

VITEEE 2026 May 2 Shift 1

Question Paper with Solutions

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General Instructions

- (i) **Duration:** The total duration of the examination is 2.5 hours (150 minutes).
- (ii) **Total Marks:** The complete paper carries a maximum of 500 marks.
- (iii) **Structure:** The paper has 4 Sections:
 - **Part 1:** 35 Multiple Choice Questions (Physics).
 - **Part 2:** 35 Multiple Choice Questions (Chemistry).
 - **Part 3:** 40 Multiple Choice Questions (Mathematics/Biology).
 - **Part 4:** 10 Multiple Choice Questions (Aptitude).
 - **Part 5:** 5 Multiple Choice Questions (English)
- (iv) **Compulsory Questions:** All 125 questions are compulsory.
- (v) Each question has four options. Only **one** option is correct.
- (vi) **Correct Answer:** +4 marks.
- (vii) **Incorrect Answer:** -1 (Negative marking).
- (viii) **Unanswered/Marked for Review:** 0 marks.

1. Evaluate the integral $\int_0^{\pi/2} \frac{\sin x}{\sin x + \cos x} dx$.

- (A) $\frac{\pi}{2}$
- (B) $\frac{\pi}{4}$
- (C) $\frac{\pi}{6}$
- (D) $\frac{\pi}{3}$

Correct Answer: (B) $\frac{\pi}{4}$

Solution:

Concept: Use the property of definite integrals:

$$\int_0^a f(x) dx = \int_0^a f(a-x) dx$$

This is especially useful when symmetry simplifies the integrand.

Step 1: Let $I = \int_0^{\pi/2} \frac{\sin x}{\sin x + \cos x} dx$.

Using the property:

$$I = \int_0^{\pi/2} \frac{\cos x}{\sin x + \cos x} dx$$

Step 2: Add the two expressions.

$$2I = \int_0^{\pi/2} \left(\frac{\sin x}{\sin x + \cos x} + \frac{\cos x}{\sin x + \cos x} \right) dx$$

$$2I = \int_0^{\pi/2} 1 dx$$

Step 3: Evaluate the integral.

$$2I = [x]_0^{\pi/2} = \frac{\pi}{2}$$

$$I = \frac{\pi}{4}$$

Quick Tip: For definite integrals involving $\sin x$ and $\cos x$, try replacing x with $a-x$ to exploit symmetry and simplify the expression.

2. Find the area bounded by the curve $y^2 = 4x$ and its latus rectum.

- (A) $\frac{4}{3}$ sq units
- (B) $\frac{8}{3}$ sq units
- (C) $\frac{16}{3}$ sq units
- (D) $\frac{2}{3}$ sq units

Correct Answer: (B) $\frac{8}{3}$ sq units

Solution:

Concept: For the parabola $y^2 = 4ax$:

- The **latus rectum** is the line $x = a$.
- The endpoints of the latus rectum are $(a, 2a)$ and $(a, -2a)$.
- Area bounded by the parabola and its latus rectum can be obtained by integrating the curve between these limits.

Step 1: Identify the value of a .

Given:

$$y^2 = 4x$$

Comparing with $y^2 = 4ax$, we get

$$a = 1$$

Thus, the latus rectum is the line

$$x = 1$$

and its endpoints are $(1, 2)$ and $(1, -2)$.

Step 2: Express y in terms of x .

$$y = \pm\sqrt{4x}$$

Because the region is symmetric about the x -axis,

$$\text{Area} = 2 \int_0^1 \sqrt{4x} \, dx$$

Step 3: Evaluate the integral.

$$\begin{aligned}\text{Area} &= 2 \int_0^1 2\sqrt{x} \, dx \\ &= 4 \int_0^1 x^{1/2} \, dx\end{aligned}$$

$$= 4 \left[\frac{2}{3} x^{3/2} \right]_0^1$$

$$= 4 \left(\frac{2}{3} \right)$$

$$= \frac{8}{3}$$

Quick Tip: For the parabola $y^2 = 4ax$, the latus rectum is $x = a$. When finding the area bounded by the parabola and its latus rectum, use symmetry about the x -axis and integrate the positive branch of the curve.

