FTRE
FIITJEE TALENT REWARD EXAM

SAMPLE PAPER
for Students presently in Class X

Paper 3   JEE Advanced

Duration : 90 minutes   *Maximum Marks : 120*

Please read the instructions and guidelines carefully :

Important Note : Please ensure to accurately input the details for the Class and Paper No. as indicated at the top of this sheet into the corresponding columns / fields on the OMR sheet before proceeding with the paper. Incorrectly filled information regarding the class or paper may result in inaccurate outcomes or results.

"This paper has been scientifically designed to evaluate your potential – manifested and hidden for the target examinations mentioned in various sections of the paper. Thus, your adherence to the instructions is critical in the evaluation of the same"

1.   This Question paper consists of 1 sections.

2.   **Student should devote allotted time for each section. If a section is easy, then it is easy for everyone & was meant to be like that with a goal in mind. Do not switch over to another section if you find the section to be easy. If a section is tough, then it is tough for everyone.** You are advised to spend 90 Minutes on Section-I. This adherence is crucial for assessing your true potential, as this section is meticulously crafted to evaluate your potential for the corresponding competitive examination.

3.   Sheets will be given to each candidate for rough work. Candidate must fill all details on the rough sheet and submit the same to invigilator along with OMR sheet. Candidate must mention the Question No. while doing the rough work in the sheet.

4.   Please note candidates are not allowed to bring any prohibited items into the exam hall such as electronic devices, mobile phones, smart watch, earphones, calculators, books, notes, formula sheets, and bags.

5.   Marking scheme is given in table below:

| Section	Subject		Question no.	Marking Scheme for each question	
				Correct answer	Wrong answer
SECTION – I **JEE Advanced** **Time Allotted: 90 Minutes**	PHYSICS	(PART-A)	1 to 4	**+3**	**–1**
	CHEMISTRY	(PART-B)	5 to 8	**+3**	**–1**
	MATHEMATICS	(PART-C)	9 to 12	**+3**	**–1**
	PHYSICS	(PART-D)	13 to 19	**+4**	**–1**
	CHEMISTRY	(PART-E)	20 to 26	**+4**	**–1**
	MATHEMATICS	(PART-F)	27 to 33	**+4**	**–1**

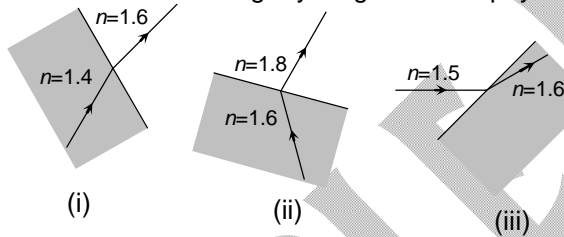# Section – I

Time: 90 Minutes

PHYSICS – (PART – A)

*This part contains **4 Multiple Choice Questions** number **1 to 4**. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*

1. A ray of light passes through four transparent media with refractive indices μ_1, μ_2, μ_3 and μ_4 as shown in the figure. The surfaces of all media are parallel. If the emergent ray *CD* is parallel to the incident ray *AB*, we must have
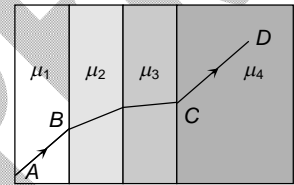
    (A) $\mu_1 = \mu_2$
    (B) $\mu_2 = \mu_3$
    (C) $\mu_3 = \mu_4$
    (D) $\mu_4 = \mu_1$

2. Which of the following ray diagram show physically possible refraction?

    (i)   (ii)   (iii)

    (A) (i)
    (B) (ii)
    (C) (iii)
    (D) None of these

3. A convex lens *A* of focal length 20 cm and a concave lens *B* of focal length 5 cm are kept along the same axis with a distance *d* between them. If a parallel beam of light falling on *A* leaves *B* as a parallel beam, then the distance *d* in cm will be

    (A) 25
    (B) 15
    (C) 30
    (D) 50

4. Which of the following diagrams, shows correctly the dispersion of white light by a prism

    (A)   (B)

