

# FIITJEE Talent Reward Exam

for student presently in  
Class 10

**PAPER-2**

Time: 3 Hours

Maximum Marks: 270

**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.

1. You are advised to devote 1 Hour on Section-I and 2 Hours on Section-II and Section-III.
2. This Question paper consists of 3 sections. All questions will be multiple choice single correct out of four choices with marking scheme in table below:

Section			Question no.	Marking Scheme for each question	
				correct answers	wrong answers
SECTION – I (IQ)			Q. 1 to 8	+3	-1
			Q. 9 to 16	+6	-2
SECTION – II (PCM)	Part –A	Physics	Q. 17 to 25	+4	-1
	Part –B	Chemistry	Q. 26 to 34	+4	-1
	Part –C	Mathematics	Q. 35 to 43	+4	-1
SECTION – III (PCM)	Part –A	Physics	Q. 44 to 48	+6	-2
	Part –B	Chemistry	Q. 49 to 53	+6	-2
	Part –C	Mathematics	Q. 54 to 58	+6	-2

3. Answers have to be marked on the OMR sheet.
4. The Question Paper contains blank spaces for your rough work. No additional sheets will be provided for rough work.
5. Blank papers, clip boards, log tables, slide rule, calculator, cellular phones, pagers and electronic devices, in any form, are not allowed.
6. Before attempting paper write your Name, Registration number and Test Centre in the space provided at the bottom of this sheet.

**Note:**

Check all the sheets of this question paper. Please ensure the same SET is marked on header of all the sheets inside as indicated above 'Maximum Marks' of this page. In case SET marked is not the same on all pages, immediately inform the invigilator and CHANGE the Questions paper.

Registration Number :

Name of the Candidate : \_\_\_\_\_

Test Centre : \_\_\_\_\_

**SECTION – I**  
**I.Q**

**Directions (1 – 2):** These questions are based on the following information.

$C_1$ ,  $C_2$  and  $C_3$  are three cars that leave town  $T_1$  and reach town  $T_2$ . For a car, say  $C_k$ ,  $k$  is considered to be the car number. The car number and the order in which they depart or arrive is not the same. The first car to leave  $T_1$  is the third car to reach  $T_2$ .

1. Which car is the first to leave from  $T_1$ ?  
(A)  $C_1$  (B)  $C_2$   
(C)  $C_3$  (D) Either  $C_2$  or  $C_3$
2. Which car is the second to reach  $T_2$ ?  
(A)  $C_1$  (B)  $C_2$   
(C)  $C_3$  (D) Either  $C_2$  or  $C_3$

**Directions (3 – 4):** These questions are based on the following information.

Anna, the only daughter of John was celebrating her tenth birthday. A total of six members, apart from Anna, attended the party. All except Steve who was a close friend of Anna, were her close relatives. Jessie was the daughter in – law of Maria, who was the wife of Thomas. Abey was the son of Jessie and brother of Anna.

3. How is Maria related to John?  
(A) Mother – in – law (B) Mother  
(C) Aunt (D) Wife
4. How is Jessie related to Thomas?  
(A) Daughter – in – law (B) Daughter  
(C) Grand – daughter (D) Sister

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**Space For Rough Work**

**Directions (5 – 8):** These questions are based on the following information.

Seven friends – B, L, M, N, D, S and P were sitting in a row in that order facing same direction. They rearrange themselves in another order, such that, in the new arrangement.

- (I) For any one of them neither of the neighbours is same as in the previous arrangement.
- (II) Only M and D remain at their previous positions.
- (III) S and L do not sit adjacent to each other in the new arrangement.

5. How many people are sitting between B and P?  
 (A) 0 (B) 1  
 (C) 2 (D) 3
6. The number of people sitting between S and L is:  
 (A) 1 (B) 2  
 (C) 3 (D) 4
7. Who among the following are definitely adjacent to each other?  
 (A) P and L (B) B and D  
 (C) D and P (D) S and M
8. Who is sitting at the right end of the row?  
 (A) N (B) L  
 (C) S (D) Cannot be determined

**Directions (9 – 12):** These questions are based on the following data:

One face of a cube is painted with brown, two faces are painted with black and three faces are painted with white. This cube is now cut into 512 small but identical cubes.

