FIITJEE SOLUTIONS

for

NSET – 2012

(NTSE – 2012-13 STAGE - 1)

12/NSET - 2

Time for marking all 90 Questions : 1:30 Hours | Maximum Marks : 90

SET - D

NOTE

1 . This paper has **Three** sections, Science : Q. Nos. **1-35**, **Social Science** : Q. Nos. **36-70** and **Mathematics** : Q. Nos. **71-90**.

2. This question booklet contains 90 questions numbered from **1** to **90** and each question carries 1 mark. All questions are compulsory. There is no-negative marking.

3. Tally the number of pages along with no. of questions printed on cover page of the booklet. Also check that question booklet contains the questions of all relevant subjects/topics, as required and stated above and no repetition or omission of questions is evident.

4. If any discrepancy is found in the Question Booklet, the same can be replaced with another correct Question Booklet within first 15 minutes.

5. Before answering the questions please read carefully the instructions printed on the back cover page of the question booklet and strictly follow them. **Indicate your answers by blacking bubbles carefully only on the O.M.R. Answer Sheet provided.**

6. Use of any type of calculator, mobile phone or any other electronic equipment and log table etc. is strictly prohibited.

SECTION - A
SCIENCE

1. Ribosomes are the centre for :
(A) Respiration (B) Protein synthesis (C) Photosynthesis (D) Fat synthesis

Ans. **B**
Sol. Ribosomes are also known as 'Protein Factories of Cell'
Mitochondria is responsible for Respiration.
Chloroplast helps in photosynthesis
Smooth Endoplasmic Reticulum helps in fats synthesis

2. Binomial nomenclature was introduced by :
(A) John Ray (B) Aristotle (C) A.P. DeCandolle (D) Carolus Linnaeus

Ans. **D**
Sol. Carolus Linnaeus is also known as 'Father of Binomial Nomenclature'.
The term 'species' was coined by John Ray.
Father of Biology is Aristotle.
A.P. Decandolle introduced the term 'taxonomy'.

3. Which of the following is rich in vitamin A ?
(A) Carrot (B) Amla (C) Apple (D) Green vegetables

Ans. **A**
Sol. Carrot is rich in carotene, Amla is a rich source of Vitamin-C.

4. Typhoid is caused by :
(A) Streptococcus (B) Salmonella (C) Giardia (D) Mycobacterium

Ans. **B**
Sol. Typhoid is a bacterial disease caused by *Salmonella typhi.*
Streptococcus sp. are responsible for meningitis, pneumonia, endocarditis etc.
Giardia is an anaerobic flagellate protozoans causes giardiasis.
Mycobacterium sp. causes tuberculosis and leprosy.

5. The percentage of oxygen in air is :
(A) 78% (B) 0.03% (C) 21% (D) 80%

Ans. **C**
Sol. The percentage of oxygen in air is about 21% by volume

6. Which of the following is the high milk yielding variety of cow ?
(A) Holstein (B) Sahiwal (C) Red Sindhi (D) Mehsana

Ans. **A**
Sol. Holstein is a breed of cattle known today as the world's highest production dairy animal.

7. In the year 1984, the Bhopal gas tragedy was caused by the leakage of :
(A) Carbon monoxide (B) Methyl isocyanate (C) Nitrogen oxide (D) Sulphur oxide

Ans. **B**
Sol. Methyl isocynate gas (CH_3NCO) was leaked from the union carbide plant of Bhopal (M.P.)

8. The ceptre of curvature of a concave mirror
(A) lies in front of it (B) lies behind it
(C) lies on the surf ace of mirror (D) is apart of mirror

Ans. **A**

9. If a lens has power -2.5D, then it is a :
(A) convex lens, with a focal length of 40 cm
(B) concave lens with a focal length of 40 cm
(C) convex lens with a focal length of 0.4 cm
(D) concave lens with a focal length of 0.4 cm

Ans. **B**

Sol. $P = \frac{1}{f(\text{in meter})}$

$f = \frac{1}{P} = \frac{1}{-2.5} = \frac{10}{-25} \qquad \Rightarrow f = \frac{-1000}{25}\text{cm} = -40\text{ cm}$

10. Which of the following substances has lowest electrical resistivity at room temperature ?
(A) Aluminium (B) Iron (C) Nichrome (D) Diamond

