FIITJEE Talent Reward Exam-2014

for student presently in

Class 10

PAPER–1

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.

2. 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	IQ	Q. 1 to 30	**+3**	**–1**
SECTION – II	Physics	Q. 31 to 50	**+3**	**–1**
	Chemistry	Q. 51 to 70	**+3**	**–1**
	Mathematics	Q. 71 to 90	**+3**	**–1**

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 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 90 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

IQ

Straight Objective Type

*This section contains 30 multiple choice questions numbered 1 to 30. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*

Directions (Q. 1 to 4): There is a letter/number series from which some of the letters/numbers are missing. The missing letters/numbers are given in proper sequence in one of the alternatives among the four given under each question.

1. 7, 15, 47, 191, ?
   (A) 385 (B) 767
   (C) 959 (D) 1009

2. $\frac{2}{3}, \frac{4}{7}, ?, \frac{11}{21}, \frac{16}{31}$
   (A) $\frac{5}{9}$ (B) $\frac{6}{11}$
   (C) $\frac{7}{13}$ (D) $\frac{9}{17}$

3. ejo tyd ins xch ?
   (A) nrw (B) mrw
   (C) msx (D) nsx

4. Z1A, X2D, V6G, T21J, R88M, P445P, ?
   (A) N2676S (B) N2766S
   (C) N2667S (D) none of these

Directions (Q. 5 to 6): Find the odd one out:

5. (A) Bucket (B) Bowl
   (C) Sack (D) Canister

6. (A) Now (B) Then
   (C) After (D) Again

7. What should come in place of question mark(?) in the following series?
   ATTRIBUTION, TTRIBUTIO, RIBUTIO, IBUTI, ?
   (A) BUT (B) UTI
   (C) UT (D) IBU

Space for rough work

8. What should come in the blank space in the following series?
M, N, O, L, R, I, V, ____
(A) E (B) H
(C) Z (D) F

9. 25th June 542695283217 A.D. is Dooms day. Which weekday falls on that day?
(A) Sunday (B) Monday
(C) Friday (D) Wednesday

10. If REQUEST is coded as S2R52TU in certain code, how will ACID be written in that code?
(A) BDJE (B) 1D3E
(C) 1C94 (D) 1E79

11. Pointing to Priti, father of Rishu says, "She is the daughter of the daughter of the wife of the only son of the grand father of my sister. "How is Sukriti related to Priti if Sukriti is the sister of Rishu's father?
(A) Aunt (B) Mother
(C) Niece (D) Can't say

12. A person moves towards North a distance of 30 m. He turns 135° in clockwise direction and goes $50\sqrt{2}$ m. From here he turns 135° clockwise and goes 35 m. How far is he from initial point?
(A) 25 m (B) 20 m
(C) 15 m (D) 30 m

13. Ram wants to go to the school. He starts from his home which is in the East and comes to a crossing. The road to the left ends in a theatre, straight ahead is the temple. In which direction is the school?
(A) North (B) South
(C) East (D) West

14. If a cube is to be painted with Red and Blue colour such that each face should get exactly one colour then in how many ways this cube can be painted?
(A) 2^6 (B) 6^2
(C) 12 (D) 10

Space for rough work

15. If a cube is painted with Red, Blue and Green on two adjacent faces each colour and then it is cut into 343 smaller cubes by minimum number of cuts, then the number of smaller cubes, with all three colour will be
(A) 2 (B) 8
(C) 12 (D) 6

Directions: (Q. 16 to 18): In the following questions, the symbols @, #, $, %, $\not<$ are used with the following meanings as illustrated below :
'A @ B' means 'A is not greater than B'.;
'A # B' means 'A is greater than or equal to B';
'A $ B' means 'A is neither greater than nor less than B';
'A % B' means 'A is less than B';
'A $\not<$ B' means 'A is neither less than nor equal to B';
Now, in each of the following questions, assuming the given statements to be true, find which of the following conclusions I, II and III given below them is/are definitely true.

