SAMPLE PAPER (XI MOVING)

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MATHEMATICS

### PART : A (11 × 3 = 33 Marks) (3R – 1W)

CHOOSE THE CORRECT OPTION:

1. Two cones A and B have their base radii in the ratio of 4 : 3 and their heights in the ratio 3 : 4. The ratio of volume of cone A to that of cone B is
   (a) 4 : 3　　　(b) 3 : 4　　　(c) 2 : 3　　　(d) 1 : 2

2. If each edge of a cube is increased by 50%, then the percentage increase in the surface area is
   (a) 50　　　(b) 125　　　(c) 150　　　(d) 300

3. If $\cos\alpha = \dfrac{3}{5}$, then the value of $\dfrac{\sin\alpha - \dfrac{1}{\tan\alpha}}{2\tan\alpha}$ is
   (a) 3/160　　　(b) 841/160　　　(c) 41/160　　　(d) 31/160

4. If $2^{2x-y} = 32$ and $2^{x+y} = 16$ then $x^2 + y^2$ is equal to
   (a) 9　　　(b) 10　　　(c) 11　　　(d) 13

5. The value of the expression $\sqrt{6 + \sqrt{6 + \sqrt{6 + \ldots + \text{upto}\ \infty}}}$ is
   (a) 2　　　(b) 3　　　(c) 30　　　(d) 5

6. ABC is an isosceles triangle with $AB = AC = 5$ and $BC = 6$. If G is the centroid of ΔABC, then AG is equal to
   (a) 1/3　　　(b) 2/3　　　(c) 4/3　　　(d) 8/3

7. Three circles have the centres at A, B, C and each circle touches the other two externally. If $AB = 5$ cm, $BC = 7$ cm and $CA = 6$ cm, then the radii of three circles respectively are
   (a) 2, 3, 4　　　(b) 3, 4, 5　　　(c) 2, 4, 5　　　(d) 2, 3, 5

8. What should be added to $\dfrac{1}{x^2 - 7x + 12}$ to get $\dfrac{2}{x^2 - 6x + 8}$?
   (a) $\dfrac{1}{x^2 + 5x - 16}$　　　(b) $\dfrac{1}{(x+3)(x+2)}$　　　(c) $\dfrac{4}{(x-3)(x+2)}$　　　(d) $\dfrac{1}{x^2 - 5x + 6}$

9. If $a + b + c = 0$, the value of $\dfrac{a^2}{bc} + \dfrac{b^2}{ca} + \dfrac{c^2}{ab}$ is
   (a) 1　　　(b) 0　　　(c) –1　　　(d) 3

10. If $\dfrac{x}{2} = \dfrac{y}{3}$, then $\left[\dfrac{4}{5} + \dfrac{y-x}{y+x}\right]$ equals
    (a) 3/5　　　(b) 4/5　　　(c) 1　　　(d) 6/5

11. If $a = b^x$, $b = c^y$, $c = a^z$, then xyz is
    (a) –1　　　(b) 0　　　(c) 1　　　(d) abc

PART : B (7 × 4 = 28 Marks) (4R – 1W)

CHOOSE THE CORRECT OPTION :

12. For an acute angle α, ($\sin\alpha + \cos\alpha$) takes the greatest value when the value of α is equal to
    (a) 30°　　　(b) 45°　　　(c) 60°　　　(d) 90°

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13. In the diagram, O is the centre of the circle. The angle CBD is equal to
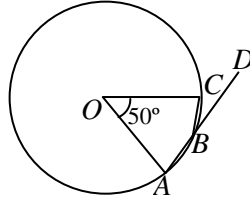
(a) 25° (b) 50° (c) 40° (d) 130°

14. If $f(x) = \log\left(\dfrac{1+x}{1-x}\right)$, then $f\left(\dfrac{2x}{1+x^2}\right)$ is equal to

(a) $2f(x)$ (b) $f(2x)$ (c) $2f(-x)$ (d) $f(x)$

15. A sum of ₹ 731 is divided among A, B and C, such that A receives 25% more than B and B receives 25% less than C. What is C's share?