9. What is the minimum possible number of small cubes that have two faces painted black?  
 (A) 0 (B) 9  
 (C) 7 (D) 16
10. What is the maximum possible number of smaller cubes that have both brown colours and black colours on them, but no other colour?  
 (A) 12 (B) 6  
 (C) 14 (D) 13

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**Space For Rough Work**

11. What is the least possible number of small cubes that have at least two painted faces but have only white colour on them?  
(A) 18 (B) 15  
(C) 17 (D) 12
12. How many small cubes have all the three colours on them?  
(A) Either one or two (B) Two  
(C) Three (D) Either two or four

**Directions (13 – 16):** These questions are based on the following information.

From a group of five batsmen A, B, C, D and E and five bowlers P, Q, R, S and T, a group of five players is to be selected. The group must consist of exactly two batsmen.

It is also known that,

- (I) Atleast one among C and P must be selected.  
(II) Exactly two among B, D, E and R must be selected.  
(III) If B or E is selected, then none among P, R and Q are selected.  
(IV) If A is selected, then neither Q nor S is selected.

13. Among the batsmen, who must be selected?  
(A) B (B) D  
(C) E (D) None of these
14. Among the bowlers, who must be selected?  
(A) P (B) T  
(C) Q (D) None of these
15. If E is selected, who among the following must be selected?  
(A) D  
(B) Q  
(C) P  
(D) E cannot be selected under any condition.
16. How many different group of players can be selected?  
(A) 2 (B) 3  
(C) 4 (D) 6

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**Space For Rough Work**

**SECTION – II  
PCM**

17. 10 electrons are moving in a circular orbit of radius  $r$  with angular velocity  $\omega$ . Then average current due to these moving electrons will be (charge of electron =  $e$ )
- (A)  $\frac{10\omega e}{2\pi}$  (B)  $\omega e$   
 (C)  $10\omega e$  (D) none of these
18. The direction of the force on a current-carrying wire placed in a magnetic field depends on
- (A) the direction of the current but not on the direction of the field.  
 (B) the direction of the field but not on the direction of the current.  
 (C) the direction of the current as well as the direction of the field.  
 (D) neither the direction of the current nor the direction of the field.

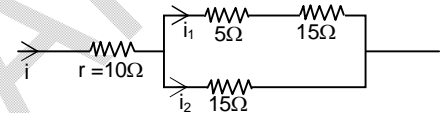
19. Ratio  $\frac{i_1}{i_2}$  will be

(A)  $\frac{3}{4}$

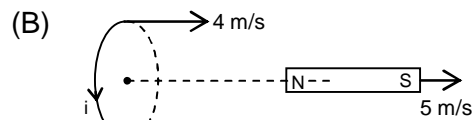
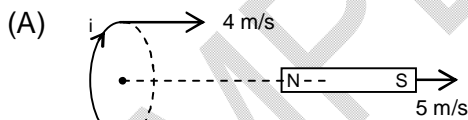
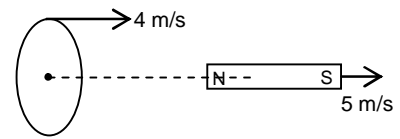
(B)  $\frac{4}{3}$

(C) 1

(D)  $\frac{1}{2}$



20. A conducting ring is moving towards a bar magnet with speed 4 m/s while the bar magnet is moving away from the conducting ring with speed 5 m/s along axis of ring as shown in figure then current induced in the ring will be



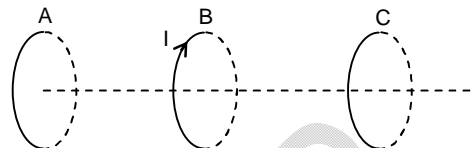
(C) No current will be induced

(D) Direction of current will depend on separation between ring & magnet

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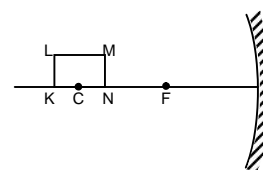
21. FIITJEE is written on a plate & image of this word is seen after three reflections from two parallel mirrors image will look like  
 (A)  $\overline{\text{FIITJEE}}$  (B) FIITJEE  
 (C) EEJTIIF (D) none of these

22. Three identical circular rings A, B and C are placed co axially and close to each other. If current in B is increased then the magnetic force on rings A & C due to ring B will be of nature



- (A) repulsive & attractive respectively  
 (B) attractive & repulsive respectively  
 (C) attractive & attractive respectively  
 (D) repulsive & repulsive respectively
23. Astigmatism is a type of defects in which  
 (A) a person is not able to see distant object.  
 (B) a person is not able to see nearby objects  
 (C) a person is not able to see both horizontal and vertical lines simultaneously  
 (D) a person is not able to distinguish between certain colours

