STATE TALENT SEARCH EXAMINATION-2019-20, RAJASTHAN
SCHOLASTIC APTITUTE TEST (SAT) PAPER

1. Unit of force is

(1) newton   (2) dyne

(3) kilogram-mitre/ second 2   (4) all of these

Sol.   (1)

2. if work, force and time are represented by x, y and z respectively, then the term $(\dfrac{x}{yz^2})$ will

represent

(1) displacement   (2) velocity

(3) acceleration   (4) momentum.

Sol.   (3). $\dfrac{x}{yz^2} = \dfrac{w}{Ft^2} = \dfrac{s}{t^2}$ acceleration

3. An objective of mass 100gm is moving with an acceleration of 10 m/s^2.

force acting on the object will be

(1) 1000 N   (2) 100 N

(3) 1 N   (4) 0.1 N

Sol.   (3)   F = ma

F = (.1 kg) x 10 = 1N

4 Value of universal gravitational constant (G) is

(1) 9.8 m/s^2 (2) 6.67 x 10^{11} N-m^2/kg^2

(3) 6.67 x 10^{-11} N-m^2/kg   (4) 6.67 x 10-11 N-m^2/kg^2

Sol.   (4)

5. Weight of a body of mass 10 kg will be

(1) 9.8 N   (2) 10 N   (3)98 N   (4) 980 N.

Sol.   (3)   w = mg = 10 x 9.8 = 93N

6 A body is thrown vertically upward with velocity 9.8 m/s . time taken by the body to reach at maximum height is

(1) 1 s   (2) 9.8 s   (3) 19.6 s   (4) 28 s.

Sol.   (1)   v = u + at

0 = -9.8 + 9.8 + { at maximum height}

t = 1 sec.

7   The rate of change of momentum of a body is equal to

(1) force applied on the body   (2) pressure on the body

(3) work done by the body   (4) acceleration in the body

Sol.   (1)

8   The wave having compression and rarefaction is known as

(1) transverse were   (2) longitudinal wave

(3) light wave   (4) ultraviolet rays.

Sol.   (2)

9   A particle of mass 10 gm is moving with velocity 5 m/s, collides with a stationary of equal mass particle with an elastic collision. After collision velocity of the first particle will be

(1) 10 m/s   (2) 5 m/s   (3) 0 (zero)   (4) -5 m/s.

Sol.   (3)   By conservation of momentum

$mu = mv_1 + mv_2$

$U = v_1 + v_2$ -------1

Velocity of approach = Velocity of Seperation

$u - o = v_2 - v_1$ -------2

by solving it $v_1 = 0$

10   The frequency of a sound source is 100 Hz. In four second number of vibrations will be

(1) 800   (2) 400   (3) 100   (4) 25

Sol.   (2)

11   The relation between velocity (v) , frequency (n') and wavelength (λ) of a wave is

(1) $n = v\lambda$ (2) $\lambda = vn$ (3) $v = n\lambda$ (4) $n = \dfrac{1}{v\lambda}$
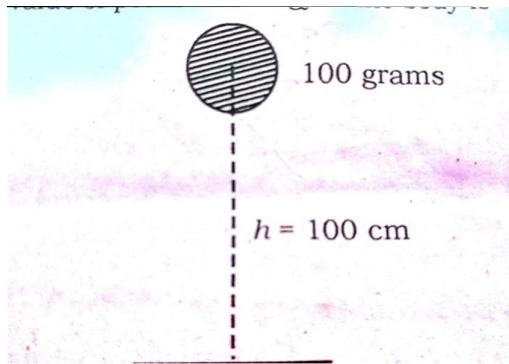
Sol.   (3)

12   Normally at $0°C$ temperature the speed of sound in air is

(1). 330 m/s   (2) 9.8 m/s

(3) 6420 m/s   (4) $3x 10^8$ m/s

Sol.   (1)

13   In dioptre, power of lens in the given ray diagram will be

(1) 25

(2) $\dfrac{1}{25}$

(3) 5 cm

(4) $\dfrac{1}{4}$

Sol.   (3) $P = \dfrac{100}{f\,(cm)} = \dfrac{100}{25} = +4D$

14   Radius of curvature of a concave mirror of focal length 10 cm whose aperture is small, is

(1) 20 cm   (2) 10 cm

(3) 5 cm   (4) 1 cm

Sol.   (1) R = 2f = 2 x 10 = 20 cm

15   Mirror formula is

(1) $f = u + v$ (2) $f = \dfrac{1}{u} + \dfrac{1}{v}$ (3) $f = \dfrac{u+v}{uv}$ (4) $\dfrac{1}{f} = \dfrac{1}{u} + \dfrac{1}{v}$

Sol.   (4)

16   Unit of specific resistance (resistivity) of the conducting material is

(1) ohm   (2) ohm x metre

(3) ohm / metre   (4) ohm x metre^2

Sol.   (2)

17   When an electric bulb is connected to a source of 220 V then current flowing through it is   0.5 A. Power of the bulb is

(1) 110 watt   (2) 220 watt   (3) 440 watt   (4) 880 watt.

