# FIITJEE COMMON TEST – VII

## PHYSICS, CHEMISTRY & MATHEMATICS

**CODE:**

**Time Allotted: 3 Hours** **Maximum Marks: 186**

- Please read the instructions carefully. You are allotted 5 minutes specifically for this purpose.
- You are not allowed to leave the Examination Hall before the end of the test.

## INSTRUCTIONS

**Caution: Question Paper CODE as given above MUST be correctly marked in the answer OMR sheet before attempting the paper. Wrong CODE or no CODE will give wrong results.**

### A. General Instructions

1. Attempt ALL the questions. Answers have to be marked on the OMR sheets.
2. This question paper contains Three Section.
3. **Section-I** is Physics, **Section-II** is Chemistry and **Section-III** is Mathematics.
4. Each section is further divided into two parts: **Part-A & Part-B**
5. Rough spaces are provided for rough work inside the question paper. No additional sheets will be provided for rough work.
6. Blank Papers, clip boards, log tables, slide rule, calculator, cellular phones, pagers and electronic devices, in any form, are not allowed.

### B. Filling of OMR Sheet

1. Ensure matching of OMR sheet with the Question paper before you start marking your answers on OMR sheet.
2. On the OMR sheet, darken the appropriate bubble with HB pencil for each character of your Enrolment No. and write in ink your Name, Test Centre and other details at the designated places.
3. OMR sheet contains alphabets, numerals & special characters for marking answers.

### C. Marking Scheme For All Three Parts.

**(i)** **Part-A (01 – 05)** contains 5 multiple choice questions which have only one correct answer. Each question carries **+3 marks** for correct answer and **– 1 mark** for wrong answer.

**PART – A** (**06 – 13)** contains 8 Multiple Choice Questions which have **One or More Correct** answer.
For each question in the group **Q. 6 – 13** of **PART – A** you will be awarded
*Full Marks*: **+4** If only the bubble(s) corresponding to all the correct options(s) is (are) darkened.
*Partial Marks*: **+1** For darkening a bubble corresponding **to each correct option,** provided NO incorrect option is darkened.
*Zero Marks*: **0** If none of the bubbles is darkened.
*Negative Marks*: **–1** In all other cases.
For example, if **(A), (C) and (D)** are all the correct options for a question, darkening all these three will result in **+4 marks**; darkening only **(A) and (D)** will result in **+2 marks**; and darkening **(A) and (B)** will result in **–1** marks, as a wrong option is also darkened.

**(iii)** **Part-B (01-05)** contains five (05) Numerical based questions, the answer of which maybe positive or negative numbers or decimals (e.g. 6.25, 7.00, -0.33, -.30, 30.27, -127.30) and each question carries **+3 marks** for correct answer and **there will be no negative marking.**

**Name of the Candidate:** _____

**Batch:** _____ **Date of Examination:** _____

**Enrolment Number:** _____

BATCHES – 1921

# SECTION – I: PHYSICS

## PART – A

### (Single Correct Choice Type)

This section contains **5 multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE is correct.**

1. A light emitting diode (LED) has a voltage drop of 2V across it and passes a current of 10 mA. When it operates with a 6V battery through a limiting resistor R, the value of R is:
   (A) 40 k $\Omega$ (B) 4 k $\Omega$ (C) 200 $\Omega$ (D) 400 $\Omega$

1. **D**

2. Two full turns of the circular scale of a screw gauge cover a distance of 1 mm on its main scale. The total number of division on the circular scale is 50. Further, it is found that the screw gauge has a zero error of – 0.03 mm. While measuring the diameter of a thing wire, a student notes the main scale reading of 3 mm and the number of circular scale divisions in line with the main scale as 35. The diameter of the wire is
   (A) 3.73 mm (B) 3.67 mm (C) 3.38 mm (D) 3.32 mm

2. **C**

3. To radiate signals with high efficiency, the antennas should have a size ($\lambda$ is wavelength)
   (A) $< \frac{\lambda}{4}$ (B) $>\lambda$ (C) $> \frac{\lambda}{4}$ (D) $> 4\lambda$

