

FIITJEE Talent Reward Exam-2014

for student presently in
Class 9

PAPER-2

Time: 3 Hours

Maximum Marks: 207

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. This Question paper consists of 2 sections. All questions will be multiple choice single correct out of four choices with marking scheme in table below:

Section	Subject	Question no.	Marking Scheme for each question	
			correct answer	wrong answer
SECTION – I	Physics	Q. 1 to 8	+3	-1
	Chemistry	Q. 9 to 16	+3	-1
	Mathematics	Q. 17 to 24	+3	-1
SECTION – II	Physics	Q. 25 to 34	+3	-1
		Q. 35 to 37	+5	-2
	Chemistry	Q. 38 to 47	+3	-1
		Q. 48 to 50	+5	-2
	Mathematics	Q. 51 to 60	+3	-1
		Q. 61 to 63	+5	-2

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

Note: Please check this Question Paper contains all **63** questions in serial order. If not so, exchange with the correct Question Paper.

Registration Number : _____

Name of the Candidate : _____

Answer Sheet No. : _____

Test Centre : _____

Section-I**Physics****Comprehension Passage Comprising of 3 Questions (1 – 3)****Straight Objective Type**

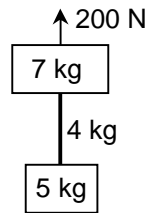
A body of mass 0.3 kg is taken up an inclined plane of length 10 and height 5 m and then allowed to slide down to the bottom again. the coefficient of friction between the body and the plane is 0.15. What is the

- The work done by the gravitational force over the round trip is
(A) 1 (B) zero
(C) 2 (D) 3
- The work done by the applied force over the upward journey is
(A) 17.5 J (B) 16.5 J
(C) 18.5 J (D) 15.5 J
- The work done by frictional force over the round trip is
(A) -5.6 J (B) -7.6 J
(C) -8.5 J (D) -3.4 J

Space for rough work

Comprehension Passage Comprising of 5 Questions (4 – 8)**Straight Objective Type**

Two blocks of masses 5 kg and 7 kg are connected by uniform rope of mass 4 kg as shown in the figure. An upward force $F = 200 \text{ N}$ is applied on the system. (Take $g = 10 \text{ m/s}^2$)



4. The net downward force of the system is
(A) 40 N (B) 160 N
(C) 200 N (D) 16 N
5. The acceleration of the system is
(A) 2.5 m/s^2 (B) 5 m/s^2
(C) 6 m/s^2 (D) 7.5 m/s^2
6. The tension at the top of the heavy rope is
(A) 100 N (B) 112.5 N
(C) 125 N (D) 150 N
7. The tension at the midpoint of the rope is
(A) 50 N (B) 75 N
(C) 87.5 N (D) 98.5 N
8. The tension at the lower end point of the rope is
(A) 50 N (B) 75 N
(C) 87.5 N (D) 62.5 N

Space for rough work

Chemistry

Comprehension Passage comprising of 3 Questions (9 – 11)

Straight Objective Type

We know that each orbit is associated with a fixed amount of energy and therefore orbits are also called energy levels. These orbits are designated K, L, M, N, O, P, The K orbit being nearest to the nucleus with least energy. Hence K shell or orbit is most stable. Bohr and Bury (1921) simultaneously but independently put forward two identical schemes for distribution of electrons.

9. Which of the following is a correct electronic configuration of sodium?
(A) 2, 8 (B) 2, 8, 2
(C) 2, 1, 8 (D) 2, 8, 1
10. The number of electrons in the outermost orbit of the element of atomic number 24 is
(A) 4 (B) 1
(C) 3 (D) 6
11. If n is the number of shell, then the number of electrons that can be accommodate in a shell is given by
(A) n^2 (B) $2n^3$
(C) $2n^2$ (D) $2(n+1)^2$
-

Space for rough work

Comprehension Passage comprising of 5 Questions (12 – 16)

Straight Objective Type

Atomic mass unit (a.m.u), a special unit to express the weight of different atoms and is $\frac{1}{12}$ th weight of a carbon atom and the weights of all other chemical elements are compared to this relative weight unit. One mole is the quantity of a substance that contains the number of constituent particles (objects) equal to the number of atoms contained in 12 g of carbon.

1 mole = 6.02×10^{23} C atoms.

e.g., one mole of C contains 6.02×10^{23} C atoms.

one mole of water contains 6.02×10^{23} molecules.

In moles, amount of substances taken for reactions are measured.

The molar weight of a substance is the relationship between the number of grams of a substance and the number of moles of the same substance.