    (C)   (D)
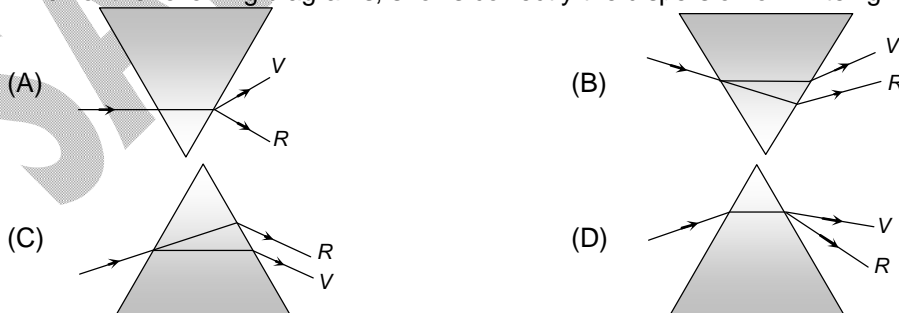
CHEMISTRY – (PART – B)

*This part contains **4 Multiple Choice Questions** number **5 to 8**. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*

5. In the compound,
   $CH_2 = CH – CH_2 – CH_2 –C \equiv CH$, the $C_2 – C_3$
   bond is of the type
   (A) $sp – sp^2$ (B) $sp^3 – sp^3$
   (C) $sp – sp^3$ (D) $sp^2 – sp^3$

6. What is the oxidation state of Cr in CrO_5
   (A) 3   (B) 4
   (C) 5   (D) 6

7. The pH of a solution of hydrochloric acid is 4. The molarity of the solution is
   (A) 4.0   (B) 0.4
   (C) 0.0001   (D) 0.04

8. The isomerism exhibited by n-propyl alcohol and isopropyl alcohol is
   (A) Metamerism   (B) Position isomerism
   (C) Functional isomerism   (D) Optical isomerism

MATHEMATICS – (PART – C)

*This part contains **4 Multiple Choice Questions** number **9 to 12**. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*

9. If $\tan x + \tan^2 x + \tan^3 x = 1$ then the value of $2 \cos^6 x – 2 \cos^4 x + \cos^2 x$ equals to
   (A) 1/2   (B) 2
   (C) 1   (D) none of these

10. If y, x, z are in A.P., then 2^{x+y}, 2^{y+z}, 2^{x+z} are in
    (A) A.P.   (B) G.P.
    (C) H.P.   (D) none of these

11. If the value of a quadratic polynomical $P(x)$ is 0 only at $x = – 1$ and $P(–2) = 2$, then the vlaue of $P(3)$ is :
    (A) 32   (B) 35
    (C) 36   (D) 24

12. Points R (h, k) divides line segment AB beween axes in the ratio 1 : 2 where A lies on X-axis. Find the equation of line.
    (A) $2hx + ky = 3hk$ (B) $2kx + hy = 3hk$
    (C) $kx + hy = 2hk$ (D) $3hx + hy = 4hk$

PHYSICS – (PART – D)

*This part contains **ONE (01)** comprehension. Based on comprehension, there are **THREE (03)** questions of **Multiple Choice Questions**. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*

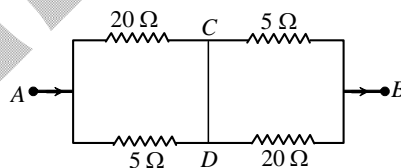**Comprehension–1 for Q. No. 13 to 15)**

An ammeter and a voltmeter are connected in series to a battery with emf E = 6 volt and negligible resistance. When a resistance $R = 3\Omega$ is connected in parallel to voltmeter, reading of ammeter increases three times while that of voltmeter reduces to one third.

13. The resistance of ammeter is
     (A) 24 Ω (B) 8 Ω
     (C) 4 Ω (D) 3Ω

14. The resistance of voltmeter is
     (A) 24 Ω (B) 8Ω
     (C) 4Ω (D) 3Ω

15. Reading of voltmeter after the connection of resistance is
     (A) 1 Volt   (B) 3 Volt
     (C) 9/2 Volt   (D) 3/2 Volt

*This part contains **TWO (02)** comprehensions. Based on each comprehension, there are **TWO (02)** questions of **Multiple Choice Questions**. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*

Comprehension–1 for Q. No. 16 to 17

When some potential difference is maintained between *A* and *B*, current *I* enters the network at *A* and leaves at *B*.