(a) ₹ 272 (b) ₹ 262 (c) ₹ 258 (d) ₹ 200

PASSAGE (Q.16-18)

A wire bent in the form of a square encloses an area of 5929 cm^2

16. The length of the wire is

(a) 830 cm (b) 308 cm (c) 803 cm (d) 83 cm

17. The area enclosed, if the same wire is bent to form a circle, is

(a) 5746 cm^2 (b) 7564 cm^2 (c) 5764 cm^2 (d) 7546 cm^2

18. The length of each side of the square is

(a) 77 cm (b) 308 cm (c) 803 cm (d) 830 cm

PART : C (3 × 4 = 12 Marks) (4R – 0W)

CHOOSE THE CORRECT OPTIONS : (ONE OR MORE CORRECT OPTIONS)

19. Which of the following statement is/are incorrect?

(a) $x^y > y^x$, if $x = 2$ and $y = 4$ (b) $x = 1$ for all values of x

(c) $x^{-y} > y^{-x}$ if $x = -103$ and $y = -104$ (d) $x^y > y^x$, if $x = 4$ and $y = 2$

20. Which of the following system of equations has infinitely many solutions?

(a) $5x - 4y = 20$, $7.5x - 6y = 30$ (b) $2x - 6y = 5$, $3x - 3.5y = 8.5$

(c) $x + 5y - 3 = 0$, $3x + 15y - 9 = 0$ (d) none of these

21. Which of the following is/are correct?

(a) $\left\{\left(\dfrac{-7}{9}\right)^2\right\}^3 = \left(\dfrac{7}{9}\right)^6$ (b) The reciprocal of $\left\{\left(\dfrac{-2}{19}\right)^5\right\}^4$ is $\left(\dfrac{19}{2}\right)^{20}$

(c) $\left(\dfrac{-3}{2}\right)^{33} = \dfrac{3^{33}}{2^{33}}$ (d) $33^9 - 33^8 = 33$

PART : D (3 × 3 = 9 Marks) (3R – 1W)

READ THE FOLLOWING PASSAGE AND CHOOSE THE CORRECT OPTION:

PASSAGE

Cards marked with the numbers 2 to 101 are placed in a box and mixed thoroughly. One card is drawn from this box.

22. The probability that the number on the card is a prime number less than 20, is

(a) 9/100 (b) 2/25 (c) 1/10 (d) 3/50

23. The probability that the number on the card is an even number is

(a) 1/2 (b) 49/100 (c) 2/25 (d) 3/50

24. The probability that the number on the card is a number which is a perfect square, is

(a) 1/10   (b) 2/25   (c) 9/100   (d) 1/20

PART : E (2 × 3 = 6 Marks) (3R – 0W)

ASSERTION AND REASONING: (Questions with Assertion A and Reason R)

Answer Codes: **(a)** Both A and R are true and R is correct explanation of A

                              (b) Both A and R are true but R is not correct explanation of A.

                              (c) A is true, R is false

                              (d) A is false, R is true

25. Assertion (A) : LCM of $42x(x-2)^2(x-3)^3$ and $14x^2(x-1)(x-2)^3$ is $42x^2(x-1)(x-2)^3(x-3)^3$.

Reason (R) : Lowest common multiple is the product of all the factors (taken once) of the polynomials given with their highest exponents respectively.

26. Assertion (A) : In the given circle $\angle ACB = \angle ADB = 90º$
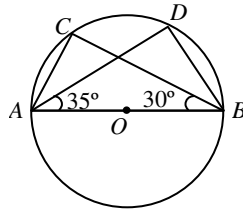
Reason (R) : An angle in a semi-circle is a right angle.

PART : F (4 × 2 = 8 Marks) (4×2R –0W)

MATCH THE LIST:

Column I	Column II
27. If $\sqrt{(75.24 + x)} = 8.71$ then the value of x is	**(a)** 324
28. If $\sqrt{0.04 \times 0.4 \times a} = 0.4 \times 0.04 \times \sqrt{b}$ then the value of a/b is	**(b)** 64
29. If $\sqrt{256} \div \sqrt{x} = 2$ then the value of x is	**(c)** 0.016
30. If $\sqrt{\dfrac{x}{169}} = \dfrac{54}{39}$ then the value of x is	**(d)** 0.6241

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CHEMISTRY

PART : A (11 × 3 = 33 Marks) (3R – 1W)