3. **C**

4. In a Searle's experiment, the diameter of the wire as measured by a screw gauge of least count 0.001 cm is 0.050 cm. The length, measured by a scale of least count 0.1 cm, is 110.0 cm. When a weight of 50 N is suspended from the wire, the extension is measured to be 0.125 cm by a micrometer of least count 0.001 cm. Find the maximum error in the measurement of Young's modulus of the material of the wire from these data.
   (A) $7.89 \times 10^8$ N/m$^2$ (B) $7.29 \times 10^9$ N/m$^2$
   (C) $5.379 \times 10^9$ N.m$^2$ (D) $5.25 \times 10^8$ N/m$^2$

4. **C**

5. The number densities of electrons and holes in a pure germanium at room temperature are equal and its value is $3 \times 10^{16}$ per m$^3$. On doping with aluminium, the hole density increases to $4.5 \times 10^{22}$ per m$^3$. Then the electron density in doped germanium is
   (A) $2.5 \times 10^{10}$ m$^{-3}$ (B) $2 \times 10^{10}$ m$^{-3}$ (C) $4.5 \times 10^9$ m$^{-3}$ (D) $3 \times 10^9$ m$^{-3}$

5. **B**

### (Multi Correct Choice Type)

This section contains **8 multiple choice questions.** Each question has four choices (A), (B), (C) and (D) out of which **ONE OR MORE** may be correct.

6. In hydrogen atom, if potential energy of electron in ground state is assumed to be zero, then
   (A) Total energy of first excited state = 23.8 eV
   (B) Potential energy of first excited state = 20.4 eV
   (C) Kinetic energy of first excited state = 6.8 eV
   (D) Kinetic energy of first excited state = 3.4 eV

6. **ABD**

7. Nucleus A decays to B with decay constant $\lambda_1$ and B decays to C with decay constant $\lambda_2$. Initially at t = 0, number of nuclei of A and B are $2N_0$ and $N_0$ respectively. At $t = t_0$, number of nuclei of B stop changing. If at this instant number of nuclei of B are $\frac{3N_0}{2}$.

(A) the value of $t_0$ is $\frac{1}{\lambda_1}\ln\frac{4}{3}\frac{\lambda_1}{\lambda_2}$ (B) the value of $t_0$ is $\frac{1}{\lambda_2}\ln\frac{4}{3}\frac{\lambda_1}{\lambda_2}$

(C) the value of $N_A$ at $t_0$ is $\frac{3N_0}{2}\frac{\lambda_2}{\lambda_1}$ (D) the value of $N_A$ at $t_0$ is $\frac{2N_0}{3}\frac{\lambda_2}{\lambda_1}$

7. **AC**

8. An experiment measures quantities *a*, *b*, *c* are *x* is calculated from $x = \frac{ab^2}{c^3}$. If the percentage errors in *a*, *b*, *c* are $\pm 1\%, \pm 3\%$ and $\pm 2\%$ respectively.

(A) The percentage error in *x* can be $\pm 13\%$
(B) The percentage error in *x* can be $\pm 7\%$
(C) The percentage error in *x* can be $\pm 20\%$
(D) The percentage error in *x* can be $\pm 26\%$

8. **AB**

9. Which of the following statement about X-rays is/are true?

(A) $E(K_\alpha) + E(L_\beta) = E(K_\beta) + E(M_\alpha) = E(K_\gamma)$, where E is the energy of respective X-rays.
(B) For the harder X-rays, the intensity is higher than soft X-rays.
(C) The continuous and the characteristic X-rays of same wavelength differ only in the method of creation.
(D) The cut-off wavelength $\lambda_{min}$ depends only on the accelerating voltage applied between the target and the filament.

9. **ACD**

10. Radiations of monochromatic waves of wavelength 400 nm are made incident on the surface of metals Zn, Fe and Ni of work functions 3.4 eV, 4.8 eV and 5.9 eV respectively (take hc = 12400 eV-Å) :

(A) maximum KE associated with photoelectrons from the surface of any metal is 0.3 eV.
(B) no photoelectrons are emitted from the surface of Ni.
(C) if the wavelength of source of radiation is doubled then KE of photoelectrons is also doubled.
(D) photoelectrons will be emitted from the surface of all the three metals if the wavelength of incident radiations is less than 200 nm.