16. Same potential points
     (A) C & D   (B) C & B
     (C) C & A   (D) A & B

17. Current $\dfrac{3I}{5}$ flows from
     (A) C to D   (B) D to C
     (C) A to C   (D) None of these

Comprehension–2 for Q. No. 18 to 19

The light ray is incident at angle of 60° on a prism of angle 45°. When the light ray falls on the other surface at 90°

18.   In this case refractive index of the material of prism μ

(A) $\mu = \sqrt{\dfrac{3}{5}}$ (B) $\mu = 1.5$

(C) $\mu = \dfrac{\sqrt{3}}{2}$ (D) $\mu = \sqrt{\dfrac{3}{2}}$

19.   The angle of deviation δ is
(A) $\delta = 30°$ (B) $\delta = 15°$
(C) $\delta = 60°$ (D) none of these

CHEMISTRY– (PART – E)

This part contains ONE (01) comprehension. Based on comprehension, there are THREE (03) questions of Multiple Choice Questions. Each question has 4 choices (A), (B), (C) and (D), out of which ONLY ONE is correct.

Comprehension–1 for Q. No. 20 to 22)

Two or more than two compounds may have same molecular formula but different properties these compounds are called isomers and phenomenon is called isomerism. It may be structural or stereo isomerism. It may be structural or stereo isomerism. Structural may be further of chain position, functional, metamerism ring-chain or tautomerism

20.   Number of isomers represented by molecular formula $C_4H_{10}O$ is
(A) 7   (B) 6
(C) 4   (D) 3

21.   Which of the following shows functional isomerism?
(A) CH_3CH_2Cl and CH_3CH_2Br (B) CH_3CHBr_2 and CH_2BrCH_2Br
(C) $C_2H_5OC_2H_5$ and $CH_3OC_3H_7$ (D) CH_3CH_2CHO and CH_3COCH_3

22.   But-1-ene and cyclobutane exhibit:
(A) ring-chain isomerism   (B) position isomerism
(C) tautomerism   (D) functional isomerism

*This part contains **TWO (02)** comprehensions. Based on each comprehension, there are **TWO (02)** questions of **Multiple Choice Questions**. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*

Comprehension–1 for Q. No. 23 to 24

When the metal carbonates and hydrogen carbonates react with the acids, they produce salt and water and liberate the carbon dioxide gas.
Metal carbonates + Acid → salt + carbon dioxide + water

23. A solution reacts with crushed egg-shells to give a gas that turns lime-water milky. The solution contains:
    (A) NaCl   (B) HCl
    (C) LiCl   (D) KCl

24. A student dropped few pieces of marbles in acetic acid contained in a test tube. The evolved gas was then passed through lime water in excess, then what will you observe
    (A) Lime water become milk   (B) Milkyness will disappear
    (C) No change   (D) None of these

Comprehension–2 for Q. No. 25 to 26

The phenomenon of existence of a chemical element to exist in two or more form differing in physical properties but having almost same chemical nature is known as allotropy. This phenomenon is due to the difference either in the number of atoms in the molecules or arrangement of atoms in the molecules in the crystal structure. Except lead, all other members of group 14 exhibit allotropy carbon exists as diamond, graphite, coal, charcoal, lampblack and fullerene. Silicon exists in two forms crystalline and amorphous

25. Carbon atoms in diamond are bonded with each other in a shape
    (A) linear   (B) planar
    (C) octahedral   (D) tetrahedral

26. C – C bond length is maximum in
   (A) diamond   (B) graphite
    (C) naphthalene   (D) fullerene

MATHEMATICS – (PART – F)

*This part contains **ONE (01)** comprehension. Based on comprehension, there are **THREE (03)** questions of **Multiple Choice Questions**. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*

Comprehension–1 for Q. No. 27 to 29)
The internal / external bisector of an angle of a triangle divides the opposite side internally / externally in the ratio of the side containing the angle.