The molar weight is expressed in grams per mole (g/mol) as $M = \frac{\text{Weight in grams}}{\text{Quantity of substance in moles}}$

The molar weight of a substance is constant for each particular substance.

To the molecular weight, the molar weight of any substance is equal numerically.

Volume occupied by one mole of a gas is known as its molar volume.

Molar volumes of gases are expressed in litres/cubic metres per mole.

12. Which of the following has smallest number of molecules?
 (A) 0.1 mole of CO_2 gas (B) 11.2 litres of CO_2 gas
 (C) 22 gm of CO_2 gas (D) 22.4×10^3 ml of CO_2 gas
13. Specific heat of an element of atomic weight 32 is likely to be
 (A) 0.16 (B) 0.24
 (C) 0.20 (D) 0.25
14. The mass of calcium chloride formed when 2.5 g calcium carbonate are dissolved in excess of hydrochloric acid is :
 (A) 1.39 g (B) 2.78 g
 (C) 5.18 g (D) 17.8 g
15. The volume of CO_2 gas formed when 2.5 g calcium carbonate are dissolved in excess hydrochloric acid at 0°C and 1 atm pressure is [1 mole of any gas at 0°C and 1 atm pressure occupies 22.414 L volume].
 (A) 1.12 L (B) 56.0 L
 (C) 0.28 L (D) 0.56 L
16. What is the total number of atoms present in 25.0 mg of camphor, $\text{C}_{10}\text{H}_{16}\text{O}$?
 (A) 9.89×10^{19} (B) 2.67×10^{21}
 (C) 6.02×10^{20} (D) 2.57×10^{21}

Space for rough work

Mathematics

Comprehension Passage comprising of 3 Questions (17 – 19)

Straight Objective Type

Rule of indices suggest that $(a^m)^n = a^{m \times n}$

17. If $g = t^{2/3} + 4t^{-1/2}$, what is the value of g when $t = 64$?
- (A) $\frac{31}{2}$ (B) $\frac{33}{2}$
(C) 16 (D) $\frac{257}{16}$
18. Which one of the following is not equal to $(\sqrt[3]{8})^{-1/2}$?
- (A) $(\sqrt[3]{2})^{-1/2}$ (B) $8^{-1/6}$
(C) $\frac{1}{(\sqrt[3]{8})^{1/2}}$ (D) $\frac{1}{\sqrt{2}}$
19. The value of m for which $\left[\left\{ \left(\frac{1}{7^2} \right)^{-2} \right\}^{-1/3} \right]^{1/4} = 7^m$, is
- (A) $-\frac{1}{3}$ (B) $\frac{1}{4}$
(C) -3 (D) 2

Space for rough work

Comprehension Passage comprising of 5 Questions (20 – 24)**Straight Objective Type**

If P is a polynomial $P(x)$ divided by a polynomial $d(x)$, leaves remainder $r(x)$ with quotient $q(x)$, then

$$P(x) = d(x).q(x) + r(x)$$

If $r(x) = 0$, then $d(x)$ is the factor of $P(x)$.

20. If $x - a$ is a factor of $x^3 - 3x^2a + 2a^2x + b$, then the value of b is
(A) 0 (B) 2
(C) 1 (D) 3
21. One factor of $x^4 + x^2 - 20$ is $x^2 + 5$. The other factor is
(A) $x^2 - 4$ (B) $x - 4$
(C) $x^2 - 5$ (D) $x^2 + 2$
22. If $x^2 - 1$ is a factor of $ax^4 + bx^3 + cx^2 + dx + e$, then
(A) $a + c + e = b + d$ (B) $a + b + e = c + d$
(C) $a + b + c = d + e$ (D) $b + c + d = a + e$
23. A polynomial of degree 5 with leading coefficient 2 is such that $P(1) = 1$, $P(2) = 4$, $P(3) = 9$, $P(4) = 16$, $P(5) = 25$. Then, the value of $P(6)$ is
(A) 246 (B) 156
(C) 126 (D) 276
24. A polynomial $P(x)$ with leading coefficient 1 of degree 4 is such that $P(\alpha) = 0$ and its roots are 1, 2 and 3. Then, value of $P(0) + P(4)$ is
(A) 24 (B) 0
(C) 6 (D) 48

Space for rough work

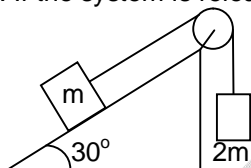
Section-II

Physics

Straight Objective Type

Physics contains 13 multiple choice questions numbered 25 to 37. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