3. What happens to the magnetic field at the center of a circular coil if the number of turns is doubled while current remains constant?

- (A) It becomes half $\left(\frac{B}{2}\right)$
- (B) It remains the same (B)
- (C) It doubles ($2B$)
- (D) It becomes four times ($4B$)

Correct Answer: (C) $2B$

Solution:

Concept: The magnetic field at the center of a circular coil is given by

$$B = \frac{\mu_0 n I}{2R}$$

where n = number of turns, I = current in the coil, R = radius of the coil, μ_0 = permeability of free space.

Thus, the magnetic field is directly proportional to the number of turns.

Step 1: Write the relation for magnetic field.

$$B = \frac{\mu_0 n I}{2R}$$

Hence,

$$B \propto n$$

Step 2: Effect of doubling the number of turns.

If the number of turns becomes $2n$,

$$B' = \frac{\mu_0(2n)I}{2R}$$

$$B' = 2B$$

Therefore, the magnetic field becomes twice the original value.

Quick Tip: For a circular coil, the magnetic field at the center is directly proportional to the number of turns. If the number of turns is doubled while other factors remain constant, the magnetic field also doubles.

4. An object is placed 15 cm in front of a concave mirror of focal length 10 cm. Find the position and nature of the image.

- (A) 20 cm in front, real and inverted
- (B) 30 cm in front, real and inverted
- (C) 30 cm behind, virtual and erect
- (D) 15 cm behind, virtual and erect

Correct Answer: (B) 30 cm in front of mirror, real and inverted

Solution:

Concept: The mirror formula is

$$\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$$

where f = focal length, u = object distance, v = image distance.

For a concave mirror, distances measured in front of the mirror are negative according to the Cartesian sign convention.

Step 1: Substitute the given values.

$$u = -15 \text{ cm}, \quad f = -10 \text{ cm}$$

Using the mirror formula:

$$\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$$

$$\frac{1}{-10} = \frac{1}{v} + \frac{1}{-15}$$

Step 2: Solve for v .

$$\frac{1}{v} = \frac{1}{-10} + \frac{1}{15}$$

$$\frac{1}{v} = -\frac{1}{30}$$

$$v = -30 \text{ cm}$$

Step 3: Interpret the result.

The negative sign indicates that the image forms in front of the mirror. Hence, the image is **real and inverted**.

Quick Tip: Always apply the Cartesian sign convention in mirror problems: distances measured in front of the mirror are negative, and distances behind the mirror are positive.

5. Identify the IUPAC name for the coordination compound $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$.

- (A) Hexaamminecobalt(II) chloride
- (B) Hexaamminecobalt(III) chloride
- (C) Hexaamminecobalt(IV) chloride
- (D) Amminecobalt(III) chloride

Correct Answer: (B) Hexaamminecobalt(III) chloride

Solution:

Concept: In coordination compounds:

- Ligands attached to the central metal atom are named first.
- Neutral ligand NH_3 is called **ammine**.
- The prefix indicates the number of ligands (hexa = 6).
- The oxidation state of the metal is written in Roman numerals.

Step 1: Identify the ligands and their number.

The complex ion is



There are six ammonia ligands.

Thus, the ligand name becomes

hexaammine

Step 2: Determine the oxidation state of cobalt.

Since ammonia is a neutral ligand and there are three chloride ions outside the complex:

$$\text{Charge on complex} = +3$$

Therefore, the oxidation state of cobalt is

$$+3$$

Step 3: Write the complete IUPAC name.

Ligand name + metal name + oxidation state:

Hexaamminecobalt(III) chloride

Quick Tip: Neutral ligands such as NH_3 and H_2O do not affect oxidation state calculations. Always determine the charge of the complex ion first to find the oxidation state of the metal.

