

# FTRE

FIITJEE TALENT REWARD EXAM

## SAMPLE PAPER

for Students presently in Class IX

### Paper 2

**NEET Science, Science (Basic School, NTSE & NEET) & NTSE Mathematics**

Duration : 90 minutes

Maximum Marks : 188

**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 3 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 30 Minutes on Section-I, 30 Minutes on Section-II and 30 Minutes on Section-III. Dedicating the required time to finish each section successfully is essential. Opening the next section before completing the allotted time for the preceding section is not permitted. This adherence is crucial for assessing your true potential, as each section is meticulously crafted to evaluate your potential for the corresponding competitive examinations.
3. Candidate should open the seal of Section-II only after devoting 30 minutes on Section-I and Seal for Section-III is to be opened only after devoting 30 minutes on Section-II.
4. 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.
5. 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.
6. Marking scheme is given in table below:

Section	Subject	Question no.	Marking Scheme for each question	
			Correct answer	Wrong answer
<b>SECTION – I</b> (NEET-Science) Time Allotted: 30 Minutes	PHYSICS (Part-A)	1 to 8	+4	-1
	CHEMISTRY (Part-B)	9 to 16	+4	-1
	BIOLOGY (Part-C)	17 to 32	+4	-1
<b>SECTION – II</b> Science (Basic School & NTSE) & NEET Time Allotted: 30 Minutes	PHYSICS (Part-A)	33 to 37	+1	0
	CHEMISTRY (Part-B)	38 to 42	+1	0
	BIOLOGY (Part-C)	43 to 47	+1	0
	PHYSICS (Part-D)	48 to 52	+1	0
	CHEMISTRY (Part-E)	53 to 57	+1	0
	BIOLOGY (Part-F)	58 to 62	+1	0
<b>SECTION – III</b> (NTSE-Mathematics) Time Allotted: 30 Minutes	MATHEMATICS (Part-A)	63 to 77	+1	0
	MATHEMATICS (Part-B)	78 to 92	+1	0

**Section – I****Time: 30 Minutes****PHYSICS – (PART – A)**

This part contains **8 Multiple Choice Questions** number **1 to 8**. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

- Name the physical quantity that is defined as the rate of change of displacement.  
(A) Velocity (B) Acceleration  
(C) Distance (D) Speed
- Newton's law of Gravitation is valid  
(A) On the earth only (B) In the laboratory only  
(C) On the moon only (D) Everywhere
- A bomb of mass 9 kg explodes into two pieces of masses 3 kg and 6 kg. The velocity of 3 kg mass is 16 m/s. The velocity of 6 kg mass is  
(A) 4 m/s (B) 8 m/s  
(C) 16 m/s (D) 32 m/s

- The escape velocity on a planet or a satellite is the minimum velocity with which a body must be projected from that planet so that it escapes the gravitational pull of the planet goes into outer space. We obtain the expression for the escape velocity by equating the work required to move the body from the surface of the planet to infinity with the initial kinetic energy given to the body. The escape velocity from a planet of mass

$$M \text{ and radius } R \text{ is given by } v_e = \sqrt{\frac{2GM}{R}} = \sqrt{2gR}$$

Where  $g$  is the acceleration due to gravity on the surface of the planet and  $G$  is the gravitation constant.

Choose the only incorrect statement from the following. The escape velocity from a planet.

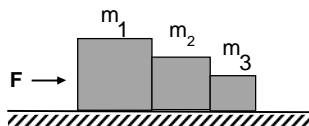
- Is independent of the mass of the body which is projected.
  - Is independent of the direction in which the body is projected
  - Depends on the mass and radius of the planet.
  - Will be less than the value given by the expression,  $v_e = \sqrt{\frac{2GM}{R}}$  if the planet has an atmosphere.
- Match the following entries of Column I and Column II

Column – I		Column – II	
(a)	Impulse equals	(p)	Rate of change of linear momentum
(b)	Force equals	(q)	Rate at which energy is consumed
(c)	Power is	(r)	Product of force and displacement
(d)	Work is	(s)	Change in linear momentum

- (a – s), (b – p), (c – q), (d – r)
- (a – q), (b – s), (c – r), (d – p)

- (a – p), (b – r), (c – q), (d – s)
- (a – s), (b – r), (c – p), (d – q)

6. Three blocks of masses  $m_1 = 3m$ ,  $m_2 = 2m$  and  $m_3 = m$  are placed in contact on a horizontal frictionless surface as shown in the figure below. A horizontal force  $F$  is applied to mass  $m_1$  as shown. Then match the items in **Column - I** with **Column - II**.



