equal in both. B:A = 3:7 and A:C = 4:3. The LCM of 7 and 4 (the two values of A) is 28. Scale B:A by 4 to get B:A = 12:28, and scale A:C by 7 to get A:C = 28:21. Combining, A:B:C = 28:12:21.*

14. 4200 men have sufficient food for 32 days at a rate of 12 hectograms per person. For how many men would the same food be sufficient for 42 days at the same rate?

A. 2400

B. 2800

✔ **C. 3200 (Correct Answer)**

D. 5512

Explanation: *Since the ration rate per person stays the same, total food is proportional to (men × days). So 4200 × 32 = x × 42, giving x = (4200 × 32) / 42 = 3200 men.*

PHYSICS

15. Which one of the following is also known as the Law of Inertia?

✔ **A. Newton’s First Law (Correct Answer)**

B. Newton’s Law of Interference

C. Newton’s Second Law

D. Newton’s Third Law

Explanation: *Newton's First Law states that a body remains at rest or in uniform motion unless acted upon by an external force. This tendency to resist a change in motion is called inertia, so the law is commonly called the Law of Inertia. ("Newton's Law of Interference" is not a real law.)*

16. The energy possessed by a spinning body about its axis with constant angular velocity is called as _____ energy.

A. kinetic

B. potential

✔ **C. rotation kinetic (Correct Answer)**

D. rotation potential

Explanation: *A body spinning about an axis possesses kinetic energy due to its rotational motion, known specifically as rotational kinetic energy, given by the formula (1/2) × I × omega^2, where I is the moment of inertia and omega is the angular velocity.*

17. Which phenomenon is prominent when the wavelength of light is large compared with the size of the obstacle?

✔ **A. Diffraction of light (Correct Answer)**

B. Interference of light

C. Reflection of light

D. Refraction of light

Explanation: *Diffraction — the bending of waves around obstacles or through openings — becomes pronounced when the wavelength is comparable to or larger than the size of the obstacle or aperture. Reflection and refraction depend on surfaces/media rather than this size comparison.*

CHEMISTRY

18. The conversion of a gas into a liquid requires _____ pressure and _____ temperature.

A. high … high

✔ **B. high … low (Correct Answer)**

C. low … high

D. low … low

Explanation: *Liquefaction of a gas (condensation) is favoured by compressing the gas (high pressure), which pushes molecules closer together, and cooling it (low temperature), which reduces molecular kinetic energy so attractive forces can bind molecules into a liquid state.*

19. Which one of the following is an ionic solid?

A. Mg

✔ **B. MgO (Correct Answer)**

C. SiC

D. SiO2

Explanation: *MgO (magnesium oxide) is formed by the transfer of electrons from a metal (Mg) to a non-metal (O), producing Mg^{2+} and O^{2-} ions held together by ionic bonds. Mg is a metallic solid, while SiC and SiO2 are covalent (network) solids.*

20. The electronic configuration $1s^2$, $2s^2$, $2p^6$ belongs to _____.

A. fluorine

✔ **B. neon (Correct Answer)**

C. nitrogen

D. oxygen

Explanation: *Adding the electrons in this configuration gives 2 + 2 + 6 = 10 electrons, which corresponds to the atomic number of neon (Ne), a noble gas with a fully filled second shell.*

MATHEMATICS

21. $(\cos \pi + i \sin \pi)^{1/6}$ = _____.

✔ **A. $(\sqrt{3} + i)/2$ (Correct Answer)**

B. $(1 - i\sqrt{3})/2$

C. $(1 + i\sqrt{3})/2$

D. $(-1 + i\sqrt{3})/2$

Explanation: *By De Moivre's theorem, $(\cos\theta + i \sin\theta)^{1/n}$ gives values $cis[(\theta + 2k\pi)/n]$. With $\theta = \pi$ and $n = 6$, taking $k = 0$ gives angle $\pi/6$ (30°), so the result is $\cos30° + i \sin30° = \sqrt{3}/2 + i/2 = (\sqrt{3} + i)/2$.*

22. "All numbers are even" is a false statement, then the true statement is _____.