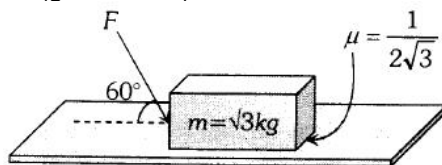
25. A parachutist after bailing out falls 50 m without friction. When parachute opens, it decelerates at 2 m/s^2 . He reaches the ground with a speed of 3 m/s . At what height, did he bail out? ($g = 9.81 \text{ m/s}^2$)
 (A) 293 m (B) 111m
 (C) 91m (D) 182m
26. A light string passing over a smooth light pulley connects two blocks of masses m_1 and m_2 (vertically). If the acceleration of the system is $g/8$ then the ratio of the masses is
 (A) 8:1 (B) 9:7
 (C) 4:3 (D) 5:3
27. Two blocks of masses m and $2m$ are connected by a light string passing over a frictionless pulley. As shown in the figure the mass m is placed on a smooth inclined plane of inclination 30° and $2m$ hangs vertically. If the system is released, the blocks move with an acceleration equal to



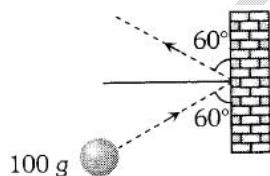
- (A) $g/4$ (B) $g/3$
 (C) $g/2$ (D) g
28. When forces F_1, F_2, F_3 are acting on a particle of mass m such that F_2 and F_3 are mutually perpendicular, then the particle remains stationary. If the force F_1 is now removed then the acceleration of the particle is
 (A) F_1/m (B) $F_2 F_3 / m F_1$
 (C) $(F_2 - F_3)/m$ (D) F_2/m

Space for rough work

29. What is the maximum value of the force F such that the block shown in the arrangement, does not move? ($g = 10 \text{ m/s}^2$)



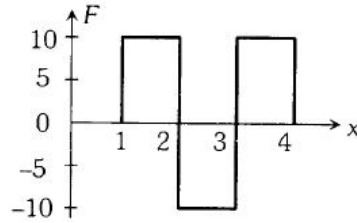
- (A) 20N
(B) 10N
(C) 12N
(D) 15N
30. A ball is released from certain height. It loses 50% of its kinetic energy on striking the ground. It will attain a height again equal to
(A) One fourth the initial height
(B) Half the initial height
(C) Three fourth initial height
(D) None of these
31. An electric pump is used to fill an overhead tank of capacity 9m^3 kept at a height of 10m above the ground. If the pump takes 5 minutes to fill the tank by consuming 10kW power the efficiency of the pump should be (Take $g = 10\text{ms}^{-2}$)
(A) 60%
(B) 40%
(C) 20%
(D) 30%
32. A body of mass 2kg is projected at 20m/s at an angle 60° above the horizontal. Power on the block due to the gravitational force at its highest point is
(A) 200W
(B) $100\sqrt{3} \text{ W}$
(C) 50W
(D) Zero
33. A mass of 100 g strikes the wall with speed 5m/s at an angle as shown in figure and it rebounds with the same speed. If the contact time is 2×10^{-3} sec, what is the force applied on the mass by the wall?



- (A) $250\sqrt{3}\text{N}$ to right
(B) 250N to right
(C) $250\sqrt{3}\text{N}$ to left
(D) 250 N to left

Space for rough work

34. Figure shows the F-x graph. Where F is the force applied and x is the distance covered by the body along a straight line path. Given that F is in newton and x in metre, what is the work done?



- (A) 10J
(C) 30J
- (B) 20J
(D) 40J
35. Two spheres of mass m and M are situated in air and the gravitational force between them is F . The space around the masses is now filled with a liquid of specific gravity 3. The gravitational force will now be
- (A) F
(C) $\frac{F}{9}$
- (B) $\frac{F}{3}$
(D) $3F$
36. Acceleration due to gravity on moon is $\frac{1}{6}$ of the acceleration due to gravity on earth. If the ratio of densities of earth (ρ_e) and moon (ρ_m) is $\left(\frac{\rho_e}{\rho_m}\right) = \frac{5}{3}$ then radius of moon R_m in terms of R_e will be
- (A) $\frac{5}{18}R_e$
(C) $\frac{3}{18}R_e$
- (B) $\frac{1}{6}R_e$
(D) $\frac{1}{2\sqrt{3}}R_e$
37. The escape velocity of a planet having mass 6 times and radius 2 times as that of earth is
- (A) $\sqrt{3}V_e$
(C) $\sqrt{2}V_e$
- (B) $3V_e$
(D) $2V_e$

Space for rough work

Chemistry

Straight Objective Type

Chemistry contains 13 multiple choice questions numbered 38 to 50. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