Column - I		Column - II	
(a)	Net force acting on $m_2$ if $F = 12\text{ N}$	(p)	1 N
(b)	Net force acting on $m_2$ if $F = 6\text{ N}$	(q)	3 N
(c)	Net force acting on $m_3$ if $F = 12\text{ N}$	(r)	2 N
(d)	Net force acting on $m_3$ if $F = 6\text{ N}$	(s)	4 N

- (A) (a - s), (b - r), (c - q), (d - p)  
 (B) (a - s), (b - r), (c - r), (d - p)  
 (C) (a - q), (b - r), (c - s), (d - p)  
 (D) (a - p), (b - s), (c - r), (d - p)

7. **Statement - 1:** A bomb at rest explodes into two fragments of different masses. The kinetic energies of the two fragments will be in inverse ratio of their masses.  
**Statement - 2:** Kinetic energy of a body is inversely proportional to its momentum.  
 (A) Both statement 1 and 2 are true and statement 2 is correct explanation of statement 1.  
 (B) Both statement 1 and 2 are true but statement is not a correct explanation of statement 1.  
 (C) Statement 1 is true and statement 2 is false.  
 (D) Statement 2 is true and statement 1 is false
8. **Statement - 1:** Friction is self - adjusting force.  
**Statement - 2:** The magnitude of static friction is less than the applied force.  
 (A) Both statement 1 and 2 are true and statement 2 is correct explanation of statement 1.  
 (B) Both statement 1 and 2 are true but statement is not a correct explanation of statement 1.  
 (C) Statement 1 is true and statement 2 is false.  
 (D) Statement 2 is true and statement 1 is false

## CHEMISTRY - (PART - B)

This part contains 8 Multiple Choice Questions number 9 to 16. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

9. Which of the following represents an incorrect chemical formula of a compound?  
 (A) AlP  
 (B) CaS  
 (C) ZnO  
 (D) MgN
10. Among the following, identify the sets in which all compounds undergo sublimation.

Set a : Iodine, Camphor, Ammonium chloride

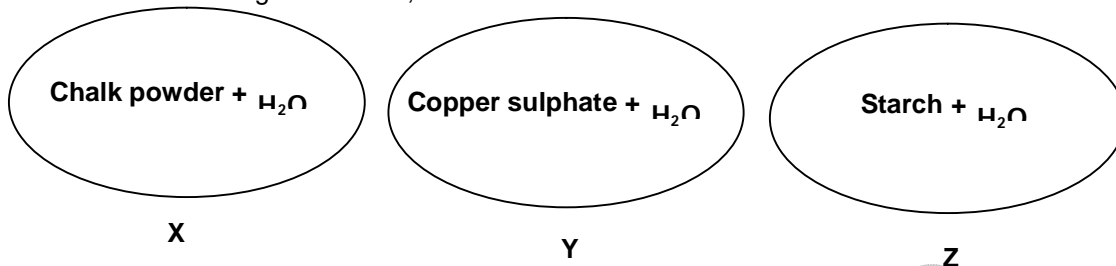
Set b : Dry ice, Naphthalene, Sodium hydroxide

Set c : Iodine, Dry ice, Naphthalene

Set d : Camphor, alcohol, Dry ice

- (A) a and c  
 (B) a and b  
 (C) c and d  
 (D) b and d

11. Consider the following solutions X, Y and Z.



Scattering of light can be done by particles of

- (A) X only  
(B) Z only  
(C) Both X and Y  
(D) Both X and Z
12. Intermixing of gases among one another is called diffusion. At higher temperatures, the rate (speed) of diffusion of a gas is higher. Which among the following gases would have the highest rate of diffusion?  
(A) SO<sub>3</sub>  
(B) CO<sub>2</sub>  
(C) NH<sub>3</sub>  
(D) HCl

13. Match the following

Column – I		Column – II	
(a)	Blue vitriol	(p)	Element
(b)	Diamond	(q)	Heterogeneous mixture
(c)	Ornamental gold	(r)	Compound
(d)	Smog	(s)	Homogeneous mixture

(A) (a – s), (b – r), (c – q), (d – p)

(B) (a – r), (b – p), (c – s), (d – q)

(C) (a – s), (b – p), (c – r), (d – q)

(D) (a – r), (b – s), (c – q), (d – p)

14. Match the following

Compound		Ratio by mass	
(a)	CuO	(p)	3: 8
(b)	CO <sub>2</sub>	(q)	4: 1
(c)	SO <sub>2</sub>	(r)	3: 2
(d)	MgO	(s)	1: 1

(A) (a – r), (b – p), (c – s), (d – q)

(B) (a – s), (b – p), (c – r), (d – q)

(C) (a – r), (b – s), (c – q), (d – p)

(D) (a – q), (b – p), (c – s), (d – r)

15. **Statement – 1:** A gas in a gas colloid is not possible.