Ans. **A**

Sol. Lowest Resistivity = Highest Conductivity

11. An electric current through a horizontal metal wire flows in East to West direction, direction of magnetic field at point directly above it is from :
(A) East toWest (B) West to East (C) North to South (D) South to North

Ans. **D**

Sol. By Right Hand thumb rule

12. One atomic mass unit (a.m.u.) is equal to:
(A) 1 eV of energy (B) 931 eV of energy (C) 1 MeV of energy (D) 931 MeV of energy

Ans. **D**

Sol. $E = mc^2$ (Einstein's equation)
mass defect
$1\text{ amu} = 1.66 \times 10^{-27}\text{ kg}$
$E = 1.66 \times 10^{-27} \times (3 \times 10^8)^2$
$= 1.66 \times 9 \times 10^{-11}\text{ J}$
$= \frac{1.66 \times 9 \times 10^{-11}}{1.6 \times 10^{-19} \times 10^6}\text{MeV}$

13. The planet nearest to Sun is :
(A) Mercury (B) Mars (C) Saturn (D) Venus

Ans. **A**

14. If the displacement-time graph for the motion of a car is parallel to the time axis, the velocity of that car is :(A) constant but not zero (B) zero
(C) infinite (D) linearly increasing

Ans. **B**

Sol. As slope of displacement-time graph represents velocity

15. S.I. unit of momentum is :
(A) kg ms^{-1} (B) kg ms^{-2} (C) kg ms^2 (D) kg $m^{-1}s^{-1}$

Ans. **A**

Sol. $\because p = mv$

16. The density of a substance is 7100 kg m^{-3} . Its relative density is :
(A) 7100 (B) 71 (C) 7.1 (D) 71 x105

Ans. **C**

Sol. $\text{R.D.} = \frac{\text{Density of body}}{\text{Density of water}}$

17. The mass of a body on earth is 60 kg. Its mass on moon will be :
(A) 360kg (B) 60kg (C) 10kg (D) 1/6kg

Ans. **B**
Sol. As mass is a property so it doesn't changes

18. If the difference of temperature of two bodies is 5°C, then the difference of temperature on Kelvin scale is :
(A) 268 K (B) 278 K (C) 5K (D) 54.6 K

Ans. **C**
Sol. $K = 273 + C \Rightarrow \Delta K = \Delta C$

19. Which of the following sound of given frequencies can be heard by us ?
(A) 10 Hz (B) 10kHz (C) 10MHz (D) 10 GHz

Ans. **B**
Sol. $20 \le \text{Audible freq.} \le 20\ \text{kHz}$

20. Which statement is correct about a proton ?
(A) It is nucleus of deuterium (B) It is ionised hydrogen molecule
(C) It is ionised hydrogen atom (D) It is - particle

Ans. **C**
Sol. Hydrogen atom contain 1 proton and 1 electron.
$^{1}H_{1} \longrightarrow H^{+} + e^{-}$, Hence H^{+} is a proton

$$\underset{\text{(Deuterium)}}{^{2}H_{1}} \longrightarrow \underset{\text{(Deuterium Nucleus)}}{(^{2}H_{1})^{+}} + e^{-}$$

21. Which of the following statements is incorrect ?
(A) Charges on an electron and proton are equal and opposite
(B) Neutron have no charge
(C) Electron and proton have same mass
(D) Masses of proton and neutron are nearly the same

Ans. **C**
Sol. Mass of a proton is about 1840 times mass of an electron.
$m_e = 9.1 \times 10^{-31}$ kg
$m_p = 1.67 \times 10^{-27}$ kg

22. Oxidation is defined as :
(A) loss of electron (B) gain of electron (C) loss of proton (D) gain of proton

Ans. **A**
Sol. Oxidation involve the loss of electron(s) and reduction involve gain of electron(s)

23. In periodic table generally following similarity is found in elements of same group :
(A) atomic number
(B) number of electrons in outermost orbit of an atom
(C) number of isotopes
(D) atomic volume

Ans. **B**
Sol. Eleements belonging to the same group of the periodic table have similar valence shell electronic configuration

24. When two atoms combine to form molecule then :
(A) energy is released
(B) energy is absorbed
(C) energy is neither released nor absorbed
(D) energy may either be released or absorbed

Ans. **A**
Sol. Generally bond formation is an exothermic process.