A. all numbers are not even

B. all numbers are odd

✔ **C. some numbers are not even (Correct Answer)**

D. some numbers are odd

Explanation: *The logical negation of a universal statement "All x are P" is not "All x are not P," but rather the existential statement "Some x are not P." So negating "All numbers are even" correctly gives "Some numbers are not even."*

23. If $a_{n-3} = 2n - 7$, then a_n = _____.

A. 2n - 11

✔ **B. 2n - 1 (Correct Answer)**

C. 2n + 1

D. 2n + 11

Explanation: *Let m = n - 3, so n = m + 3. Substituting: a_m = 2(m+3) - 7 = 2m + 6 - 7 = 2m - 1. Renaming the index m back to n gives a_n = 2n - 1.*

ANSWER KEY (SUMMARY)

1	D	7	A	13	A	19	B
2	A	8	B	14	C	20	B
3	B	9	C	15	A	21	A
4	D	10	C	16	C	22	C
5	C	11	B	17	A	23	B
6	D	12	B	18	B		

ESSAY SECTION — MODEL SOLVED ANSWERS

Note: The original paper asks students to choose ONE argumentative topic and ONE narrative topic. Below is a complete, high-scoring model essay written for one topic from each section, to demonstrate the expected structure, depth and language.

24. Argumentative Essay (15 Marks)

Topic Chosen: Does technology limit creativity?

Technology has become an inseparable part of modern life, shaping how people learn, work and express themselves. A common concern is that constant reliance on digital tools narrows the imagination rather than expanding it. However, a closer look shows that technology, when used thoughtfully, is far more likely to enhance creativity than to restrict it.

Critics argue that technology limits creativity because it offers ready-made solutions. Search engines provide instant answers, templates simplify design work, and auto-generated suggestions in writing software can make original thought feel unnecessary. When students copy information rather than analyse it, or rely on pre-set filters instead of developing their own artistic style, their independent thinking can weaken over time. This overreliance is a genuine risk, especially when technology is used passively rather than as a starting point for exploration.

On the other hand, technology has opened creative possibilities that did not exist a generation ago. Digital art software, music production tools, video editing applications and 3D printing allow people to experiment rapidly, undo mistakes without cost, and combine skills from multiple disciplines. A student with no access to a darkroom can now edit photographs digitally; an aspiring filmmaker can shoot and edit an entire movie on a smartphone. Online platforms also connect creators with global audiences and collaborators, exposing them to fresh ideas and diverse perspectives that spark new creative directions.

The determining factor is not technology itself but how it is used. A student who uses the internet only to copy answers will indeed see their creativity dulled, but a student who uses the same internet to research unfamiliar techniques, experiment with new software, or receive feedback from a wider community will find their imagination stretched further than traditional tools alone could manage. Used as a crutch, technology can weaken creative effort; used as a canvas, it can multiply creative potential.

In conclusion, technology does not inherently limit creativity. It removes technical barriers, broadens access to tools and ideas, and creates new mediums for expression. The real challenge is cultivating the discipline to use these tools actively rather than passively — because creativity, ultimately, still depends on the mind directing the tool, not the other way around.

25. Narrative Essay (10 Marks)

Topic Chosen: A Day at the Amusement Park

The morning sun had barely climbed above the rooftops when my cousins and I piled into the car, buzzing with excitement about our long-awaited trip to the amusement park. We had been planning this day for weeks, marking it on the calendar and counting down the hours, and now that it had finally arrived, none of us could sit still.

As soon as we walked through the gates, the smell of popcorn and cotton candy filled the air, mixing with the distant screams of riders on the roller coaster looping high above the trees. Bright lights flickered even in daylight, and cheerful music spilled out from every corner of the park. We wasted no time and headed straight for the tallest roller coaster, its silver tracks twisting and turning like a giant serpent against the sky.

My heart pounded as the safety bar locked into place and the car began its slow climb up the first hill. For a moment, everything went silent except for the clicking of the chain pulling us upward. Then, without warning, we plunged downward at breathtaking speed, and the whole world became a blur of wind, laughter and screams. By the time the ride came to a stop, my legs were shaking, but I was already asking to go again.

The rest of the day passed in a happy whirlwind. We spun in teacups until we were dizzy, tested our aim at the ring-toss booth, and shared a giant tub of caramel popcorn while

watching the carousel horses go round and round. As evening approached, we found the perfect spot near the lake to watch the park's firework display, the colours exploding against the darkening sky and reflecting off the still water below.

By the time we left, exhausted and content, my cheeks hurt from smiling so much. The day at the amusement park was more than just rides and games — it was a memory built from laughter, shared excitement, and the simple joy of spending time with people I love. Even now, whenever I hear the distant sound of a roller coaster or smell fresh popcorn, I am transported right back to that unforgettable day.