**Statement – 2:** A gas dissolved in a gas forms a homogeneous true solution system.

- (A) Both statement 1 and 2 are true and statement 2 is correct explanation of statement 1.  
(B) Both statement 1 and 2 are true but statement is not a correct explanation of statement 1.  
(C) Statement 2 is true and statement 1 is false.  
(D) Statement 2 is false and statement 1 is true

16. **Statement – 1:** During Summer, water kept in an earthen pot becomes cool.  
**Statement – 2:** The cooling of water in earthen pot is caused by the diffusion of water through the small pores of the pot.  
 (A) Both statement 1 and 2 are true and statement 2 is correct explanation of statement 1.  
 (B) Both statement 1 and 2 are true but statement is not a correct explanation of statement 1.  
 (C) Statement 2 is true and statement 1 is false.  
 (D) Statement 2 is false and statement 1 is true.

## BIOLOGY – (PART – C)

*This part contains 16 Multiple Choice Questions number 17 to 32. Each question has 4 choices (A), (B), (C) and (D), out of which ONLY ONE is correct.*

17. The word 'cell' is derived from  
 (A) Greek word that means 'small box like structure '  
 (B) Latin word that means 'small box like structure '  
 (C) Greek word that means 'a little room '  
 (D) Latin word that means 'a little room '
18. Which one of the following pairs of diseases can spread through blood transfusion?  
 (A) Cholera and Hepatitis (B) Hepatitis B and AIDS  
 (C) Diabetes mellitus and Malaria (D) Hay fever and AIDS
19. The cells of Apical meristem lacks  
 (A) Vacuoles (B) Cytoplasm  
 (C) Nucleus (D) Cell wall
20. Cancer is a group of non-communicable disease characterized by uncontrolled proliferation of cells and the ability of proliferated cells to invade other parts of the body through the blood and lymph. The ability of cancer cells to spread from the primary site to different sites of the host body is called as  
 (A) Apoptosis (B) Metastasis  
 (C) Non - invasive cancer (D) Benign cancer

21. Match the Column I Types of tissues with Column II Functions

Column – I Types of tissues		Column – II Functions	
1.	Aerenchyma	I.	Stores food
2.	Collenchyma	II.	Flexibility
3.	Parenchyma	III.	Buoyancy
4.	Chlorenchyma	IV.	Photosynthesis

- (A) (1 – II), (2 – I), (3 – IV), (4 – III) (B) (1 – III), (2 – I), (3 – II), (4 – IV)  
 (C) (1 – IV), (2 – I), (3 – II), (4 – III) (D) (1 – III), (2 – II), (3 – I), (4 – IV)

22. Match the Column I Cell organelle with Column II functions

Column – I Cell organelle		Column – II Functions	
1.	Lysosomes	I.	Site of energy production
2.	Golgi bodies	II.	Digestion of nutrients and worn out cell parts
3.	Vacuoles	III.	Sorting, packaging, labeling of cell products
4.	Mitochondria	IV.	Storage of cell sap

- (A) (1 – II), (2 – III), (3 – IV), (4 – I) (B) (1 – III), (2 – II), (3 – IV), (4 – I)  
 (C) (1 – IV), (2 – III), (3 – II), (4 – I) (D) (1 – III), (2 – I), (3 – IV), (4 – III)

23. Which cell organelle/ organelles in eukaryotic cells contain 70 S ribosomes  
 (A) Rough Endoplasmic Reticulum (B) Chloroplast only  
 (C) Mitochondria only (D) Both Chloroplast and Mitochondria
24. The cause of cancer is by  
 (A) Viral infections (B) Genetic abnormalities  
 (C) Cephaleros algae (D) Both (A) and (B)
25. Stomatal opening is meant for  
 (A) Transpiration (B) Respiration  
 (C) Helps in the process of photosynthesis (D) All of these
26. Mitochondria is called power house of the cell, during aerobic respiration, mitochondria help in production of high amount of energy. Which stages of aerobic cellular respiration does not use the mitochondria for production of energy?  
 (A) Glycolysis (B) Krebs cycle  
 (C) Oxidative decarboxylation of pyruvic acid (D) Both (B) and (C)

27. Match the Column I Diseases with Column II Causative organism

Column – I Diseases		Column – II Causative Organism	
1	Tuberculosis	I.	<i>Plasmodium</i>
2	AIDS	II.	<i>Wuchereria</i>
3	Elephantiasis	III.	HIV
4	Malaria	IV.	<i>Mycobacterium</i>