10. **BD**

11. Due to annihilation of electron-positron of same kinetic energy 0.95 MeV, a photon is produced which can also be produced by a photo-electron of energy E, the possible value of E is (mass of electron $= 9.1 \times 10^{-31}$ kg, $e = 1.6 \times 10^{-19}$ Coulomb)

(A) 1.02 MeV (B) 2.42 MeV (C) 2.03 MeV (D) 2.93 MeV

11. **CD**

12. If the dimensions of length are expressed as $G^x c^y h^z$; where G, c and h are the universal gravitational constant, speed of light and Planck's constant respectively, then

(A) $x = \frac{1}{2}, y = \frac{1}{2}$ (B) $x = \frac{1}{2}, z = \frac{1}{2}$

(C) $y = \frac{1}{2}, z = \frac{3}{2}$ (D) $y = -\frac{3}{2}, z = \frac{1}{2}$

12. **BD**

13. The pitch of a screw gauge is 1 mm and there are 100 divisions on circular scale. When there is nothing between the two ends (studs) of screw gauge 95$^{th}$ divisions of circular scale is coinciding with screw gauge and in this situation zero of main scale is not visible. When a wire is placed between the studs the linear scale reads 2 division and 20$^{th}$ divisions of circular scale coincides with reference line. For this situation mark the correct statement(s). Each division on the main scale to 1 mm.
(A) LC of the instrument is 0.01 mm.
(B) Zero correction for the instrument is +0.05 mm.
(C) Thickness of wire is 1.20 mm
(D) Thickness of the wire is 2.25 mm.

13. **ABD**

## PART – C
## (Integer Type)

This section contains **5 questions**. The answer to each question is a **single-digit integer**, ranging from 0 to 9. The correct digit below the question number in the ORS is to be bubbled.

1. The mean lives of a radioactive sample are 3 years and 6 years for $\alpha$-emission and $\beta$-emission respectively. If the sample decays both by $\alpha$-emission and $\beta$-emission simultaneously, find the time (in year) after which, only one-fourth of the sample remain is

1. **4**

2. Two radioactive elements R and S disintegrate as

$R \longrightarrow P + \alpha$ ; $\lambda_R = 4.5 \times 10^{-3}$ years $^{-1}$

$S \longrightarrow Q + \beta$ ; $\lambda_S = 3 \times 10^{-3}$ years $^{-1}$

Starting with number of atoms of R and S in the ratio of 2 : 1, this ratio after the lapse of three half lives of R will be

2. **1**

3. A metallic sphere (work function 3.9 eV) is suspended in a vacuum chamber by an insulating thread. Ultraviolet light of wavelength 0.2 $\mu$m strike on the sphere. Find the maximum electric potential (in volt) of the sphere will be

3. **2.3**

4. An electron in hypothetical hydrogen atom is in its 3$^{rd}$ excited state and makes transition from 3$^{rd}$ to 2$^{nd}$ excited, then to 1$^{st}$ excited state and then to ground state. If the amount of time spent by the electron in any state of quantum number n, is proportional to $\left(\frac{1}{n-1}\right)$, then find the ratio of no. of revolutions completed by the electron in 1$^{st}$ excited state to that in the 2$^{nd}$ excited state is (Take hc = 12400 eV Å)

4. **6.75**

5. Suppose potential energy between electron and proton at separation r is given by U = k ln r, where k is constant. For such hypothetical hydrogen atom, find the ratio of energy difference between energy levels (n = 1 and n = 2) and (n = 2 and n = 4).

5. **1**

*Space for rough work*

# SECTION – II: CHEMISTRY

## PART – A

### (Single Correct Choice Type)

This section contains **5 multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE is correct.**

1. Mercury can't form amalgam with
   (A) Fe, Pt (B) Ag, Au
   (C) Zn, Ag (D) None of these

1. A

2. How many metals are commercially obtained by auto reduction:
   Fe, Na, Mg, Ca, Pb, Sn, Cu, Hg, Au
   (A) 1 (B) 2
   (C) 3 (D) 4

2. C

3. The number of following pairs is correctly matched:
   (i) Van Arkel method – Zirconium
   (ii) Amalgamation – Lead
   (iii) Distillation method – Zinc
   (iv) Poling process – Copper
   (v) Mond process – Titanium
   (A) 1 (B) 2
   (C) 3 (D) 4

3. D

4. Tin can be refined by
   (A) Poling & Liquation (B) Distillation & Zone refining
   (C) Electrolysis & vapour phase refining (D) None of these

4. A

5. Find the number of ores in which roasting process is used in metallurgy of corresponding metal.
   Galena, Haematite, Calamine, Zinc Blend, Cinnabar, Horn silver, Limestone.
   (A) 1 (B) 2
   (C) 3 (D) 4

5. D

### (Multi Correct Choice Type)

This section contains **8 multiple choice questions.** Each question has four choices (A), (B), (C) and (D) out of which **ONE OR MORE** may be correct.