16. Statements: K @ L, L % N, E # N
Conclusions:
I. K % E
II. E $\not<$ L
III. N $\not<$ K
(A) Only I and II are true (B) Only II and III are true
(C) Only I and III are true (D) All are true

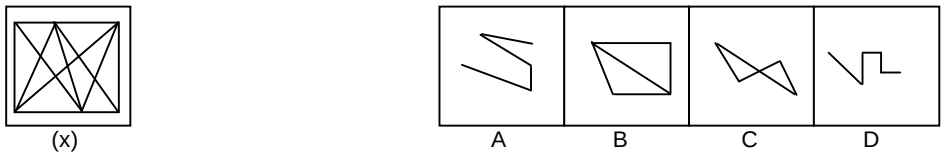
17. Statements: D $ T, T $\not<$ P, M @ P
Conclusions:
I. D $\not<$ M
II. M % T
III. D # P
(A) Only I is true (B) Only I and II are true
(C) All are true (D) Only I and III are true

18. Statements: T # R, R % L, L $\not<$ K
Conclusions: I. T % L II. K $\not<$ R III. T # K
(A) Only I is true (B) Only I and II are true
(C) Only I and III are true (D) none is true

Space for rough work

Directions (Q. 19 to 22): In each of the following questions, select the alternative figure which is embedded in the given figure (x):

19.



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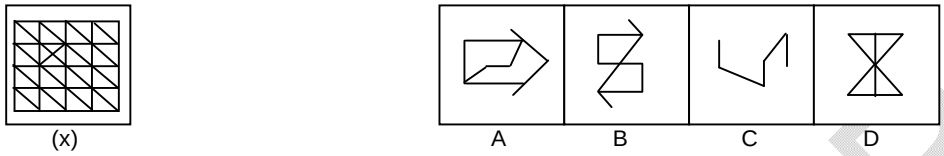

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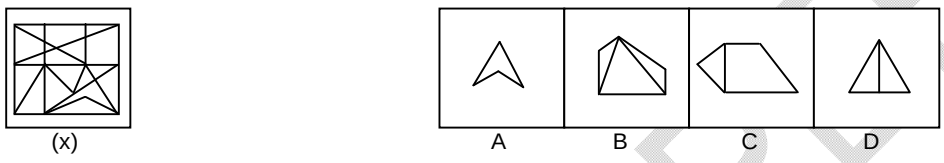


22. At what time between 5:30 and 6 will the hands of a clock be at right angles?

(A) $43\frac{5}{11}$ min. past 5 (B) $43\frac{7}{11}$ min. past 5

(C) 40 min. past 5 (D) 45 min past 5

Directions (Q. 23 to 27): Read the following information and answer the following questions :

(i) There is a group of five people – A, B, C, D and E.
(ii) In the group, there are three professors, specialists in Philosophy, Psychology and Economics.
(iii) A and D are unmarried ladies and are not specialist in any subject.
(iv) In the group there is a married couple and E is the husband.
(v) B is the brother of C, and he is neither a Psychologist nor an Economist.
(vi) Professor specialist in Psychology is also a lady.

Space for rough work

23. Who is E's wife?
(A) A (B) B
(C) C (D) D

24. Which of the following group consists of all the males?
(A) ABC (B) BCD
(C) BC (D) BE

25. Who is professor of Philosophy?
(A) A (B) B
(C) C (D) E

26. Who is professor of Economics?
(A) A (B) B
(C) E (D) C

27. Which of the statements given above is superfluous?
(A) none of these (B) (i)
(C) (iii) (D) (vi)

Directions (Q. 28 to 30): Read the following information and answer the following questions :
Seven friends Kamla, Manish, Rohit, Amit, Gaurav, Pritam and Priya are Sitting in a circle. Kamla, Manish, Rohit, Amit, Pritam and Priya are sitting at equal distances from each other. Rohit is sitting two places right of Pritam, who is sitting one place right of Amit. Kamla froms an angle 90^o degrees from Gaurav and an angle of 120 degrees from Manish. Manish is just opposite Priya and is sitting on the left of Gaurav.