- (A) (1 – II), (2 – I), (3 – IV), (4 – III)  
 (B) (1 – III), (2 – II), (3 – IV), (4 – I)  
 (C) (1 – IV), (2 – III), (3 – II), (4 – I)  
 (D) (1 – III), (2 – I), (3 – IV), (4 – III)

28. Match the Column I with Column II

Column – I		Column – II	
1.	Hypotonic solution	I.	Functional segment of DNA
2.	Hypertonic solution	II.	Nucleus
3.	Chromosomes	III.	Plant cell become Plasmolyzed
4.	Genes	IV.	Plant cell become turgid

- (A) (1 – II), (2 – I), (3 – IV), (4 – III)  
 (B) (1 – IV), (2 – III), (3 – II), (4 – I)  
 (C) (1 – IV), (2 – I), (3 – II), (4 – III)  
 (D) (1 – III), (2 – I), (3 – IV), (4 – III)

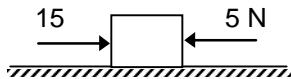
29. **Statement 1:** Robert Brown discovered the nucleus  
**Statement 2:** Nucleoplasm and cytoplasm of a living cell together form the protoplasm  
 (A) Statement 1 and 2 are correct and statement 2 explains the statement 1  
 (B) Statement 1 and 2 are correct but statement 2 does not explain the statement 1  
 (C) Statement 1 is true and statement 2 is false  
 (D) Statement 1 is false and statement 1 is true
30. Find out the correct statement/s from the options given below  
 (i) Mitochondria are rod shaped or sausage shaped cell organelles which are commonly called as the power house of the cell.  
 (ii) Mitochondria is a single membrane organelle and its wall is inwardly folded to form cristae.  
 (iii) Cristae has specialized structures called Oxysomes which serve as the site of ATP synthesis.  
 (iv) It has circular DNA and 80S type of ribosomes.  
 (A) Only statement (i) is correct (B) Statement (i) and (iii) are correct  
 (C) Statement (iii) and (iv) are correct (D) All the given statements are correct

31. Chloroplast is double membrane bound organelle enclosing the fluid stroma and membranous system called grana made up of stacked flattened sacs called thylakoids which contain chlorophylls. This cell organelle involves in photosynthesis. Photosynthesis involves light reaction and Dark reaction. Dark reaction takes place in which part of the chloroplast.
- (A) Stroma (B) Thylakoid  
(C) Grana (D) Fret channels
32. A certain patient is suspected to be suffering from Acquired Immuno Deficiency Syndrome. Which diagnostic technique will you recommend for its detection?
- (A) WIDAL (B) ELISA  
(C) CT (D) MRI

**SAMPLE PAPER**

**Section – II****Time: 30 Minutes****PHYSICS – (PART – A)**

*This part contains 5 Multiple Choice Questions number 33 to 37. Each question has 4 choices (A), (B), (C) and (D), out of which ONLY ONE is correct.*

33. The velocity time graph of a body in motion is a straight line inclined to the time-axis. The correct statement is  
 (A) velocity is uniform.  
 (B) acceleration is uniform.  
 (C) both velocity and acceleration are uniform.  
 (D) neither velocity nor acceleration is uniform.
34. Calculate the resultant force in the given figure.  
  
 (A) 5 N toward left  
 (B) 15 N towards right  
 (C) 10 N towards right  
 (D) 10 N towards left
35. The time period of a geostationary satellite is  
 (A) 24 hours  
 (B) 12 hours  
 (C) 365 days  
 (D) One month
36. When we jump out of a boat standing in water it moves  
 (A) Forward  
 (B) Backward  
 (C) Sideways  
 (D) None of these
37. In which of the following cases is the potential energy of a spring minimum?  
 (A) When it is compressed  
 (B) When it is extended  
 (C) When it is at its natural length  
 (D) none of these

**CHEMISTRY – (PART – B)**

*This part contains 5 Multiple Choice Questions number 38 to 42. Each question has 4 choices (A), (B), (C) and (D), out of which ONLY ONE is correct.*

38. Naturally occurring thallium consists of two stable isotopes, Tl-203 and Tl-205 (atomic mass = 203.0 and 205.0, respectively) and has an average atomic mass of 204.4. What is percentage of Tl-205?  
 (A) 14.0%  
 (B) 30.1%  
 (C) 50.0%  
 (D) 70.0%
39. Which of the following has no fluidity?  
 (A) Nitrogen  
 (B) Alcohol  
 (C) Common salt  
 (D) Helium
40. In washing machines, wet clothes are dried by using the process of:  
 (A) Filtration  
 (B) Sedimentation  
 (C) Evaporation  
 (D) Centrifugation