CHOOSE THE CORRECT OPTION:

31. In 0.32 gm. of methane, the number of moles is —
(a) 0.002   (b) 0.20   (c) 2   (d) 0.02

32. For the isotope $_6C^{13}$ the number of neutrons is —
(a) 6   (b) 7   (c) 19   (d) 13

33. Which of the following oxides react with both HCl and NaOH?
(a) CaO   (b) N_2O_5 (c) CO_2 (d) ZnO

34. The molecular formula of ammonia is NH_3. Therefore the number of hydrogen atoms in 34 gms of ammonia will be—
(a) $3 \times 6.023 \times 10^{23}$ (b) 6.023×10^{23} (c) $34 \times 6.023 \times 10^{23}$ (d) $6 \times 6.023 \times 10^{23}$

35. A compound of ammonia which sublimes on heating is—
(a) ammonium sulphate   (b) ammonium nitrate   (c) ammonium chloride   (d) ammonium nitrite

36. Which of the following is the composition of red lead?
(a) PbO   (b) PbO_2 (c) Pb_3O_4 (d) PbI_2

37. 10 g of a monoatomic gas at an atmospheric pressure is cooled from 273ºC to 0ºC keeping volume constant; its pressure would become:
(a) 273 atm   (b) 1/2 atm   (c) 2 atm   (d) remains constant

38. Which of the following gives black precipitate with H_2S?
(a) Cupric chloride   (b) Cadmium chloride   (c) Zinc chloride   (d) Ferric chloride

39. The reducing agent used in the blast furnace to reduce Fe_2O_3 to Fe is
(a) coke   (b) carbon   (c) lime stone   (d) carbon monoxide

40. Which of the following salts would give SO_2 with dil. H_2SO_4 and also decolourises bromine water?
(a) Na_2SO_4 (b) $NaHSO_4$ (c) Na_2SO_3 (d) Na_2S

41. Aluminium is extracted by
(a) heating sodium aluminium silicate to a high temperature
(b) treating crtyolite with sodium hydroxide solution under pressure
(c) heating aluminium oxide with coke in a furnace
(d) the electrolysis of molten aluminium oxide in cryolite

PART : B (7 × 4 = 28 Marks) (4R – 1W)

CHOOSE THE CORRECT OPTION :

42. The major component of CNG is
(a) Methane   (b) Ethane   (c) Propane   (d) Butane

43. Which of the following would contain the same number of atoms as 12 g. of magnesium? (At wts.: Mg = 24; C = 12; Ca = 40, O = 16, K = 40)—
(a) 12 g. of carbon   (b) 20 g. of calcium   (c) 32 g. of oxygen   (d) 40 g. of potassium

44. When phosphorus is heated with strong sodium hydroxide solution?
(a) Oxidation takes place   (b) Hydroxide is formed
(c) An inflammable gas evolves   (d) No reaction takes place

45. Electron affinity is positive when
(a) O^- is formed from O atom   (b) O^{2-} is formed from O^- ion
(c) O^+ is formed from O atom   (d) O^{2+} is formed from O^+ ion

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46. Equivalent mass of a metal is 12 g mol^{-1}. Hence equivalent mass of its oxide is

    (a) 20 g mol^{-1} (b) 28 g mol^{-1} (c) 32 g mol^{-1} (d) 40 g mol^{-1}

47. Which of the following is correct scientific notation for number 0.0975

    (a) 9.75×10^{-2} (b) 97.5×10^{-3} (c) 975×10^{-4} (d) 0.00975×10^{1}

48. The equivalent weight of $MnSO_4$ is half its molecular weight when it is converted to—

    (a) Mn_2O_3 (b) MnO_2 (c) MnO_4^- (d) MnO_4^{--}

PART : C (3 × 4 = 12 Marks) (4R – 0W)

CHOOSE THE CORRECT OPTIONS : (ONE OR MORE CORRECT OPTIONS)

49. When 28 g of nitrogen gas occupying a volume of 22.4 litres at 0ºC and 1 atm. Temperature was heated to 273ºC the pressure became 2 atm. The new volume of the gas in litres, is—