25. The electronic structure of four elements a, b, c, d respectively are :
(a) $1s^2$
(b) $1s^2\ 2s^2\ 2p^2$
(c) $1s^2\ 2s^2\ 2p^5$
(d) $1s^2\ 2s^2\ 2p^6$

The tendency to form electrovalent bond will be largest in :
(A) a (B) b (C) c (D) d

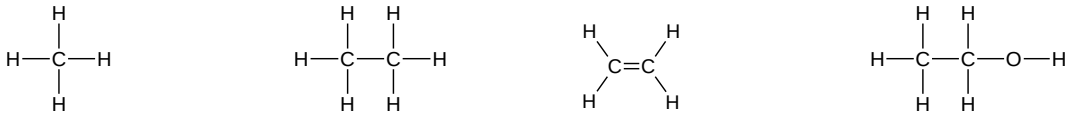
Ans. **C**
Sol. Element 'C' is most electronegative element. It form electrovalent bond with metal, by gaining one electron to complete its octet.

26. Method used for purifying Petroleum is :
(A) Simple distillation (B) Steam distillation (C) Vacuum distillation (D) Fractional distillation

Ans. **D**
Sol. Crude petroleum is mainly a mixture of many hydrocarbons, with a wide range of boiling points.

27. Unsaturated hydrocarbon is :
(A) CH_4 (B) C_2H_6 (C) C_2H_4 (D) C_2H_5OH

Ans. **C**
Sol.



28. If 0.5 g of any substance is completely transformed into energy, then how much energy in kilo-joule will be obtained ?
(A) 1.5 x10^{10} kilo-joule (B) 3.0 x 10^{10} kilo-joule
(C) 4.5 x 10^{10} kilo-joule (D) 6.0 x 10^{10} kilo-joule

Ans. **C**
Sol. Using $E = mc^2$
$m = 0.5\ g = 5 \times 10^{-4}\ kg$
$c = 3 \times 10^8\ m/s$
Hence $E = 5 \times 10^{-4} \times (3 \times 10^8)^2\ J$
$= 45 \times 10^{12}\ J$
$= 4.5 \times 10^{10}\ kJ$

29. Brass contains :
(A) Cu and Sn (B) Cu and Ni (C) Cu and Zn (D) Mg and Al

Ans. **C**
Sol. Brass is an alloy of Zn and Cu

30. On passing CO_2 in excess in aqueous solution of sodium carbonate the substance obtained is :
(A) NaOH (B) $NaHCO_3$ (C) $Na_2CO_3.10H_2O$ (D) $Na_2CO_3.H_2O$

Ans. **B**
Sol. $Na_2CO_3 + CO_2 + H_2O \longrightarrow 2NaHCO_3$

31. Botanical name of amla is :
(A) Medicago sativa (B) Emblica officinalis (C) Zingiber officinale (D) Ocimum sanctum

Ans. **B**
Sol.
Emblica officinalis - Amla
Zingiber officinale - Ginger
Ocimum sanctum - Tulsi
Medicago sativa - Alfalfa

32. Example of fossil energy is :
(A) Alcohol (B) Hydrogen (C) Petrol (D) Gobar gas

Ans. C

33. Hormone which stimulate initiation of flowering process is :
(A) Gibberellin (B) Ethylene (C) Vernalin (D) Florigen

Ans. D
Sol. Florigen is also known as flowering hormone.

34. What happens when a cell placed in hypertonic solution ?
(A) Endosmosis (B) Exosmosis (C) Deplasmolysis (D) Imbibition

Ans. B
Sol. Osmosis is the movement of solvent(water) particles from low concentrated solution to high concentrated solution through a semipermeable membrane.

35. Organisms lacking nuclear membrane and cell organelles is called as :
(A) Prokaryotes (B) Eukaryotes (C) Protozoa (D) Virus

Ans. A
Sol. Prokaryotes are the organisms lacking nuclear membrane and membrane bound cell organelles.