41. The example of solution of liquid in liquid is-  
 (A) Dry air (B) Sugar in water  
 (C) Mercury in gold (D) 75% alcohol
42. 40 g of common salt is dissolved in 320 g of water. The mass percentage of salt is.  
 (A) 11.1% (B) 12.5%  
 (C) 15 % (D) 10%

## BIOLOGY – (PART – C)

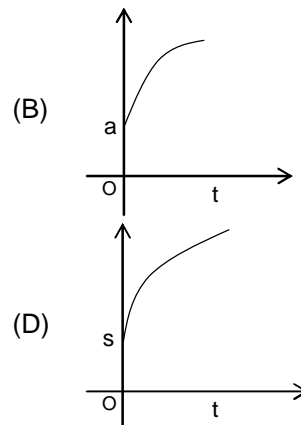
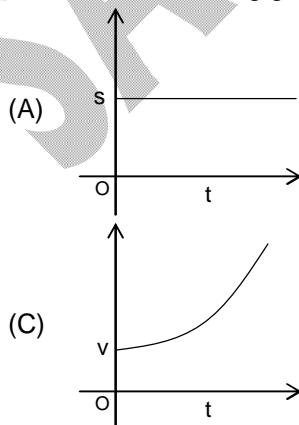
*This part contains 5 Multiple Choice Questions number 43 to 47. Each question has 4 choices (A), (B), (C) and (D), out of which ONLY ONE is correct.*

43. In which of the following disease is the liver affected?  
 (A) Pneumonia (B) Hepatitis  
 (C) AIDS (D) Amoebiasis
44. Which one the following is not a connective tissue?  
 (A) Bone (B) Blood  
 (C) Lymph (D) Neuron
45. The BCG vaccine is given for the immunity against  
 (A) Hepatitis (B) Malaria  
 (C) Tuberculosis (D) Jaundice
46. Colourless plastids are known as:  
 (A) Chloroplasts (B) Chromoplasts  
 (C) Leucoplasts (D) Protoplast
47. Which one of the following diseases is not caused by bacteria?  
 (A) Typhoid (B) Anthrax  
 (C) Cholera (D) Malaria

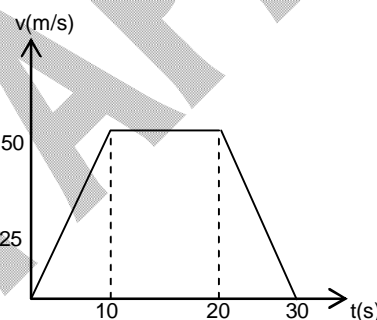
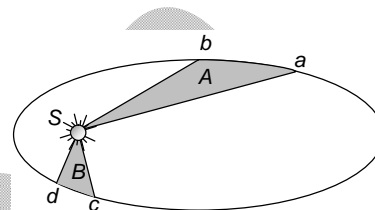
## PHYSICS – (PART – D)

*This part contains 5 Multiple Choice Questions number 48 to 52. Each question has 4 choices (A), (B), (C) and (D), out of which ONLY ONE is correct.*

48. Which of the following graph shows retarding motion?



49. The location of a particle is changed. What can we say about the displacement and distance covered by the particle?  
 (A) Both cannot be zero  
 (B) One of the two may be zero  
 (C) Both must be zero  
 (D) If one is positive, the other is negative and vice-versa
50. If the linear momentum is increased by 5%, the kinetic energy will increase by :  
 (A) 50% (B) 100%  
 (C) 125% (D) 10%
51. The figure shows the motion of a planet around the sun in an elliptical orbit with sun at the focus. The shaded areas A and B are also shown in the figure which can be assumed to be equal. If  $t_1$  and  $t_2$  represent the time for the planet to move from a to b and d to c respectively, then  
 (A)  $t_1 < t_2$  (B)  $t_1 > t_2$   
 (C)  $t_1 = t_2$  (D)  $t_1 \leq t_2$
52. Figure shows velocity time graph for a particle in rectilinear motion. Find the displacement covered by the object in thirty seconds  
 (A) 500 m  
 (B) 750 m  
 (C) 650 m  
 (D) 1000 m



## CHEMISTRY – (PART – E)

*This part contains 5 Multiple Choice Questions number 53 to 57. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*