27. In the given figure, AD is the bisector of $\angle$A. If BD = 4 cm, DC = 3 cm and AB = 6 cm determine AC.
(A) 4.5 cm   (B) 3.5 cm
(C) 4.8 cm   (D) 3.2 cm
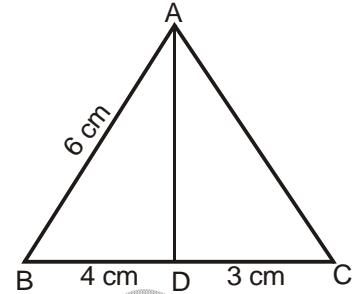
28. In the given figure AD is the bisector of $\angle$BAC. If AB = 10 cm, AC = 14 cm, and BC = 6 cm. Find BD and DC.
(A) 3.5 cm, 2.5 cm
(B) 2.5 cm, 3.5 cm
(C) 4.5 cm, 3.5 cm
(D) 3.5 cm, 4.5 cm
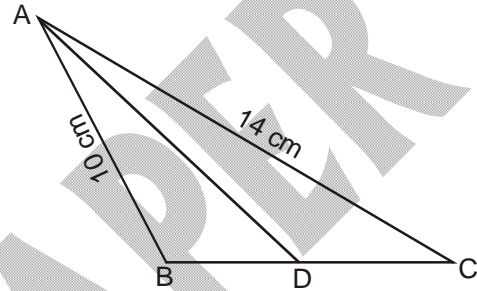
29. In the given figure AE is the bisector of the exterior $\angle$CAD meeting BC produced in E. If AB = 10 cm, AC = 6 cm and BC = 12 cm. Find CE.
(A) 12 cm
(B) 16 cm
(C) 20 cm
(D) 18 cm
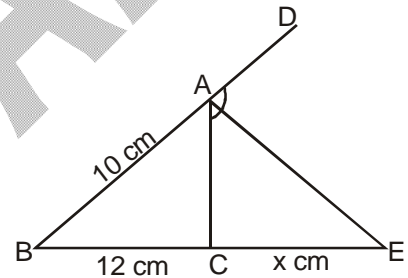
*This part contains **TWO (02)** comprehensions. Based on each comprehension, there are **TWO (02)** questions of **Multiple Choice Questions**. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*

Comprehension–1 for Q. No. 30 to 31

$(-5, -10), (-15, 15), (5,5)$ are the coordinates of vertices A, B and C respectively of $\triangle$ABC, and P is a point on median AD such that $AP : PD = 2 : 3$

30. The coordinates of point D is
(A) $(5, 10)$ (B) $(-5, -10)$
(C) $(5, -10)$ (D) $(-5, 10)$

31. The coordinates of point P is
(A) $(-5, -2)$ (B) $\left(\dfrac{10}{3}, 5\right)$
(C) $\left(\dfrac{10}{3}, \dfrac{5}{3}\right)$ (D) None of these

Comprehension–2 for Q. No. 32 to 33

$f(x) = a_0 + a_1 x + a_2 x^2 + \ldots + a_n x^n$ is divided by $(x-k)$, then remainder is is $f(k)$.

32. The remainder when x^{2014} is divided by x^2-1
    (A) 1
    (B) -1
    (C) $x + 1$
    (D) $x-1$

33. The remainder when x^{2014} is divided by x^2-3x+2 is
    (A) 2014
    (B) $2014x-2013$
    (C) $(2^{2014}-2)x+(2-2^{2014})$
    (D) $(2^{2014}-1)x+(2-2^{2014})$

FIITJEE TALENT REWARD EXAM
for Students presently in Class X (Paper 3)
ANSWER KEY
(SAMPLE PAPER)

1.	**D**	2.	**A**	3.	**B**	4.	**B**
5.	**D**	6.	**D**	7.	**C**	8.	**B**
9.	**A**	10.	**B**	11.	**A**	12.	**B**
13.	**B**	14.	**A**	15.	**D**	16.	**A**
17.	**B**	18.	**D**	19.	**B**	20.	**A**
21.	**D**	22.	**A**	23.	**B**	24	B
25.	**D**	26.	**A**	27.	**A**	28.	**B**
29.	**D**	30.	**D**	31.	**A**	32.	**A**
33.	**D**						