SECTION - B
SOCIAL SCIENCE

36. In which year Reserve Bank was set up ?
(A) 1930 (B) 1935 (C) 1940 (D) 1945

Ans. B

37. Which Bank was merged with Punjab National Bank in 1993 ?
(A) New Bank of India (B) Bank of Maharashtra
(C) Kashi Nath Bank (D) lndus Bank

Ans. A

38. Where is the headquarters of Life Insurance Corporation situated ?
(A) Kolkata (B) Chennai (C) Mumbai (D) New Delhi

Ans. C
39. Which was the capital of Mahajanpad Vatsa in 6th century B.C. ?
(A) Champa (B) Kaushambi (C) Varanasi (D) Mathura

Ans. B

40. How was Jamil related to Swami Mahavir ?
(A) Son (B) Friend (C) Son-in-law (D) Father

Ans. C

41. Who is regarded as Light of Asia ?
(A) Gautam Buddha (B) Gandhiji (B) Swami Mahavir (D) Mao-Tse Tung

Ans. A

42. God Rudra mentioned in Rigveda is :
(A) Brahma (B) Vishnu (C) Mahesh (D) Yamraj

Ans. C

43. When was Hajrat Mohammad born ?
(A) 550 A.D. (B) 560 A.D. (C) 570 A.D. (D) 580 A.D.

Ans. C

44. Who was the author of the book 'Divine Comedy' ?
(A) Acquinas (B) Marsilio (C) John of Paris (D) Dante

Ans. D

45. Who was the founder of British colonial empire in America ?
(A) James I (B) Edward I (C) George V (D) Charles II

Ans. A

46. Who said, "I am the state, and my words are law" ?
(A) Louis XIV (B) Louis XV (C) Louis XVI (D) Rousseau

Ans. C

47. Who is regarded as father of Italian unification ?
(A) Mazini (B) Cavour (C) Garivaldi (D) None of these

Ans. C

48. Who led Russian revolution of 1917 ?
(A) Stalin (B) Brezhnev (C) Lenin (D) Karl Marx

Ans. C

49. Who is egarded chief of solar system ?
(A) Sun (B) Moon (C) Earth (D) Sky

Ans. A

50. Which is the nearest planet of sun ?
(A) Venus (B) Jupiter (C) Mercury (D) Mars

Ans. C

51. How much part of Earth is covered by land ?
(A) 26% (B) 27% (C) 28% (D) 29%

Ans. D

52. In which continent, there is no active volcano ?
(A) Asia (B) Africa (C) Europe (D) Australia

Ans. D

53. Which country of Europe is called 'Playground of Europe' ?
(A) England (B) Holland (C) Switzerland (D) Belgium

Ans. C

54. Areawise what is the position of India in the world ?
(A) Third (B) Fourth (C) Sixth (D) Seventh

Ans. D

55. Which State of India does not have common boundary with Myanmar ?
(A) Arunachal Pradesh (B) Tripura (C) Nagaland (D) Manipur

Ans. B

56. Which of the following countries is not in Indian sub-continent ?
(A) Maldives (B) Pakistan (C) Bangladesh (D) Nepal

Ans. A

57. Which State has Satpuda hills
(A) Utter Prades (B) Bihar (C) Andhra Pradesh (D) Madhya Pradesh

Ans. D

58. Rajsamand lake is in the Indian province of :
(A) Chhattisgarh (B) Jharkhand (C) Rajasthan (D) Uttarakhand

Ans. C

59. Who was the author of the book 'Republic' ?
(A) Aristotle (B) Socrates (C) Machiavelli (D) Plato

Ans. D

60. "Power corrupts and absolute power corrupts absolutely." Who said it ?
(A) Lord Acton (B) Abraham Lincoln (C) Garner (D) Easton

Ans. A

61. Which of the following is not an essential element of the State ?
(A) Population (B) Political Party (C) Definite Territory (D) Sovereignty

Ans. B

62. In which year India's rule was given to the British Crown ?
(A) 1773 (B) 1813 (C) 1833 (D) 1858

Ans. D

63. By which Act, Communal Electoral System was introduced in India ?
(A) Indian Councils Act, 1892 (B) Indian Councils Act, 1909
(C) Indian Councils Act, 1919 (D) Indian independence Act, 1947

Ans. B

64. In which year the first meeting of Constituent Assembly took place ?
(A) 1945 (B) 1946 (C) 1947 (D) 1948

Ans. B

65. By which country India was inspired to include Directive Principles of State Policy in the Indian Constitution?
(A) Britain (B) United States of America
(C) Russia (D) Ireland

Ans. D

66. In which year IX Schedule was included in the Indian Constitution ?
(A) 1950 (B) 1951 (C) 1952 (D) 1953

Ans. A

67. Which part became 22nd State of India on 26th April, 1975 ?
(A) Nagaland (B) Tripura (C) Himachal Pradesh (D) Sikkim

Ans. D

68. In which year the tenure of the present President will come to an end ?
(A) 2016 (B) 2017 (C) 2018 (D) 2019

Ans. B

69. By which Five Year Plan, Community Development Programme was launched in India ?
(A) First (B) Second (C) Third (D) Fourth