28. Who is the only Person sitting between Rohit and Manish?
(A) Pritam (B) Amit
(C) Gaurav (D) Kamla

29. The angle between Gaurav and Manish in the clock wise direction is ?
(A) 150^o (B) 180^o
(C) 120^o (D) None of these

30. Gaurav is sitting _____ of Priya
(A) to the left (B) to the Right
(C) two place right (D) None of these

Space for rough work

Section-II PCM

Physics

Straight Objective Type

*Physics contains 20 multiple choice questions numbered 31 to 50. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*

31. S.I. unit of magnetic field is
(A) Weber (B) Weber-m
(C) Tesla (D) Tesla-m

32. The resistivity of a wire
(A) Increases with the length of the wire
(B) Decreases with the area of cross-section
(C) Decreases with the length and increases with the cross-section of wire
(D) None of the above statement is correct

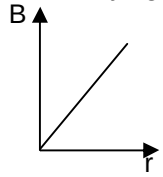
33. A coil develops heat of 800 cal/sec. When 20 volts is applied across its ends. The resistance of the coil is (1 cal = 4.2 joule)
(A) $1.2\,\Omega$ (B) $1.4\,\Omega$
(C) $0.12\,\Omega$ (D) $0.14\,\Omega$

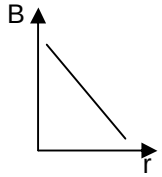
34. The electrolyte used in Lechlanche cell is
(A) Copper sulphate solution (B) Ammonium chloride solution
(C) Dilute sulphuric acid (D) Zinc sulphate

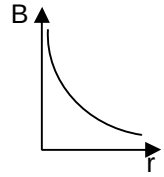
35. The magnetic induction at a point P which is at a distance 4cm from a long current carrying wire is 10^{-8} tesla. The field of induction at a distance 12cm from the same current would be
(A) 3.33×10^{-9} tesla (B) 1.11×10^{-4} tesla
(C) 3×10^{-3} tesla (D) 9×10^{-2} tesla

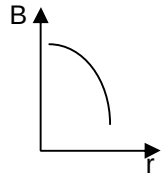
Space for rough work

36. Which of the following graphs shown the variation of magnetic induction B with distance r from a long wire carrying current

(A) 

(B) 

(C) 

(D) 

37. For a colour of light the wavelength for air is 6000 $\overset{o}{A}$ and in water the wavelength is 4500 $\overset{o}{A}$. Then the speed of light in water will be

(A) $5.0\times10^{14}\,m/s$ (B) $2.25\times10^{8}\,m/s$

(C) $4.0\times10^{8}\,m/s$ (D) Zero

38. Which one of the following is not associated with total internal reflection

(A) The mirage formation (B) Optical fiber communication

(C) The glittering of diamond (D) Dispersion of light

39. The specific resistance of a wire is ρ ,its volume is $3m^3$ and its resistance is 3 ohm, then its length will be

(A) $\sqrt{\frac{1}{\rho}}$ (B) $\frac{3}{\sqrt{\rho}}$

(C) $\frac{1}{\rho}\sqrt{3}$ (D) $\rho\sqrt{\frac{1}{3}}$

Space for rough work

40. Dimensions of a block are $1\text{cm} \times 1\text{cm} \times 100\text{cm}$. If specific resistance of its material is 3×10^{-7} ohm $-$ m, then the resistance between the opposite rectangular faces is

(A) 3×10^{-9} ohm (B) 3×10^{-7} ohm

(C) 3×10^{-5} ohm (D) 3×10^{-3} ohm

41. When two resistance R_1 and R_2 are connected in series, they consume 12W power. When they are connected in parallel, they consume 50 W power. What is the ratio of the powers of R_1 and R_2

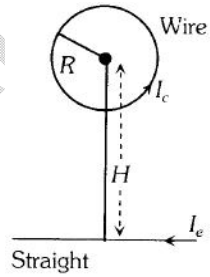
(A) $\frac{1}{4}$ (B) 4

(C) $\frac{3}{2}$ (D) 3

42. When a magnetic field is applied in a direction perpendicular to the direction of cathode rays, then their

(A) Energy decreases
(B) Energy increases
(C) Momentum increases
(D) Magnitude of momentum and energy remain unchanged

43. Circular loop of a wire and a long straight wire carry currents I_c and I_e, respectively as shown in figure. Assuming that these are placed in the same plane. The magnetic fields will be zero at the centre of the loop when the separation H is



(A) $\frac{I_e R}{I_c \pi}$ (B) $\frac{I_c R}{I_e \pi}$

(C) $\frac{\pi I_c}{I_e R}$ (D) $\frac{I_e \pi}{I_c R}$

44. A current carrying circular loop is freely suspended by a long thread. The plane of the loop will point in the direction

(A) Wherever left free (B) North-south
(C) East-west (D) At 45^o with the east-west direction