6. For aluminium extraction when electrolysis of molten mass $Al_2O_3$ is carried out then which statement are correct?
   (A) Lining of carbon acts as cathode and graphite anode is used
   (B) During electrolysis, the oxygen liberated reacts with carbon of anode to give CO and $CO_2$
   (C) This process is called Hall-Heroult process
   (D) $CaF_2$ reduces the melting point of the mixture and increases electrical conductivity

6. ABCD

7. The method used in metallurgy to refine the impure metal is
   (A) Chromatographic separation (B) Vapour phase refining
   (C) Zone refining (D) Distillation

7. ABCD

8. $4\,Au + 8\,CN^- + 2H_2O + O_2\,(g) \longrightarrow 4\left[Au(CN)_2\right]^-(aq) + 4\,OH^-(aq)$

$2\left[Au(CN)_2\right]^-(aq) + Zn \longrightarrow 2\,Au(s) + \left[Zn(CN)_4\right]^{2-}(aq)$

Which of the following options are correct?
(A) Both the reactions are the example of nonredox reaction
(B) Both are examples of redox reactions
(C) In I$^{st}$ reaction $O_2$ acts as oxidizing agent
(D) In II$^{nd}$ reaction Zn acts as reducing agent

8. BCD

9. CO can't be used as reducing agent
(A) to prepare/extract Zn metal from ZnO (B) To prepare Al metal from $Al_2O_3$
(C) to prepare Fe metal from $Fe_2O_3$ (D) To prepare Pb metal from PbS

9. ABD

10. Magnetic substance which are present in casseterite for Sn extraction.
(A) $FeWO_4$ (B) $SnO_2$
(C) $MnWO_4$ (D) $Fe_3O_4$

10. AC

11. Which of the two metal form cyano complex during its extraction?
(A) Zn (B) Ag
(C) Au (D) Cu

11. BC

12. Which of the following is/are used as transquilizers?
(A) Equanil (B) Meprobamat
(C) Iproniazid (D) Morphine

12. ABC

13. Which of the following is/are used as artificial sweetners?
(A) Aspartame (B) Sucralose
(C) Saccharin (D) Alitame

13. ABCD

## PART – C
## (Integer Type)

This section contains **5 questions**. The answer to each question is a **single-digit integer**, ranging from 0 to 9. The correct digit below the question number in the ORS is to be bubbled.

1. How many metals are commercially obtained by carbon reduction of their oxide
Fe, Al, Mg, Ca, Sn, Pb, Zn

1. 5

2. How many metals can be commercially extracted by hydrometallurgy i.e., displacement reaction takes place in aqueous solution.
Au, Ag, In, Zn, Pb, Al, Cu

2. 2

3. How many statements are correct?
   (i) Graphite rod is used as anode but not diamond because mobile electrons are present in graphite layer which helps in electrical conductivity.
   (ii) If the impurity in a metal has greater affinity for oxygen than the purification of metal may be carried out by cupellation.
   (iii) Fe and Pt can't form alloy with Hg.
   (iv) During roasting of sulfide ore at high temperature oxide is formed and at low temperature sulphate is formed.
   (v) During Sn/Pb/iron metallurgy $CaSiO_3$ is formed as slag.
   (vi) Wolframite is ferromagnetic, therefore attracted by magnet.
   (vii) Magnetic siderite, chromite, Wolframite are of Fe(II) but limonite, Haematite ore of Fe(III).
   (viii) Bauxite is considered as oxide as well as hydroxide of Al.
   (ix) In cyanide extraction process of silver from argentite ore the oxidizing and reducing agent used as $O_2$ and Zn.