38. Particles of matter :
(A) have forces of attraction between them
(B) are very-very tiny and move continuously
(C) have space between them
(D) all the above
39. The charge in coulombs on P^{-3} ion is :
(A) 4.8×10^{-19}
(B) 1.6×10^{-19}
(C) $-3 \times 6.022 \times 10^{23}$
(D) 4.8×10^{-16}
40. Formula of bicarbonate of a metal is $M(\text{HCO}_3)_3$. The formula of its pyrophosphate is:
(A) $M_3(\text{P}_2\text{O}_4)_4$
(B) $M(\text{P}_2\text{O}_7)_2$
(C) $M_3(\text{P}_2\text{O}_7)_3$
(D) $M_4(\text{P}_2\text{O}_7)_3$
41. Chromatography is used to separate :
(A) colours from a dye
(B) drugs from blood
(C) pigments from natural colours
(D) all the above
42. The largest number of molecules is in
(A) 28 g CO
(B) 46 g $\text{C}_2\text{H}_5\text{OH}$
(C) 36 g H_2O
(D) 54 g N_2O_5
43. Calculate the molarity of water in pure water.
(A) 5.55
(B) 55.5
(C) 0.55
(D) Can't be calculated
44. How many moles are present in 4.68 mg of Si (at. Mass of Si = 28 amu)
(A) 1.67×10^{-4}
(B) 0.167×10^{-4}
(C) 167
(D) 16.7
45. Intermixing of particles of two different types of matter on their own is :
(A) sublimation
(B) condensation
(C) diffusion
(D) fusion

Space for rough work

46. The percentage of oxygen in NaOH is
(A) 40 (B) 60
(C) 8 (D) 10
47. What amount of quick lime (CaO) is given on complete decomposition of 10 g CaCO_3 ?
(A) 56 g (B) 5.6 g
(C) 0.56 g (D) 56 kg
48. Cream from milk is separated by using :
(A) sublimation (B) filtration
(C) centrifugation (D) distillation
49. Element X (Atomic mass = 75) and element Y (Atomic mass = 16) combine to give a compound having 75.8% X. The formula of the compound is :
(A) XY (B) X_2Y
(C) X_2Y_2 (D) X_2Y_3
50. How many gram of NaOH will be needed to prepare 250 ml 0.1 M solution?
(A) 1 gm (B) 10 gm
(C) 4 gm (D) 6 gm

Space for rough work

Mathematics

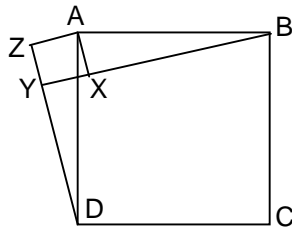
Straight Objective Type

Mathematics contains 13 multiple choice questions numbered 51 to 63. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.

51. The value of $\frac{(0.013)^3 + (0.007)^3}{(0.013)^2 - 0.013 \times 0.007 + (0.007)^2}$ is

- (A) 0.006 (B) 0.02
(C) 0.0091 (D) 0.00185

52. In Fig., X is a point in the interior of square ABCD. XYZ is also a square. If $DY = 3$ cm and $AZ = 2$ cm, then $BY =$



- (A) 5 cm (B) 6 cm
(C) 7 cm (D) 8 cm

53. A square and an equilateral triangle have equal perimeters. If the diagonal of the square is $12\sqrt{2}$ cm, then area of the triangle is

- (A) $24\sqrt{2}$ cm² (B) $24\sqrt{3}$ cm²
(C) $48\sqrt{3}$ cm² (D) $64\sqrt{3}$ cm²

54. ABCD is a trapezium in which $AB \parallel DC$. M and N are the mid-points of AD and BC respectively. If $AB = 12$ cm, $MN = 14$ cm, then $CD =$

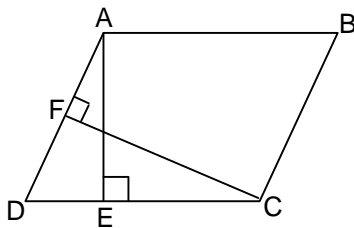
- (A) 10 cm (B) 12 cm
(C) 14 cm (D) 16 cm

55. ABCD is a parallelogram, P is any point on CD. If $\text{ar}(\triangle DPA) = 15$ cm² and $\text{ar}(\triangle APC) = 20$ cm², then $\text{ar}(\triangle APB) =$

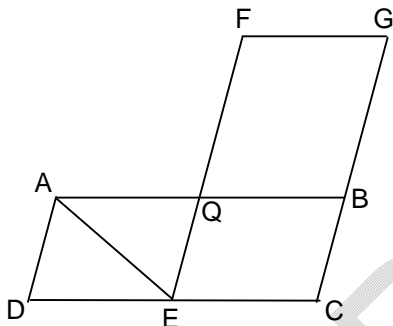
- (A) 15 cm² (B) 20 cm²
(C) 35 cm² (D) 30 cm²