53. Barium sulphate ( $\text{BaSO}_4$ ) dispersed in water used in diagnostic X-rays is a -  
 (A) Aerosol (B) Solution  
 (C) Suspension (D) Foam
54. The triple point in matter is defined as  
 (A) The combination of pressure and temperature at which solid, liquid, gas phase coexist at equilibrium  
 (B) The combination of standard temperature, pressure and volume  
 (C) The combination of pressure and temperature at which liquid, gas and plasma phase all exist in equilibrium  
 (D) The combination of temperature and pressure at which liquid and gas cannot be separated.
55. A high concentration of soap in water, soap behaves as  
 (A) molecular colloid (B) associated colloid  
 (C) macromolecular colloid (D) lyophilic colloid
56. Method by which lyophobic sol can be protected  
 (A) by addition of oppositely charged sol  
 (B) by addition of an electrolyte  
 (C) by addition of lyophilic sol  
 (D) by boiling

57. The separation of colloidal particles (or purification of sol) from particles of molecular dimensions is known as
- (A) photolysis (B) dialysis  
(C) pyrolysis (D) peptization

## BIOLOGY – (PART – F)

*This part contains 5 Multiple Choice Questions number 58 to 62. Each question has 4 choices (A), (B), (C) and (D), out of which ONLY ONE is correct.*

58. Antigens are present on
- (A) Nucleus (B) Cell surface  
(C) Cytoplasm (D) Nuclear membrane
59. Which of the following cells are amoeboid in shape?
- (A) Red Blood Cells (B) Guard Cells  
(C) Nerve cells (D) White blood cells
60. Which unit of measurement is used for expressing dimensions of nucleus?
- (A) Millimetre (B) Kilometre  
(C) Nanometre (D) Centimetre
61. Shrinkage of protoplast of a cell is called
- (A) Osmosis (B) Plasmolysis  
(C) Diffusion (D) Facilitated Diffusion
62. Ribosomes are the site of
- (A) Respiration (B) Photosynthesis  
(C) Protein synthesis (D) Circulation

## Section – III

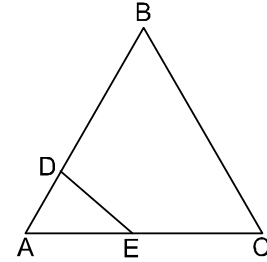
Time: 30 Minutes

## MATHEMATICS – (PART – A)

This part contains 15 Multiple Choice Questions number 63 to 77. Each question has 4 choices (A), (B), (C) and (D), out of which ONLY ONE is correct.

63. If  $a = \frac{p-q}{p+q}$ ,  $b = \frac{q-r}{q+r}$  and  $c = \frac{r-p}{r+p}$ , then the value of  $\frac{(1+a)(1+b)(1+c)}{(1-a)(1-b)(1-c)}$  is  
 (A) 1 (B) 0  
 (C) 121 (D) 11
64. If  $P = \frac{x}{x+y}$ ,  $Q = \frac{y}{x+y}$ , then the value of  $\frac{1}{(P-Q)} - \frac{2Q}{P^2 - Q^2}$  is  
 (A)  $\frac{x+y}{x-y}$  (B) 0  
 (C) 1 (D)  $\frac{x-y}{x+y}$
65. If  $p$  is any integer such that  $xy = p$ ,  $xz = p^2$  and  $yz = p^3$ . Also  $x + y + z = 13$  and  $x^2 + y^2 + z^2 = 91$  then value of  $\frac{z}{y} =$   
 (A) 3 (B)  $\frac{7}{3}$   
 (C) 13 (D)  $\frac{13}{3}$
66. If  $a + b + c = 3$ ,  $a^2 + b^2 + c^2 = 6$  and  $\frac{1}{a} + \frac{1}{b} + \frac{1}{c} = 1$ , where  $a, b, c$  are all non-zero, then 'abc' is equal to  
 (A)  $\frac{2}{3}$  (B)  $\frac{3}{2}$   
 (C)  $\frac{1}{2}$  (D)  $\frac{1}{3}$
67. If  $5^p = 7^q = 35^{-r}$ , then the value of  $\frac{1}{p} + \frac{1}{q} + \frac{1}{r}$  is :  
 (A) 0 (B) 1  
 (C) -1 (D)  $\frac{2}{3}$
68. If  $\alpha, \beta$  are the roots of the equation  $ax^2 + bx + c = 0$ , then  $\frac{\alpha}{a\beta + b} + \frac{\beta}{a\alpha + b} = ?$   
 (A)  $2/a$  (B)  $2/b$   
 (C)  $2/c$  (D)  $-2/a$

69. If each side of triangle ABC is of length 4 and if AD is 1 cm and  $ED \perp AB$ . What is area of region BCED :
- (A)  $8\sqrt{3}$  cm<sup>2</sup> (B)  $4\sqrt{3}$  cm<sup>2</sup>  
 (C)  $4.5\sqrt{3}$  cm<sup>2</sup> (D)  $3.5\sqrt{3}$  cm<sup>2</sup>