24. A square frame KLMN is kept on the principle axis of the concave mirror with K & N on axis. The image of the frame is best represented by



- (A)
- (B)
- (C)
- (D)

Space For Rough Work

25. A plane mirror  
 (A) always forms a virtual image (B) always forms a real images  
 (C) forms real image for virtual object (D) none of the above
26. Which of the following represents a neutralization reaction?  
 (A)  $\text{H}^+ + \text{H}_2\text{O} \longrightarrow \text{H}_3\text{O}^+$  (B)  $2\text{H}_2 + \text{O}_2 \longrightarrow 2\text{H}_2\text{O}$   
 (C)  $\text{H}^+ + \text{OH}^- \longrightarrow \text{H}_2\text{O}$  (D)  $\text{H}_2 + \frac{1}{2}\text{O}_2 \longrightarrow \text{H}_2\text{O}$
27.  $\text{CaO} + \text{HCl} \longrightarrow (\text{X}) + \text{H}_2\text{O}$   
 The compound (X) in the above reaction is a/an  
 (A) acid (B) base  
 (C) salt (D) none of these
28. Which of the following reaction takes place with oxidation as well as reduction?  
 (A)  $\text{CaCO}_3 \xrightarrow{\text{Heat}} \text{CaO} + \text{CO}_2$  (B)  $\text{MgO} + \text{H}_2\text{SO}_4 \longrightarrow \text{MgSO}_4 + \text{H}_2\text{O}$   
 (C)  $\text{CuO} + \text{H}_2 \longrightarrow \text{Cu} + \text{H}_2\text{O}$  (D)  $\text{SO}_2 + \text{H}_2\text{O} \longrightarrow \text{H}_2\text{SO}_3$
29. Which of the following reaction takes place in aqueous solution?  
 (A)  $\text{C} + \text{O}_2 \longrightarrow \text{CO}_2$  (B)  $\text{MgCO}_3 \xrightarrow{\Delta} \text{MgO} + \text{CO}_2$   
 (C)  $\text{NaCl} + \text{AgNO}_3 \longrightarrow \text{AgCl} \downarrow + \text{NaNO}_3$  (D)  $\text{N}_2 + \text{O}_2 \xrightarrow{\Delta} 2\text{NO}$
30. Choose correct statement regarding the following reaction:  
 $\text{Fe}_2\text{O}_3 + 2\text{Al} \longrightarrow 2\text{Fe} + \text{Al}_2\text{O}_3$   
 (i) The reactants and the products are solids.  
 (ii) Aluminium behaves as a reducing agent.  
 (iii) It is a thermite reaction (reactions taking place at high temperature)  
 (iv) iron is obtained in liquid state  
 (v) It is a metal refining process.  
 Choose the correct codes:  
 (A) i, ii, iii and v (B) i, ii and v  
 (C) ii, iii and iv (D) ii, iii, iv and v

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31. Which of the following is correct order of acidic strength of the given oxides?  
(A)  $\text{CO}_2 > \text{NO}_2$  (B)  $\text{SO}_2 > \text{SO}_3$   
(C)  $\text{CO} > \text{CO}_2$  (D)  $\text{NO}_2 > \text{SO}_2$
32. Which of the following substance is prepared through electrolysis of aqueous solution of NaCl?  
(A)  $\text{Na}_2\text{O}$  (B) HCl  
(C) NaOH (D) Na
33. Which of the following is not a characteristic of chemical reactions?  
(A) The mass of reactants is equal to the mass of products.  
(B) Bond breaking and bond making takes place.  
(C) The number of moles of reactants is same as the number of moles of products.  
(D) Energy change takes place, i.e. energy is either evolved or absorbed.
34. Which of the following compound evolves an acidic gas when reacts with HCl?  
(A) NaOH (B)  $\text{Na}_2\text{CO}_3$   
(C)  $\text{NaNO}_3$  (D) NaCl
35. If  $\alpha, \beta, \gamma$  are distinct zeros of polynomial  $x^3 - x^2 + x - 2$  then  $\alpha^3 + \beta^3 + \gamma^3 =$   
(A) 1 (B) -1  
(C) 3 (D) 4
36. In a  $\Delta ABC$ ,  $AB = 10\text{ cm}$ ,  $BC = 5\text{ cm}$ ,  $AC = 6\text{ cm}$ . BC is extended to D such that  $\Delta DAB \sim \Delta DCA$  then the length of DC =  
(A) 2.8125 cm (B) 3.2165 cm  
(C) 2.8215 cm (D) none of these
37. The number of values of  $x$ ,  $90^\circ > x > 0^\circ$  such that  $2^{\cos^2 x} + 2^{\sin^2 x} = 3$  is  
(A) 1 (B) 2  
(C) 4 (D) 0