Space for rough work

56. In figure, ABCD is a parallelogram. If $AB = 12$ cm, $AE = 7.5$ cm, $CF = 15$ cm, then $AD =$



- (A) 3 cm (B) 6 cm
(C) 8 cm (D) 10.5 cm
57. In figure, ABCD and FECG are parallelograms equal in area. If $\text{ar}(\triangle AQE) = 12 \text{ cm}^2$, then $\text{ar}(\text{||}^{\text{gm}} \text{FGBQ}) =$



- (A) 12 cm^2 (B) 20 cm^2
(C) 24 cm^2 (D) 36 cm^2
58. ABCD is a trapezium with parallel sides $AB = a$ and $DC = b$. If E and F are mid-points of non-parallel sides AD and BC respectively, then the ratio of areas of quadrilaterals ABFE and EFCD is
- (A) $a : b$ (B) $(a + 3b) : (3a + b)$
(C) $(3a + b) : (a + 3b)$ (D) $(2a + b) : (3a + b)$
59. If $a = \frac{9}{3-b}$, $b = \frac{9}{3-c}$, then the value of c in terms of 'a' is
- (A) $\frac{8}{3-a}$ (B) $\frac{9}{3-a}$
(C) $\frac{7}{3-a}$ (D) $\frac{6}{3-a}$

Space for rough work

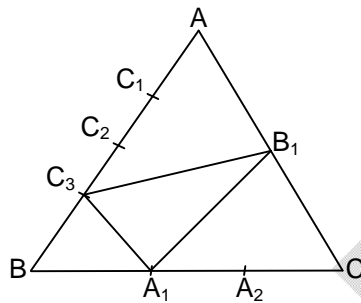
60. If $x + \frac{1}{x} = 99$, then the value of $\frac{100x}{3x^2 + 103x + 3}$ is

- (A) $\frac{3}{4}$ (B) $\frac{1}{4}$
 (C) $\frac{5}{4}$ (D) $\frac{7}{4}$

61. The hypotenuse of a right angled isosceles triangle is 5 cm. Then, its area is

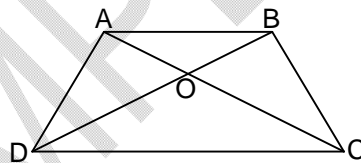
- (A) $\frac{21}{4}$ cm² (B) $\frac{23}{4}$ cm²
 (C) $\frac{25}{4}$ cm² (D) $\frac{27}{4}$ cm²

62. $BA_1 = A_1A_2 = A_2C$, $AC_1 = C_1C_2 = C_2C_3 = C_3B$, $AB_1 = B_1C$. Then, $\frac{\text{ar}\Delta A_1B_1C_3}{\text{ar}\Delta ABC}$ is



- (A) $\frac{5}{12}$ (B) $\frac{11}{24}$
 (C) $\frac{5}{24}$ (D) $\frac{7}{24}$

63. $AB \parallel CD$, $\frac{AB}{CD} = \frac{3}{5}$. Then, $\frac{\text{ar}\Delta BOC}{\text{ar}\Delta ACD}$ is



- (A) $\frac{3}{5}$ (B) $\frac{3}{8}$
 (C) $\frac{5}{8}$ (D) $\frac{9}{25}$

Space for rough work

FIITJEE Talent Reward Exam-2014

for student presently in
Class 9

PAPER-2

ANSWER KEYS

SECTION – I (PCM) (COMPREHENSION PASSAGE)		SECTION – II (PCM)			
Q. No	Answer	Q. No	Answer	Q. No	Answer
1.	B	25.	A	49.	D
2.	C	26.	B	50.	A
3.	B	27.	C	51.	B
4.	B	28.	A	52.	C
5.	A	29.	A	53.	D
6.	B	30.	B	54.	D
7.	C	31.	D	55.	C
8.	D	32.	D	56.	B
9.	D	33.	C	57.	C
10.	B	34.	A	58.	C
11.	C	35.	A	59.	B
12.	A	36.	A	60.	B
13.	C	37.	A	61.	C
14.	B	38.	D	62.	C
15.	D	39.	A	63.	B
16.	B	40.	D		
17.	B	41.	D		
18.	A	42.	C		
19.	A	43.	B		
20.	A	44.	A		
21.	A	45.	C		
22.	A	46.	A		
23.	D	47.	B		
24.	A	48.	C		