3. 9

4. How many of these are used as food preservatives:
   Table salt, sugar, vegetable oils, sodium benzoate, sodium stearate, bithional, terpineol, sulphanilamide

4. 4

5. Find the number of ores which can be concentrated by magnetic separation.
   Galena, Copperpyrites, Haematite, Siderite

5. 2

***Space for rough work***

# SECTION – III: MATHEMATICS

## PART – A

### (Single Correct Choice Type)

This section contains **5 multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE is correct.**

1. If $E_1$ and $E_2$ are two events such that $P(E_1) = \frac{1}{4}, P\left(\frac{E_2}{E_1}\right) = \frac{1}{2}$ and $P\left(\frac{E_1}{E_2}\right) = \frac{1}{4}$,

   Then which of the following is **incorrect**?
   (A) $E_1$ and $E_2$ are independent
   (B) $E_1$ and $E_2$ are exhaustive
   (C) $E_2$ is twice as likely to occur as $E_1$
   (D) Probabilities of the events $E_1 \cap E_2, E_1$ and $E_2$ are in G.P.

1. B

2. A quadratic equation is chosen from the set of all the quadratic equations which are unchanged by squaring their roots. The chance that the chosen equation has equal roots is:
   (A) $\frac{1}{2}$ (B) $\frac{1}{3}$
   (C) $\frac{1}{4}$ (D) $\frac{2}{3}$

2. A

3. The reflection of the point (2, –1, 3) in the plane 3x – 2y – z = 9 is
   (A) $\left(\frac{26}{7}, \frac{15}{7}, \frac{17}{7}\right)$ (B) $\left(\frac{26}{7}, \frac{-15}{7}, \frac{17}{7}\right)$
   (C) $\left(\frac{15}{7}, \frac{26}{7}, \frac{-17}{7}\right)$ (D) $\left(\frac{26}{7}, \frac{17}{7}, \frac{-15}{7}\right)$

3. **B**

4. An urn contains 3 red balls and n white balls
   Mr. A draws two balls together from the urn. The probability that they have the same colour is 1/2. Mr. B draws one ball from the urn, notes its colour and replaces it. He then draws a second ball from the urn and finds that both balls have the same colour is 5/8. The possible value of n is
   (A) 9 (B) 6
   (C) 5 (D) 1

4. D

5. The number of distinct real values of $\lambda$, for which the vectors $-\lambda^2\hat{i} + \hat{j} + \hat{k}, \hat{i} - \lambda^2\hat{j} + \hat{k}$ and $\hat{i} + \hat{j} - \lambda^2\hat{k}$ are coplanar, is
   (A) zero (B) one
   (C) two (D) three

5. **C**

**(Multi Correct Choice Type)**

This section contains **8 multiple choice questions.** Each question has four choices (A), (B), (C) and (D) out of which **ONE OR MORE** may be correct.

6. If $\vec{a}=\hat{i}+2\hat{j}+4\hat{k},\ \vec{b}=2\hat{i}-3\hat{j}-\hat{k}$ and $\vec{c}=\hat{i}+4\hat{j}-4\hat{k}$, then the vector $\vec{a}\times\left(\vec{b}\times\vec{c}\right)$ is orthogonal to

(A) $\vec{a}$ (B) $\vec{b}$

(C) $\vec{c}$ (D) $\vec{a}+\vec{b}+\vec{c}$

6. **AD**

7. Let $\vec{a}=2\hat{i}-\hat{j}+\hat{k},\ \vec{b}=\hat{i}+2\hat{j}-\hat{k},\ \vec{c}=\hat{i}+\hat{j}-2\hat{k}$ be three vectors. A vector in the plane of $\vec{b}$ and $\vec{c}$ whose projection on $\vec{a}$ is of magnitude $\sqrt{\frac{2}{3}}$ is

(A) $2\hat{i}+3\hat{j}-3\hat{k}$ (B) $2\hat{i}+3\hat{j}+3\hat{k}$

(C) $-2\hat{i}-\hat{j}+5\hat{k}$ (D) $2\hat{i}+\hat{j}+5\hat{k}$

7. **AC**

8. Let $\vec{a},\vec{b},\vec{c}$ be non – coplanar vectors and $\vec{p}=\frac{\vec{b}\times\vec{c}}{\left[\vec{a}\ \vec{b}\ \vec{c}\right]},\ \vec{q}=\frac{\vec{c}\times\vec{a}}{\left[\vec{a}\vec{b}\vec{c}\right]}$ and $\vec{r}=\frac{\vec{a}\times\vec{b}}{\left[\vec{a}\vec{b}\vec{c}\right]}$, then