Space for rough work

45. Two mirrors at an angle θ produce 5 images of a point. The number of images produced when θ is decreased to 30^o is
(A) 9 (B) 10
(C) 11 (D) 12

46. What will be the height of image when an object of 2mm is placed on the axis of a convex mirror at a distance 20 cm of radius of curvature 40 cm
(A) 20 mm (B) 10 mm
(C) 6 mm (D) 1 mm

47. If the critical angle for total internal reflection from a medium to vacuum is 30^o, the velocity of light in the medium is
(A) $3\times10^8 m/s$ (B) $1.5\times10^8 m/s$
(C) $6\times10^8 m/s$ (D) $\sqrt{3}\times10^8 m/s$

48. A lens of refractive index n is put in a liquid of refractive index n' if focal length of lens in air is f, its focal length in liquid will be
(A) $-\frac{fn'(n-1)}{n'-n}$ (B) $-\frac{f(n'-n)}{n'(n-1)}$
(C) $-\frac{n'(n-1)}{f(n'-n)}$ (D) $\frac{fn'}{n-n'}$

49. A ray of light is incident normally on one of the face of a prism of angle 30^o and refractive index $\sqrt{2}$. The angle of deviation will be
(A) 26^o (B) 0^o
(C) 23^o (D) 15^o

50. A ray of light passes through the equilateral prism such that angle of incidence is equal to the angle of emergence if the angle of incidence is 45^o. The angle of deviation will be
(A) 15^o (B) 75^o
(C) 60^o (D) 30^o

Space for rough work

Chemistry

Straight Objective Type

*Chemistry contains 20 multiple choice questions numbered 51 to 70. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*

51. Which of the following metals will give H_2 on reaction with NaOH ?
(A) Be (B) Ba
(C) Ca (D) K

52. 1 mole of H_3PO_3 is neutralised by….. mole/s of NaOH
(A) 6 (B) 3
(C) 2 (D) 1

53. The conjugate base of $H_2PO_4^-$ is
(A) H_3PO_4 (B) HPO_4^{-2}
(C) PO_4^{-3} (D) H_3PO_3

54. If 30 ml of H_2 and 20 ml of O_2 react to form water. What is left at the end of the reaction.
(A) 10 ml of H_2 (B) 5 ml of H_2
(C) 10 ml of O_2 (D) 5 ml of O_2

55. The value of n in the following equation is: $Cr_2O_7^{-2} + 14H^+ + ne^- \rightarrow 2Cr^{+3} + 7H_2O$
(A) 2 (B) 3
(C) 4 (D) 6

56. What is the normality of 0.3 M H_3PO_4. When it undergoes the reaction as:
$H_3PO_4 + 2OH^- \rightarrow HPO_3^{-2} + 2H_2O$
(A) 0.3N (B) 0.15N
(C) 0.6N (D) 0.9N

57. The metals present in insulin, haemoglobin and vitamin B_{12} are respectively
(A) Zn, Hg, Cr (B) Co, Fe, Zn
(C) Mg, Fe, Co (D) Zn, Fe, Co

58. In the compound $CH_2{=}CHCH_2CH_2C{\equiv}CH$ the bond between c-2 and c-3 is of the type
(A) sp-sp^2 (B) sp^3-sp^3
(C) sp-sp^3 (D) sp^2-sp^3

59. Which of the following compounds has the highest boiling point?
(A) Ethane (B) Butane
(C) 2- Butanol (D) Pentane

60. In the molecule $CH_3 - C \equiv CCH = CH_2$, the maximum number of carbon atoms arranged linearly is
(A) 2 (B) 3
(C) 4 (D) 5

Space for rough work

61. When CaC_2 is heated in atmospheric nitrogen in an electric furnace, the compound formed is :
(A) $Ca(CN)_2$ (B) CaNCN
(C) Ca_3N_2 (D) $Ca(NC)_2$

62. Lime is heated with coke at 2000^oC. The organic product is treated with water to liberate
(A) CO (B) C_2H_2
(C) C_2H_4 (D) CH_4

63. Which of the following does not give flame colouration
(A) $MgCl_2$ (B) $BaCl_2$
(C) $CaCO_3$ (D) $SrCO_3$

64. Nitrogen is an essential constituent of
(A) Fats and carbohydrates (B) Carbohydrates and enzymes
(C) Proteins and amino acids (D) Vitamin A and Vitamin B