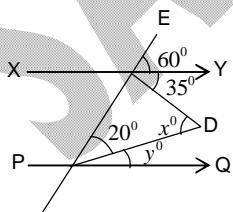
70. Find A, where

$$A = \frac{1}{\sqrt{5}+2} + \frac{1}{\sqrt{6}+\sqrt{5}} + \frac{1}{\sqrt{7}+\sqrt{6}} + \frac{1}{\sqrt{8}+\sqrt{7}} + \frac{1}{\sqrt{9}+\sqrt{8}} + \frac{1}{\sqrt{10}+\sqrt{9}} + \frac{1}{\sqrt{11}+\sqrt{10}} + \frac{1}{\sqrt{12}+\sqrt{11}}$$

- (A) 0 (B) 1  
 (C)  $2\sqrt{3}$  (D)  $2(\sqrt{3}-1)$
71. It is given that a, b, and c are any positive real numbers such that  $abc = 1$ . What is the value of following  $\frac{a}{ab+a+1} + \frac{b}{bc+b+1} + \frac{c}{ca+c+1} = ?$
- (A) -1 (B) 1  
 (C) 0 (D) None of these
72. In a garden trees are planted in rows. In each row there are as many trees as the number of rows in the garden. Each tree bears as many fruits as the number of trees in each row. The sum of the total number fruits on the trees is n. Then
- (A) n is a perfect square (B) n is perfect cube  
 (C) n is always an even number (D) n is always an odd number
73. In triangle ABC, point E lies on AB and point D lies on AC. Lines BD and CE meet at F. The areas of triangles BEF, CDF and BCF are 5, 8, and 10, respectively. What is the area of quadrilateral AEFD?
- (A) 20 (B) 21  
 (C) 22 (D) 25
74. Two candles of the same height are lighted at the same time. The first is consumed in 8 hours and the second in 6 hours. Assuming that each candle burns at a constant rate, in how many hours after being lighted, the ratio between the first and second candles becomes 2:1.
- (A) 2 hours 24 minutes (B) 1 hour 12 minutes  
 (C) 4 hours (D) 4 hours 48 minutes
75. If  $x^3 + \frac{1}{3x^4} = 5$  and  $x^4 + \frac{1}{3x^3} = 10$ ,  $x \neq 0$ , then find the value of  $3x^4 + 3x^3$ .
- (A) 144 (B) 36  
 (C) 50 (D) 72
76. If  $x^2 - 2y = -13$ ,  $y^2 - 4z = 14$ ,  $z^2 + 6x = -15$ , then the value of  $xy + xz + 2yz$
- (A) -2 (B) -5  
 (C) 0 (D) 1
77. Fresh grapes contain 90% water by weight while dried grapes contain 20% water by weight. What is the weight of dry grapes available from 20 kg of fresh grapes?
- (A) 2 kg (B) 2.4 kg  
 (C) 2.5 kg (D) none of these

## MATHEMATICS – (PART – B)

This part contains 15 Multiple Choice Questions number 78 to 92. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

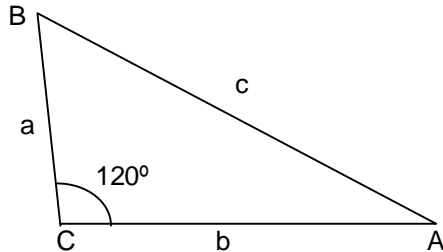
78. P is a point on the graph of  $y = 5x + 3$ . The coordinates of a point Q are  $(3, -2)$ . If M is the mid point of PQ, then M must lie on the line represented by  
 (A)  $y = 5x + 1$  (B)  $y = 5x - 7$   
 (C)  $y = \frac{5}{2}x - \frac{7}{2}$  (D)  $y = \frac{5}{2}x + \frac{1}{2}$
79. The centre of the circle passing through the points  $(6, -6)$ ,  $(3, -7)$  and  $(3, 3)$  is  
 (A)  $(3, 2)$  (B)  $(-3, -2)$   
 (C)  $(3, -2)$  (D)  $(-3, 2)$
80. If  $\alpha, \beta$  are the roots of the equation  $2x^2 - 5x + 16 = 0$ , then the value of  $\left(\frac{\alpha^2}{\beta}\right)^{1/3} + \left(\frac{\beta^2}{\alpha}\right)^{1/3}$  is :  
 (A)  $\frac{1}{4}$  (B)  $\frac{5}{4}$   
 (C)  $\frac{1}{3}$  (D)  $\frac{5}{12}$
81. The L.C.M. of the polynomials  $(x+3)^2(x-2)(x+1)^2$  and  $(x+1)^3(x+3)(x^2-4)$  is  
 (A)  $(x+1)^3(x+3)(x^2-4)$  (B)  $(x+3)^2(x+1)^3(x^2-4)$   
 (C)  $(x+3)^2(x+1)^3(x+2)$  (D)  $(x+3)^2(x+1)^2(x-2)$
82. If l, m and n are the zeroes of polynomial  $f(x) = 2x^3 + 5x^2 + 6x + 10$ , then the value of  $\frac{1}{l} + \frac{1}{m} + \frac{1}{n}$  is:  
 (A)  $\frac{-5}{2}$  (B)  $\frac{-3}{5}$   
 (C)  $\frac{-5}{3}$  (D)  $\frac{-2}{5}$
83. In the given diagram  $XY \parallel PQ$  find  $\angle x^\circ$  and  $m\angle y^\circ$
- 
- (A)  $75^\circ$  and  $40^\circ$  (B)  $45^\circ$  and  $60^\circ$   
 (C)  $75^\circ$  and  $45^\circ$  (D)  $60^\circ$  and  $45^\circ$
84. The ratio of income of two persons is  $11 : 7$  and the ratio of their expenditures is  $9 : 5$ . If each of them manage to save Rs. 400 per month, then the sum of their monthly income is :  
 (A) Rs 3600 (B) Rs 3200  
 (C) Rs 2800 (D) Rs 1700