    (a) 44.8   (b) 11.2   (c) 22.4   (d) 89.6

50. Cryolite is—

    (a) Sodium aluminium fluoride   (b) Magnesium silicate

    (c) Calcium Magnesium Carbonate   (d) Sodium borofluoride

51. Which of the following represents disproportionation reaction

    (a) $2Cu^+ \longrightarrow Cu^{2+} + Cu$

    (b) $3I_2 \longrightarrow 5I^- + I^{+5}$

    (c) $H_2O + Cl_2 \longrightarrow Cl^- + ClO^- + 2H^+$

    (d) $2HCHO \xrightarrow{OH^-} HCOO^- + CH_3OH$

PART : D (3 × 3 = 9 Marks) (3R – 1W)

READ THE FOLLOWING PASSAGE AND CHOOSE THE CORRECT OPTION:

PASSAGE

The concentration of solutions can be expressed in number of ways such that Normality, Molarity, Molality, Mole fractions, Strength, % by weight, % by volume and % by strength. The molarity of ionic compound is usually expressed as formality because we use formula weight of ionic compound. Addition of water to a solution changes all these terms, however increase in temperature does not change molality, mole fraction and % by weight terms.

52. Volume of water required to convert 100 mL 0.5 M NaOH solution to 0.2 M NaOH solution is :

    (a) 250 mL   (b) 150 mL   (c) 100 mL   (d) 400 mL

53. The equivalent weight of H_3PO_4 in the reaction (At weigth of P = 31)

    $Ca(OH)_2 + H_3PO_4 \longrightarrow CaHPO_4 + 2H_2O$ is :

    (a) 49   (b) 32.66   (c) 98   (d) 196

54. Number of oxalate ions in 100 mL of 0.1N oxalic acid is :

    (a) $\dfrac{N_A}{100}$ (b) $\dfrac{N_A}{20}$ (c) $\dfrac{N_A}{200}$ (d) $\dfrac{N_A}{1000}$

PART : E (2 × 3 = 6 Marks) (3R – 0W)

ASSERTION AND REASONING: (Questions with Assertion A and Reason R)

Answer Codes: (a) Both A and R are true and R is correct explanation of A

(b) Both A and R are true but R is not correct explanation of A.

(c) A is true, R is false

(d) A is false, R is true

55. **Assertion (A) :** Half life of ^{14}C is same whether it is in CO or CO_2 or cellulose or in coal.

    Reason (R) : The rate of decay of an element is independent of all external factors.

56. Assertion (A) : 1 equivalent of $K_2Cr_2O_7$ has 1 equivalent of K, Cr and O each.

Reason (R) : Equivalent and milli-equivalent reacts in equal number to give same equivalent or milli equivalent of product.

PART : F (4 × 2 = 8 Marks) (4×2R –0W)

MATCH THE LIST : (ONE OR MORE CORRECT OPTIONS)

Column I	Column II
57. Molten NaCl	**(a)** pH < 7
58. Aqueous NaCl	**(b)** pH = 7
59. Aqueous CH_3COONa	**(c)** Electrolytic solution
60. Aqueous NH_4Cl	**(d)** pH > 7

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PHYSICS

PART : A (11 × 3 = 33 Marks) (3R – 1W)

CHOOSE THE CORRECT OPTION:

61. Inertia of a body

(a) depends on the velocity of the body   (b) depends on the size of the body

(c) is determined by the matter content of the body   (d) depends on the shape of the body

62. A luminous object is kept at a distance D from a screen. In order to obtain the image of the same size as the object, the focal length of a convex lens to be inserted between them must be

(a) D   (b) D/2   (c) 2D   (d) D/4

63. A particle moving along the x-axis travels first 3m distance with velocity $3\,ms^{-1}$ and the second 3 m distance with velocity $6\,ms^{-1}$. The average velocity of the particle is

(a) 4 ms^{-1} (b) 2 ms^{-1} (c) 4.5 ms^{-1} (d) 6 ms^{-1}

64. A piece of ice, with a stone embedded inside it, is floating in water contained in a vessel. When the ice melts completely, the level of water in the vessel

(a) remains unchanged   (b) rises

(c) falls   (d) falls in the beginning and rises to the same level later

65. A ray of light strikes a glass plate at an angle of 60°. If the reflected and refracted rays are perpendicular to each other, the index of refraction of glass is :