65. The substance not likely to contain $CaCO_3$ is:
(A) Bauxite (B) sea shell
(C) Marble statue (D) Limestone

66. Which of the following pairs contains amphoteric oxides:
(A) BeO, BaO (B) BeO, Al_2O_3
(C) Al_2O_3 , P_2O_5 (D) CuO, Na_2O

67. Bleaching powder is prepared from the reaction of:
(A) Slaked lime and chlorine (B) Quick lime and chlorine
(C) Burnt lime and chlorine (D) Calcium and chlorine

68. Swimming pools are disinfected by bubbling through water a controlled quantity of:
(A) Br_2 (B) N_2
(C) Cl_2 (D) O_2

69. Identify species with an atom in +6 oxidation state
(A) CrO_2Cl_2 (B) $Cr(CN)_6^{-3}$
(C) MnO_4^- (D) NiF_6^{-2}

70. BF_3 is a :
(A) Bronsted acid (B) Bronsted base
(C) Lewis acid (D) Lewis base

Space for rough work

Mathematics

Straight Objective Type

*Mathematics contains 20 multiple choice questions numbered 71 to 90. Each question has 4 choices (A), (B), (C) and (D), out of which **ONLY ONE** is correct.*

71. $3.\overline{27}$ is
(A) an integer
(B) a rational number
(C) a natural number
(D) an irrational number

72. If the sum of LCM and HCF of two numbers is 1260 and their LCM is 900 more than their HCF, then the product two numbers is
(A) 203400
(B) 194400
(C) 198400
(D) 205400

73. The value of k for which the system of equations
$$2x + 3y = 5$$
$$4x + ky = 10$$
has infinite number of solutions, is
(A) 1
(B) 3
(C) 6
(D) 0

74. The area of the triangle formed by the lines y=x, x=6 and y=0 is
(A) 36 sq.units
(B) 18 sq.units
(C) 9 sq.units
(D) 72 sq.units

Space for rough work

75. In a $\Delta ABC, AD$ is the bisector of $\angle BAC$, If AB=6cm , AC=5cm and BD=3, then DC=
(A) 11.3cm (B) 2.5cm
(C) 3:5cm (D) None of these.

76. If $x\sin(90^o-\theta)\cot(90^o-\theta)=\cos(90^o-\theta)$, then x =
(A) 0 (B) 1
(C) -1 (D) 2

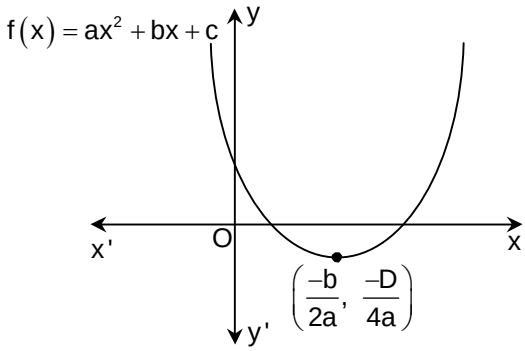
77. $\tan 5^o \times \tan 30^o \times 4\tan 85^o$ is equal to
(A) $\frac{4}{\sqrt{3}}$ (B) $4\sqrt{3}$
(C) 1 (D) 4

78. The mean of n observations is $\bar{x}$. If the first observation is increased by 1, the second by 2, the third by 3, and so no, then the new mean is
(A) $\bar{x}+(2n+1)$ (B) $\bar{x}+\frac{n+1}{2}$
(C) $\bar{x}+(n+1)$ (D) $\bar{x}-\frac{n+1}{2}$

79. If one zero of the polynomial $f(x)=(k^2+4)x^2+13x+4k$ is reciprocal of the other, then k
(A) 2 (B) -2
(C) 1 (D) -1

Space for rough work

80. If the given diagram shows the graph of the polynomial $f(x) = ax^2 + bx + c$, then



(A) $a > 0, b < 0$ and $c > 0$
(B) $a > 0, b > 0$ and $c < 0$
(C) $a > 0, b > 0$ and $c > 0$
(D) $a < 0, b > 0$ and $c < 0$

81. What should be added to the polynomial $x^2 - 5x + 4$, so that 3 is the zero of the resulting polynomial?
(A) 1
(B) 2
(C) 4
(D) 5