6. Which of the following is an example of a condensation polymer?

- (A) Polyethylene
- (B) PVC
- (C) Nylon 6,6
- (D) Polystyrene

Correct Answer: (C) Nylon 6,6

Solution:

Concept: Polymers are classified mainly into two types based on the mechanism of polymerization:

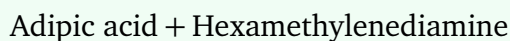
- **Addition polymers:** formed by addition of monomers without elimination of small molecules.
- **Condensation polymers:** formed by the condensation of monomers with the elimination of small molecules such as water or HCl.

Step 1: Identify polymers formed by condensation reaction.

Condensation polymers are formed when two different monomers react and release small molecules like water.

Step 2: Formation of Nylon 6,6.

Nylon 6,6 is produced by the condensation reaction between:



During polymer formation, water molecules are eliminated.

Step 3: Conclusion.

Since Nylon 6,6 forms with the elimination of water molecules, it is a **condensation polymer**.

Quick Tip: Remember: polymers like Polyethylene, PVC, and Polystyrene are addition polymers, while Nylon, Terylene, and Bakelite are condensation polymers.

7. Find the missing number in the series: 2, 6, 12, 20, 30, __.

- (A) 38
- (B) 40
- (C) 42
- (D) 44

Correct Answer: (C) 42

Solution:

Concept: In number series problems, observe the pattern in the difference between consecutive terms. If the differences follow a recognizable pattern, extend it to determine the next term.

Step 1: Find the differences between consecutive terms.

$$6 - 2 = 4$$

$$12 - 6 = 6$$

$$20 - 12 = 8$$

$$30 - 20 = 10$$

Thus, the differences are:

$$+4, +6, +8, +10$$

Step 2: Identify the pattern.

The difference increases by 2 each time.

Therefore, the next difference is

$$10 + 2 = 12$$

Step 3: Find the next term.

$$30 + 12 = 42$$

Hence, the missing number is

Quick Tip: In many number series questions, the pattern lies in the differences between consecutive terms. Always check first differences and second differences to identify the rule.

8. If 'FRIEND' is coded as 'HUMJTK', how is 'CANDLE' coded?

- (A) EDRJRI
- (B) EDQJRI
- (C) EDSJRI
- (D) EDRKRI

Correct Answer: (A) EDRJRI

Solution:

Concept: In coding–decoding problems, letters are often shifted forward or backward in the alphabet by increasing numerical values.

Step 1: Analyze the pattern in the given coding.

FRIEND → HUMJTK

$$F(+2) \rightarrow H$$

$$R(+3) \rightarrow U$$

$$I(+4) \rightarrow M$$

$$E(+5) \rightarrow J$$

$$N(+6) \rightarrow T$$

$$D(+7) \rightarrow K$$

Thus, the shift pattern is:

$$+2, +3, +4, +5, +6, +7$$

Step 2: Apply the same pattern to CANDLE.

$$C(+2) \rightarrow E$$

$$A(+3) \rightarrow D$$

$$N(+4) \rightarrow R$$

$$D(+5) \rightarrow J$$

$$L(+6) \rightarrow R$$

$$E(+7) \rightarrow I$$

Step 3: Write the coded word.

$$\text{CANDLE} \rightarrow \text{EDRJRI}$$

Quick Tip: In letter coding problems, carefully track the shift in alphabetical positions. Often the shift follows a consistent increasing or decreasing pattern.

9. Choose the correct synonym for “Benevolent”.

- (A) Cruel
- (B) Kind/Generous
- (C) Angry

(D) Selfish

Correct Answer: (B) Kind/Generous

Solution:

Concept: A synonym is a word that has the same or nearly the same meaning as another word.

Step 1: Understand the meaning of the word “Benevolent”.

The word **Benevolent** refers to someone who is kind, helpful, and willing to do good for others.

Step 2: Compare with the given options.

- Cruel — opposite in meaning.
- Kind/Generous — matches the meaning of benevolent.
- Angry — unrelated meaning.
- Selfish — opposite in meaning.

Step 3: Select the correct synonym.

Thus, the correct synonym for “Benevolent” is:

Kind/Generous

Quick Tip: The word **benevolent** comes from Latin roots: “bene” (good) and “volent” (wishing). Hence it describes a person who wishes good for others.