(a) 1/2   (b) $\sqrt{3/2}$ (c) 3/2   (d) $\sqrt{3}$

66. What would be the acceleration due to gravity at another planet whose mass and radius are twice of that of earth ? (Where g = acceleration due to gravity on earth)

(a) $2g$ (b) g (c) $g/4$ (d) $g/2$

67. If a soap bubble is given a charge, then its radius

(a) decreases   (b) increases

(c) remains unchanged   (d) depends on the nature of charge given

68. When a red rose is seen through green glass then rose appears

(a) red   (b) green   (c) yellow   (d) black

69. An athlete completes one round of a circular track of radius R in 40 sec. What will be his displacement at the end of 2 min. 20 sec ?

(a) zero   (b) $2R$ (c) $2\pi R$ (d) $7\pi R$

70. If the direction of the incident rays is kept constant and the mirror is rotated through an angle θ about an axis in the plane of mirror, then the reflected ray rotates through an angle
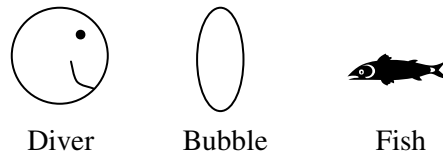
(a) $\dfrac{\theta}{2}$ (b) θ (c) 2θ (d) $\dfrac{3\theta}{2}$

71. A fish sees the smiling face of a scuba diver through a bubble of air between them, as shown. Compared to the face of the diver, the image seen by the fish will be
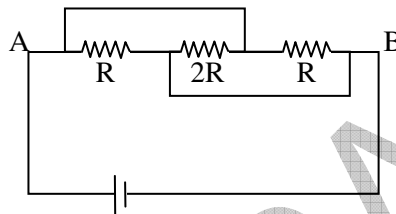
Diver   Bubble   Fish

(**a**) smaller and erect

(**b**) smaller and inverted

(**c**) larger and erect

(**d**) Can be either of above depending on the distance of the diver.

PART : B (7 × 4 = 28 Marks) (4R – 1W)

CHOOSE THE CORRECT OPTION:

**72.** In the figure shown the current flowing through 2R is:

A   R   2R   R   B

(**a**) from left to right   (**b**) from right to left   (**c**) no current   (**d**) none of these

73. A body starts from rest and uniformly accelerated for 15 sec. The distance traveled in first 5 sec is S_1, next 5 sec is S_2 & last 5 sec is S_3 then $S_1 : S_2 : S_3 =$

(**a**) $1 : 2 : 4$ (**b**) $1 : 4 : 9$ (**c**) $1 : 3 : 5$ (**d**) $1 : 1 : 1$

74. A light and a heavy body have equal momentum. Which one has greater kinetic energy?

(**a**) the light body   (**b**) both have equal kinetic energy

(**c**) the heavy body   (**d**) data given is incomplete

75. The specific resistance of a wire

(**a**) varies with its length   (**b**) varies with its cross-section

(**c**) varies with its mass   (**d**) does not depend upon its length, cross-section and mass

76. A boy throws a cricket ball from the boundary to the wicket. If frictional force cannot be ignored, the forces acting on the ball at *X* are represented by

(**a**)   (**b**)   (**c**)   (**d**)
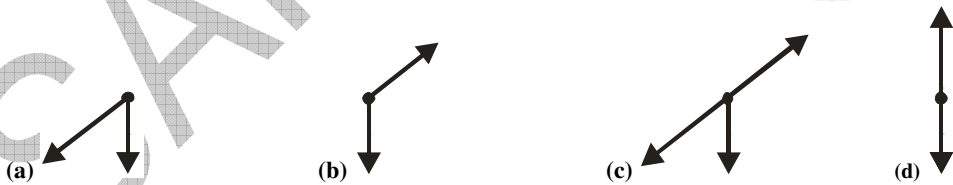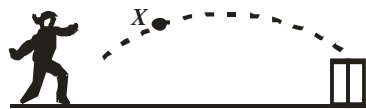
77. A boy has two spare light bulbs in his drawer. One is marked 240 V and 100 W and the other is marked 240 V and 60 W. He tries to decide which of the following assertions are correct ?