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**Space For Rough Work**



38. Given  $\frac{1}{x} + \frac{2}{y} + \frac{3}{z} = 0$  and  $\frac{1}{x} - \frac{6}{y} - \frac{5}{z} = 0$  then find the value of  $\frac{x}{y} + \frac{y}{z} + \frac{z}{x}$
- (A) 0 (B) 1  
(C) -1 (D) none of these
39. a and b are two real numbers such that  $a + b = 1$  and  $a^2 + b^2 = 2$  then  $a^5 + b^5 =$
- (A)  $\frac{15}{4}$  (B)  $\frac{19}{4}$   
(C)  $\frac{17}{4}$  (D) 5
40. If  $x^2 + x + 1 = 0$  then the value of  $x^{2013} + 2013x^{2010} =$
- (A) 2011 (B) 2013  
(C) 2014 (D) 2015
41. Find the area (in unit square) of region bounded by  $x = 4$ ,  $x + y = 6$  and coordinate axes
- (A) 4 (B) 8  
(C) 12 (D) 16
42. The mean and median of 100 objects are 50 & 52 respectively. The value of largest item is 100. It was later found that it is 110 and not 100. The true mean and median are
- (A) 50.10, 51.5 (B) 50.10, 52  
(C) 50, 51.5 (D) none of these
43. Area of circle inscribed in a n sided regular polygon with each side 'a' is
- (A)  $\pi \frac{a^2}{4} \tan \frac{\pi}{n}$  (B)  $\pi \frac{a^2}{4} \tan^2 \frac{\pi}{n}$   
(C)  $\pi \frac{a}{4} \cot^2 \frac{\pi}{n}$  (D)  $\pi \frac{a^2}{4} \cot^2 \frac{\pi}{n}$

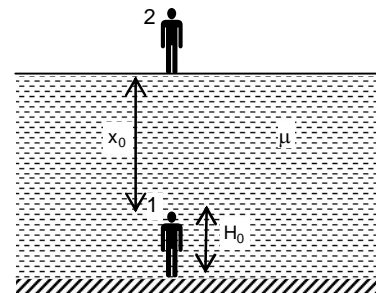
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**Space For Rough Work**

**SECTION – III**  
**PCM**

44. Find out height of man 1 as observed by man 2 standing in air just above the water surface overhead man 1

- (A)  $\frac{H_0}{\mu}$  (B)  $\mu H_0$   
(C)  $(\mu - 1)H_0$  (D) none of these



45. A concave mirror has a focal length 20 cm. The distance between the two positions of the object for which the image size is double the object size is

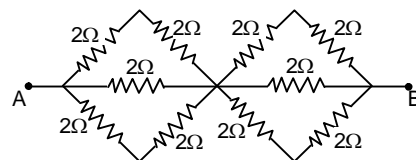
- (A) 20 cm (B) 40 cm  
(C) 30 cm (D) 60 cm

46. A resistive wire of length  $\ell = 10\text{m}$  and resistance  $10\Omega$  is folded 10 times to reduce its effective length to 1m then resistance between two ends of folded wire will be

- (A)  $1\Omega$  (B)  $\frac{1}{10}\Omega$   
(C)  $10\Omega$  (D)  $\frac{1}{100}\Omega$

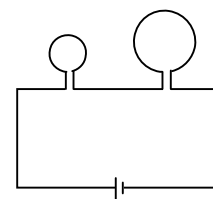
47. Find the equivalent resistance between A & B in the adjacent figure.

- (A)  $1\Omega$  (B)  $2\Omega$   
(C)  $3\Omega$  (D)  $4\Omega$



48. Two circular coils radii 10cm and 40cm are connected in series to a battery. The ratio of magnetic fields at the centre of first coil to that of second coil is