85. If  $x - \frac{\sqrt{5}}{\sqrt{x}} = 6$ .

Then the value of  $x - \sqrt{5x}$  is

- (A) 3 (B) -1  
(C) 1 (D) 53

86. In the adjoining figure,



$\angle BCA = 120^\circ$  and  $AB = c$ ,  $BC = a$  and  $AC = b$ , then :

- (A)  $c^2 = a^2 + b^2 + ba$  (B)  $c^2 = a^2 + b^2 - ba$   
(C)  $c^2 = a^2 + b^2 - 2ba$  (D)  $c^2 = a^2 + b^2 + 2ba$

87. If  $f(x)$  is a biquadratic polynomial having leading coefficient 5 such that  $f(1) = 1$ ,  $f(2) = 16$ ,  $f(-2) = 16$  and  $f(3) = 81$  the  $f(-3) =$

- (A) 201 (B) 681  
(C) 81 (D) 561

88. If  $a^3 - 3a + 4 = 0$ , Then  $\sqrt[3]{a + (2 - \sqrt{3})^{1/3}} + (2 + \sqrt{3})^{1/3}$

- (A) 1 (B) 2  
(C) 3 (D) 0

89. Angle between the internal bisector of one base angle and the external bisector of the other base angle of a triangle is equal to  $\frac{2}{k}$  of the vertical angle. What is the value of  $k$ ?

- (A) 2 (B) 4  
(C) 6 (D) 8

90. Abscissa of orthocenter of  $\triangle ABC$  formed by vertices  $A(1,6)$ ,  $B(5,2)$  and  $C(12,9)$  is

- (A) 2 (B) 4  
(C) 6 (D) 5

91. The vertices of a triangle are  $(1, 2)$ ,  $(h, -3)$  and  $(-4, k)$ . Find the value of  $\frac{\sqrt{(h+k)^2 + (h+3k)^2}}{4}$ , if the centroid of the triangle is at the point  $(5, -1)$ .

- (A) 2 (B) 5  
(C) 6 (D) 8

92. LCM of  $\frac{4}{5}$  and  $\frac{5}{9}$  is

- (A)  $\frac{4}{9}$  (B)  $\frac{2}{3}$   
(C) 20 (D)  $\frac{1}{45}$

# FIITJEE TALENT REWARD EXAM

for Students presently in **Class IX** (Paper 2)

## ANSWER KEY (SAMPLE PAPER)

1. A	2. D	3. B	4. D
5. A	6. B	7. C	8. C
9. D	10. A	11. D	12. C
13. B	14. D	15. A	16. D
17. D	18. B	19. A	20. B
21. D	22. A	23. D	24. D
25. D	26. A	27. C	28. B
29. B	30. B	31. A	32. B
33. B	34. C	35. A	36. B
37. C	38. D	39. C	40. D
41. D	42. A	43. B	44. D
45. C	46. C	47. D	48. D
49. A	50. D	51. C	52. D
53. C	54. A	55. B	56. C
57. B	58. B	59. D	60. C
61. B	62. C	63. A	64. C
65. A	66. B	67. A	68. D
69. D	70. D	71. B	72. B
73. C	74. D	75. D	76. B
77. C	78. B	79. C	80. B
81. B	82. B	83. C	84. A
85. C	86. A	87. D	88. D
89. B	90. D	91. B	92. C