Ans. A

70. Who is the Chairman of Planning Commission in India ?
(A) President (B) Prime Minister (C) Planning Minister (D) Vice-President

Ans. B

SECTION - C
MATHEMATICS

71. The probability of getting a number greater than 2 by throwing a fair dice is :
(A) 2/3 (B) 1/3 (C) 1 (D) 3/5

Ans. A

Sol. $P(E) = \frac{n(E)}{n(S)} = 4/6 = 2/3$

72. Which one of the following is a factor of the expression $(a + b)^3 – (a– b)^3$?
(A) a (B) $3a^2 - b$ (C) 2b (D) (a + b) (a - b)

Ans. C

Sol. $(a+b)^3-(a-b)^3$

$a^3+b^3+3a^2b+3ab^2-(a^3-b^3+3a^2b^2-3a^2b)$

$2b^3+6a^2b=2b(b^2+3a^2)$

73. If a number with 12 has the same ratio as 8 having with 10 then the number is :
(A) 15 (B) 9.6 (C) 7.5 (D) 10

Ans. A

Sol. $\frac{12}{x}=\frac{8}{10}\Rightarrow x=15$

74. If the sum of the roots of the equation $ax^2 + bx + c = 0$ is equal to product of their reciprocal, then:
(A) $a^2 + bc = 0$ (B) $b^2 + ca = 0$ (C) $c^2 + ab = 0$ (D) $b + c = 0$

Ans. A

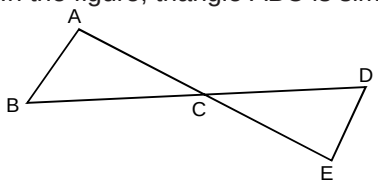
Sol. $\alpha+\beta=-b/a \quad \alpha\beta=c/a$

$\alpha+\beta=\frac{1}{\alpha\beta} \quad \frac{1}{\alpha\beta}=c/a$

$\frac{-b}{a}=\frac{a}{c}\Rightarrow a^2=-bc$

$\Rightarrow a^2+bc=0$

75. In the figure, triangle ABC is similar to triangle EDC :



If we have AB = 4 cm, ED = 3 cm, CE = 4-2 cm and CD = 4-8 cm, then the values of CA and CB respectively are
(A) 6 cm, 6.6 cm (B) 4.8 cm, 6.6 cm (C) 5.4 cm, 6.4 cm (D) 5.6 cm, 6.4 cm

Ans. **D**

Sol. $\frac{AB}{DE}=\frac{BC}{DC}=\frac{AC}{CE}$

$\frac{4}{3}=\frac{BC}{4.8}=\frac{AC}{4.2}$

BC = 6.4 AC = 5.6

76. If two circles are such that one is not contained in the other and are non-intersecting, then number of common tangents are :
(A) One (B) Two (C) Three (D) Four

Ans. **D**

77. $\frac{1}{\sin^2\theta}-\cot^2\theta$ is equal to :
(A) 1 (8) -1 (C) 2 (D) -2

Ans. **A**

Sol. $\frac{1}{\sin^2\theta}-\frac{\cos^2\theta}{\sin^2\theta}=\frac{1-\cos^2\theta}{\sin^2\theta}=\frac{\sin^2\theta}{\sin^2\theta}=1$

78. On the level ground, the angle of elevation of the top of a tower is 30°. On moving 20 metres nearer to it the angle of elevation becomes 60°. The height of the tower is :
(A) 10m (B) 15m (C) 20m (D) m

Ans. **D**

Sol. $\tan 30=\frac{h}{20+x}$

$\frac{1}{\sqrt{3}}=\frac{h}{20+x}$

$h=\frac{20+x}{\sqrt{3}}$

$\tan 60=\frac{h}{x}$

$h=\sqrt{3}x$

$\sqrt{3}x=\frac{20+x}{\sqrt{3}}$

$3x = 20 + x$ $x = 10$

$h=\sqrt{3}\times 10$

79. A sphere of diameter 12.6 cm is melted and cast into a right circular cone of height 25.2 cm. The diameter of the base of the cone is :
(A) 158.76 cm (B) 79.38 cm (C) 39.69 cm (D) 69.39 cm