- (A) 1 : 4 (B) 4 : 1  
(C) 2 : 1 (D) 1 : 2



**Space For Rough Work**

49. Which of the following reaction(s) produces salts?  
 (I)  $\text{NH}_4\text{OH} + \text{HCN}$  (II)  $\text{MgO} + \text{H}_2\text{O}$   
 (III)  $\text{Cu} + \text{H}_2\text{SO}_4$  (IV)  $\text{CaO} + \text{HCl}$   
 Choose the correct reactions:  
 (A) only I (B) II and IV  
 (C) II, III and IV (D) I, III and IV
50. Which of the following reaction(s) take(s) place in the self reduction process for the extraction of lead from galena ( $\text{PbS}$ )?  
 (I)  $2\text{PbS} + \text{C} \longrightarrow 2\text{Pb} + \text{CS}_2$  (II)  $2\text{PbS} + 3\text{O}_2 \longrightarrow 2\text{PbO} + 2\text{SO}_2$   
 (III)  $2\text{PbO} + \text{PbS} \longrightarrow 3\text{Pb} + \text{SO}_2$  (IV)  $\text{PbS} + \text{H}_2 \longrightarrow \text{Pb} + \text{H}_2\text{S}$   
 Choose the correct reactions:  
 (A) I and IV (B) Only III  
 (C) I, III and IV (D) II and III
51. The reaction between  $\text{KOH}$  and  $\text{HCl}$  can be represented as:  
 $\text{KOH}(\text{aq}) + \text{HCl}(\text{aq}) \longrightarrow \text{KCl}(\text{aq}) + \text{H}_2\text{O}(\text{l}) + \text{Heat}$   
 In which of the following type(s), the above reaction can be classified?  
 (I) Double displacement reaction (II) Neutralization reaction  
 (III) Endothermic reaction (IV) Exothermic reaction  
 Choose the correct codes:  
 (A) I and III (B) I, II and IV  
 (C) II and III (D) I, II and III
52. Which of the following is/are the properties of  $\text{NaHCO}_3$ ?  
 (I) It evolves  $\text{CO}_2$  gas when reacts with dil.  $\text{HCl}$   
 (II) It is known as baking powder  
 (III) It is used to preserve milk  
 (IV) It decomposes to a metal carbonate, carbon dioxide and water on heating  
 Choose the correct codes:  
 (A) II and III (B) I, II, III and IV  
 (C) I, III and IV (D) Only I and IV

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**Space For Rough Work**

53. Which of the following metallurgical process(es) is/are used in order to extract pure zinc from its sulphide ore(ZnS)?  
 (I) Froth Floatation (II) Calcination  
 (III) Roasting (IV) Carbon reduction  
 (V) Electrolytic refining  
 Choose the correct codes:  
 (A) III and IV (B) II, IV and V  
 (C) I, III and IV (D) I, III, IV and V
54. Let  $f(x)$  be a polynomial of degree five with leading coefficient 252 which is the total number of students qualified for IITJEE Advance from FIITJEE Punjabi Bagh.  
 If  $f(2) = 3$ ,  $f(3) = 8$ ,  $f(4) = 15$ ,  $f(5) = 24$ ,  $f(6) = 35$  then  $\frac{f(1)}{252} =$   
 (A) 0 (B) 1  
 (C) 120 (D) -120
55. ABCD is a square. AB is extended to P and DP intersects AC and BC at Q and R respectively such that  $DQ = 3$  cm and  $QR = 2$  cm then length of PR is  
 (A) 1.5 cm (B) 2.5 cm  
 (C) 5 cm (D) 1 cm
56. In a  $\Delta ABC$ ,  $\angle B = 90^\circ$ ,  $AB = 6$  units and  $AC = 10$  unit then the length of angle bisector AD from  $\angle A$  is  
 (A)  $2\sqrt{5}$  unit (B)  $4\sqrt{5}$  unit  
 (C)  $3\sqrt{5}$  unit (D)  $5\sqrt{5}$  unit
57. Remainder when  $26^{3008} + 3008^{26}$  is divided by 4  
 (A) 0 (B) 1  
 (C) 2 (D) 3
58. The sum of possible integral values of  $a$  such that quadratic polynomial  $(x + a)(x + 2013) + 1$  is a perfect square is  
 (A) 2026 (B) 4026  
 (C) 4 (D) 2030

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**Space For Rough Work**

# FIITJEE Talent Reward Exam

## Class 10 PAPER-2 ANSWERS

### I.Q

1. B	2. A	3. B	4. A
5. B	6. D	7. C	8. D
9. A	10. D	11. D	12. D
13. B	14. D	15. D	16. C

### SECTION – II PCM

17. A	18. C	19. A	20. A
21. D	22. D	23. C	24. B
25. C	26. C	27. C	28. C
29. C	30. C	31. D	32. C
33. C	34. B	35. D	36. A
37. D	38. C	39. B	40. C
41. D	42. B	43. D	

### SECTION – III PCM

44. A	45. A	46. B	47. B
48. B	49. D	50. D	51. B
52. C	53. D	54. D	55. B
56. C	57. C	58. B	