82. The area of the triangle formed by the line $\frac{x}{a} + \frac{y}{b} = 1$ with the coordinate axes is
(A) ab
(B) 2ab
(C) $\frac{1}{2}ab$
(D) $\frac{1}{4}ab$

83. In a $\Delta ABC, \angle A = 90^0, AB = 5cm$ and AC=12 cm. If $AD \perp BC$ then AD=
(A) $\frac{13}{2}cm$
(B) $\frac{60}{13}cm$
(C) $\frac{13}{60}cm$
(D) $\frac{2\sqrt{15}}{13}cm$

Space for rough work

84. If ABC is an isosceles triangle and D is a point on BC such that $AD \perp BC$, then
(A) AB^2-AD^2=BD.DC (B) AB^2-AD^2 =BD^2-DC^2
(C) AB^2+AD^2=BD.DC (D) AB^2+AD^2=BD^2-DC^2

85. In an equilateral triangle ABC if $AD \perp BC$, then
(A) $5AB^2 = 4AD^2$ (B) $3AB^2 = 4AD^2$
(C) $4AB^2 = 3AD^2$ (D) $2AB^2 = 3AD^2$

86. If 5θ and 4θ are acute angles satisfying $\sin 5\theta = \cos 4\theta$, then $2\sin 3\theta - \sqrt{3}\tan 3\theta$ is equal to
(A) 1 (B) 0
(C) -1 (D) $1+\sqrt{3}$

87. The value of $(1+\cot\theta-\operatorname{cosec}\theta)(1+\tan\theta+\sec\theta)$ is
(A) 1 (B) 2
(C) 4 (D) 0

88. If $a\cos\theta - b\sin\theta = c$,then $a\sin\theta + b\cos\theta =$
(A) $\pm\sqrt{a^2+b^2+c^2}$ (B) $\pm\sqrt{a^2+b^2-c^2}$
(C) $\pm\sqrt{c^2-a^2+b^2}$ (D) None of these

89. If $u_i = \frac{x_i - 25}{10}, \sum f_i u_i = 20, \sum f_i = 100,$ then $\bar{x} =$
(A) 23 (B) 24
(C) 27 (D) 25

90. If the sum of the roots of the equation $x^2 - (k+6)x + 2(2k-1) = 0$ is equal to half of their product, then $k =$
(A) 6 (B) 7
(C) 1 (D) 5

Space for rough work

FIITJEE Talent Reward Exam-2014

for student presently in Class 10

PAPER–1

ANSWER KEYS

SECTION – I (IQ)		SECTION – II (SCIENCE & MATHEMATICS)			
Q. No	**Answer**	**Q. No**	**Answer**	**Q. No**	**Answer**
1.	**C**	31.	**C**	61.	**B**
2.	**C**	32.	**D**	62.	**B**
3.	**B**	33.	**C**	63.	**A**
4.	**A**	34.	**B**	64.	**C**
5.	**C**	35.	**A**	65.	**A**
6.	**D**	36.	**C**	66.	**B**
7.	**B**	37.	**B**	67.	**A**
8.	**A**	38.	**D**	68.	**C**
9.	**A**	39.	**B**	69.	**A**
10.	**B**	40.	**B**	70.	**C**
11.	**D**	41.	**C**	71.	**B**
12.	**A**	42.	**D**	72.	**B**
13.	**A**	43.	**A**	73.	**C**
14.	**D**	44.	**C**	74.	**B**
15.	**A**	45.	**C**	75.	**B**
16.	**D**	46.	**D**	76.	**B**
17.	**B**	47.	**B**	77.	**A**
18.	**D**	48.	**A**	78.	**B**
19.	**A**	49.	**D**	79.	**A**
20.	**C**	50.	**D**	80.	**A**
21.	**C**	51.	**A**	81.	**B**
22.	**B**	52.	**C**	82.	**C**
23.	**C**	53.	**B**	83.	**B**
24.	**D**	54.	**D**	84.	**A**
25.	**B**	55.	**D**	85.	**B**
26.	**C**	56.	**C**	86.	**B**
27.	**A**	57.	**D**	87.	**B**
28.	**C**	58.	**D**	88.	**B**
29.	**D**	59.	**C**	89.	**C**
30.	**D**	60.	**A**	90.	**B**