Ans. No Option is correct

Sol. $V_1 = V_2$

$$\frac{4}{3}\pi(6.3)^3 = \frac{1}{3}\pi(r^2)\times 25.2$$

$$r^2 = \frac{4\times 6.3\times(6.3)^2}{25.2}$$

r = 6.3 **2r = 12.6**

80. If the mean of x and is M, then the mean of x^2 and is :
(A) M^2 (B) $\frac{M^2}{4}$ (C) $2M^2 - 1$ (D) $2M^2 + 1$

Ans. C

Sol. $\frac{x+\frac{1}{x}}{2} = M$ $\frac{x^2+\frac{1}{x^2}}{2} = ?$

$x + \frac{1}{x} = 2M$ $x^2 + \frac{1}{x^2} + 2 = 4M^2$

$x^2 + \frac{1}{x^2} = 4M^2 - 2$ Mean = $\frac{x^2+\frac{1}{x^2}}{2} = \frac{4M^2-2}{2} = 2M^2 - 1$

81. Positional mean is :
(A) Arithmetic mean (B) Geometric mean (C) Median (D) Harmonic mean

Ans. C

82. Number of zero's in the product of 5 x 10 x 25 x 40 x 50 x 55 x 65 x 125 x 80
(A) 8 (B) 9 (C) 12 (D) 13

Ans. B

83. If in $\sqrt{3}+\sqrt[3]{5}$, $x = \sqrt{3}$ and $y = \sqrt[3]{5}$, then its rationalising factor is :
(A) x + y (B) x - y
(C) $x^5 + x^4y + x^3y^2 + x^2y^3 + xy^4 + y^5$ (D) $x^5 - x^4y + x^3y^2 - x^2y^3 + xy^4 - y^5$

Ans. D

84. If one root of $x^2 - 4x + k = 0$ is 6, then the value of k is :
(A) -12 (B) 2 (C) -2 (D) 12

Ans. D

85. A farmer divides his herd of x cows among his 4 sons so, that first son. gets-one-half of the herd, the second son gets one-fourth, the third son gets one-fifth, and the fourth son gets 7 cows, then the value of x is :
(A) 100 (B) 140 (C) 160 (D) 180

Ans. B

Sol. $A = \frac{x}{2}$ $B = \frac{x}{4}$ $C = \frac{x}{5}$ $D = 7$

$$\frac{x}{2} + \frac{x}{4} + \frac{x}{5} + 7 = x$$

$$\frac{10x + 5x + 4x}{20} = x - 7$$

19x = 20x – 140 140 = x

86. If $\sin\theta+\cos\theta=1$, then $\sin\theta\cos\theta$ is equal to :

(A) 0 (B) $\frac{1}{\sqrt{3}-1}$ (C) 1 (D) $\frac{1+\sqrt{2}}{1+\sqrt{3}}$

Ans. A

Sol. $\sin\theta+\cos\theta=1$

$\sin^2\theta+\cos^2\theta+2\sin\theta\cos\theta=1$

$\sin\theta\cos\theta=0$

87. If A merchant purchases 9 pens and sells 8 pens at the cost price of 9 pens, then his profit percent is :

(A) $5\frac{15}{17}$ (B) $8\frac{2}{3}$ (C) $12\frac{1}{2}$ (D) $11\frac{1}{9}$

Ans. C

Sol. Let CP of 1 pen = x

CP of 9 pen = 9x CP of 8 pen = 8x

SP of 8 pens = 9x

% profit = $\frac{9x-8x}{8x}\times100$

$\frac{100}{8}=12\frac{1}{2}$

88. Marked price of a Saree is Rs. 600 and is available on Rs. 450. Rate of discount is :

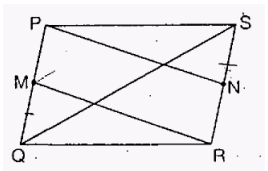
(A) 25% (B) 30% (C) 15% (D) 40%

Ans. A

Sol. MP = 600 SP = 450

Disc. = $\frac{150}{600}\times100=25\%$

89. PQRS is a parallelogram and M, N are the mid-points of PQ and RS respectively. Which of the following is not true ?



(A) RM trisects QS (B) PN trisects QS

(C) PSN QMR (D) MS is not parallel to QN

Ans. C

90. The ratio of the areas of two similar triangles is equal to :

(A) The ratio of corresponding medians (B) The ratio of corresponding sides

(C) The ratio of the squares of corresponding sides (D) None of these

Ans. C

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