(A) $\vec{p}.\vec{a}=1$ (B) $\vec{p}.\vec{a}+\vec{q}.\vec{b}+\vec{r}.\vec{c}=3$

(C) $\vec{p}.\vec{a}+\vec{q}.\vec{b}+\vec{r}.\vec{c}=0$ (D) $\vec{a}\times\vec{c}=\vec{b}$

8. **AB**

9. The vector $\frac{1}{3}(2\hat{i}-2\hat{j}+\hat{k})$ is

(A)A unit vector

(B)Makes an acute angle $\frac{\pi}{3}$ with the vector $2\hat{i}-4\hat{j}+3\hat{k}$

(C)Parallel to $-\hat{i}+\hat{j}-\frac{1}{2}\hat{k}$

(D)Perpendicular to $3\hat{i}+2\hat{j}-2\hat{k}$

9. ACD

10. The value(s) of x and y for which the vectors $x\hat{i}+y\hat{j}+3\hat{k},\ \hat{i}+2\hat{j}+7\hat{k}$ and the line joining the two points $\hat{i}+3\hat{j}+5\hat{k}$ and $\hat{i}+4\hat{j}+4\hat{k}$ are all coplanar is

(A) x = 1, y = 6 (B) x=0, y = 3

(C) $x=\frac{1}{3},\ y=0$ (D) $x=1,\ y=-6$

10. **AC**

11. Coordinate of a point in the plane parallel to the plane $x-y+2z=5$ and at a distance of $\sqrt{6}$ units from it is

(A) (1, –2, 4) (B) (–1, 0, 0)

(C) (1, 2, 3) (D) (6, –5, 0)

11. **ABD**

12. If PQ is a line segment given by the equation $\frac{x-1}{2}=\frac{y-1}{3}=\frac{z-1}{4}$ such that middle point of PQ is (1, 1, 1) then coordinate of P and Q respectively may be
(A) (3, 4, 5) and (–1, –2, –3) (B) (1, 0, –1) and (1, 2, 3)
(C) (9, 13, 17) and (–7, –11, –15) (D) (7, 10, 13) and (–5, –8, –11)

12. **ACD**

13. If two events A and B are such that P(A′) = 0.3, P(B) = 0.5 and P(A ∩B) = 0.3 then
(A) A and B are independent events (B) $P\left(\frac{A}{B}\right)=0.6$
(C) $P\left(\frac{A}{B'}\right)=0.8$ (D) $P\left(\frac{B}{A\cup B'}\right)=\frac{3}{8}$

13. BCD

## PART – C
## (Integer Type)

This section contains **5 questions**. The answer to each question is a **single-digit integer**, ranging from 0 to 9. The correct digit below the question number in the ORS is to be bubbled.

1. The shortest distance between the lines given by $\vec{r}=3\hat{i}+8\hat{j}+3\hat{k}+\lambda\left(3\hat{i}-\hat{j}+\hat{k}\right)$ and $\vec{r}=-3\hat{i}-7\hat{j}+6\hat{k}+\mu\left(-3\hat{i}+2\hat{j}+4\hat{k}\right)$ is $k\sqrt{30}$, then the value of k is

1. 3

2. If the distance of the planes through (1, 1, 1) and perpendicular to the line $\frac{x-1}{3}=\frac{y-1}{0}=\frac{z-1}{4}$ from the origin is k, then 5k is equal to

2. **7**

3. If $\vec{a}=\hat{i}+\hat{j}+\hat{k},\ \vec{b}=\hat{i}+\hat{j},\ \vec{c}=\hat{i}$ and $\left(\vec{a}\times\vec{b}\right)\times\vec{c}=\lambda\vec{a}+\mu\vec{b}$ then $\lambda+\mu$ is

3. **0**

4. $\hat{i}\cdot\left(\hat{j}\times\hat{k}\right)+\hat{j}\cdot\left(\hat{i}\times\hat{k}\right)+\hat{k}\cdot\left(\hat{i}\times\hat{j}\right)$ is equal to

4. **1**

5. $|\vec{a}|=3,\ |\vec{b}|=4$ and $|\vec{a}+\vec{b}|=5$, then $|\vec{a}-\vec{b}|=$

5. **5**

*Space for rough work*