(**a**) The 60 W light bulb has more resistance and therefore burns less brightly

(**b**) The 60 W light bulb has less resistance and therefore burns less brightly

(**c**) The 100 W bulb has more resistance and therefore burns more brightly

(**d**) The 100 W bulb has less resistance and therefore burns less brightly

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78. A ball is thrown vertically upwards and returns to the point of projection.
Which statement about the acceleration at point *X* and *Y* is correct ?
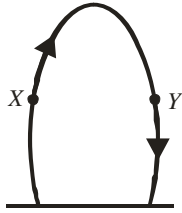
(a) The acceleration is downwards at both point

(b) The acceleration is upwards at both points

(c) The acceleration is downwards at *X* and upwards at *Y*

(d) The acceleration upwards at *X* and downwards at *Y*

PART : C (3 × 4 = 12 Marks) (4R – 0W)

CHOOSE THE CORRECT OPTION: (ONE OR MORE CORRECT OPTIONS)

79. Identify the statement explaining the correct difference between conduction, convection and radiation.

(a) Conduction and convection require material medium but radiation does not required material medium

(b) Conduction transfers heat without transporting matter but convection transfers heat with transportation of matter.

(c) The radiation mode of heat transfer cannot be eliminated

(d) None of these

80. A particle moving along a circular path with constant speed is

(a) in equilibrium

(b) moving with varying velocity

(c) accelerating towards the centre of the rotation

(d) constantly pulled towards the centre

81. When light ray traveling in air enters into a medium of refractive index μ .

(a) its speed decreases by μ times

(b) its frequency decreases by μ times

(c) its wavelength decreases by μ times

(d) all of these

PART : D (3 × 3 = 9 Marks) (3R – 1W)

READ THE FOLLOWING PASSAGE AND CHOOSE THE CORRECT OPTION:
PASSAGE

The fig. shows a network of five resistances and a battery.
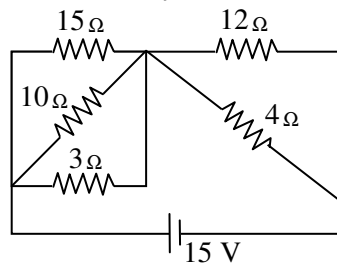
82. The current coming out of the battery is

(a) 2.5 A **(b)** 3A **(c)** 4A **(d)** none of these

83. The total resistance of the network across the battery is

(a) 5 Ω **(b)** 6 Ω **(c)** 3.5 Ω **(d)** none of these

84. Total power consumed in resistor's is

(a) 45 Kilo Watt **(b)** 54 Watt **(c)** 45 Watt **(d)** none of these

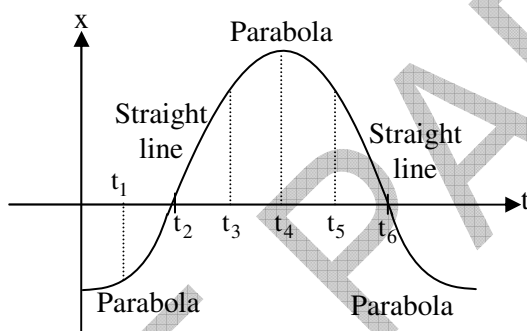## ASSERTION AND REASONING: (Questions with Assertion A and Reason R)

Answer Codes: **(a)** Both A and R are true and R is correct explanation of A

(b) Both A and R are true but R is not correct explanation of A.

(c) A is true, R is false

(d) A is false, R is true

85. Assertion (A) : When velocity of a particle is zero then acceleration of particle is also zero..

Reason (R) : Acceleration is equal to rate of change of velocity.

86. Assertion (A): On a rainy day, it is difficult to drive a car or bus at high speed

Reason (R) : The value of coefficient of friction is lowered due to wetting of the surface

MATCH THE LIST : (ONE OR MORE CORRECT OPTIONS)

Figure shows a graph of position versus time graph for a particle moving along x-axis.

Column I	**Column II**
87. Slowing down	**(a)** $t_1 - t_2$
88. Returning towards origin	**(b)** $t_2 - t_3$
89. Moving away from origin	**(c)** $t_3 - t_4$
90. Speeding up	**(d)** $t_4 - t_5$

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Answer Key

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

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