Sol.   (1) V = VI = 220 x 0.5 = 110 W

18   Equivalent resistance between points A and B in the following circuit is

(1) 1 Ω   (2) 2 Ω   (3) 3 Ω   (4) 4 Ω

Sol.   (1)

19   Heat generated when current flows through a resistance wire will be

(1) $H \propto I, H \propto R, H \propto t$

(2) $H \propto I, H \propto R^2, H \propto t$

(3) $H \propto I^2, H \propto R, H \propto t$

(4) $H \propto I^2, H \propto R^2, H \propto t$

Sol.   (3) $I = \dfrac{q}{t} = \dfrac{120C}{2 x 60 \sec} = 1A$

20   If 120 coulomb charge flows through an electric circuit in 2 minutes then current in circuit will be

(1) $\dfrac{1}{60} A$ (2) 1 A   (3) 2 A   (4) 60 A

Sol.   (2)

21   Value of 1 kilowatt – hour (1 kWh) in joule is

(1) $36 \times 10^7 \, joule$ (2) $36 \times 10^5 \, joule$ (3) $6.67 \times 10^{11} \, joule$ (4) $3 \times 10^8 \, joule$

Sol.   (2)

22   When the angle between force and displacement is 0 then formula of work is

(1) $W = fs \sin \theta$ (2) $W = \dfrac{fs}{\sin \theta}$ (3) $W = fs \cos \theta$ (4) $W = \dfrac{fs}{\cos \theta}$

Sol.   (3)

23   In the diagram value of potential energy of the body is

(1) 0.98 joule   (2) 9.8 joule

(3) 980 joule   (4) 98000 joule

100 grams

$h = 100$ cm

Sol.   (1) P.E. = mgh

= 0.1 x 9.8 x 1

= 0.98 Joule

24   Spring constant of a spring is K = 6 x 10^3 N/m. Work done to stretch it by 10^{-2} m from mean position is

(1) 30 joule   (2) 3 joule

(3) 0.3 joule   (4) 0.03 joule

Sol.   (3)

$$W = \frac{1}{2}kx^2$$

$$W = \frac{1}{2} \times 6 \times 10^3 \times (10^{-2})^2$$

$$= 3 \times 10^3 \times 10^{-4}$$

25   Value of one horsepower is

(1) 3600 watt   (2) 1000 watt

(3) 746 watt   (4) .220 watt

Sol.   (3)

26   The name of fifth state of matter is

(1) Plasma   (2) Boson

(3) Fermion   (4) Bose – Einstein condensate.

Sol.   (4)

27   The first artificial satellite launched by India is

(1) Appollo   (2) Bhaskara

(3) Aryabhatta   (4) Rohini

Sol.   (3)

28   Monatomic molecule among the following is

(1) Oxygen   (2) Nitrogen

(3) Argon   (4) Hydrogen

Sol.   (3) Argon is noble gas, exists in atomic form.

29.   Physical change among the following is:

(1) $C(s) + O_2(g) \rightarrow CO_2(g)$ (2) $CaCO_3(s) \rightarrow CaO(s) + CO_2(g)$

(3) $H_2(g) + I_2(g) \rightarrow 2HI(g)$ (4) $H_2O(s) \rightarrow H_2O(l)$

Sol.   (4)

Conversion of state is physical charnge

30.   The process of formation of solid crystal from a saturated solution is called:

(1) distillation   (2) sublimation

(3) crystallisation   (4) filtration

Sol.   (3)

31.   Maximum number of electrons present in M-shell of an atom is :

(1) 8   (2) 18

(3) 32   (4) 50

Sol.   (2)

No. of Maximum e^- $= 2n^2$

$$= 2(3)^2 = 18$$

32.   Which of the following pairs is not an example of isotopes ?

(1) $^{40}_{18}Ar$ and $^{40}_{20}Ca$ (2) $^{35}_{17}Cl$ and $^{37}_{17}Cl$

(3) $^{12}_{6}C$ and $^{14}_{6}C$ (4) $^{16}_{8}O$ and $^{18}_{8}O$

Sol.   (1)

Isotopes are atoms of same element having different mass number.

33.   Number of molecules present in 0.36 g of water is

(1) 12.044 X 10^{20} (2) 12.044 X 10^{21}

(3) 12.044 X 10^{23} (4) 12.044 X 10^{25}

Sol.   (2)

No. of moles of water =   Given mass/ molar mass

$$= \frac{0.36}{18} = 0.02$$

No of molecules=   No. of moles x NA

= $0.02 \times 6.022 \times 10^{23}$

= 12.044×10^{21} molecules

34.   The numbers of protons and neutrons in $^{235}_{92}U$ are respectively

(1) 92, 235   (2) 92, 143

(3) 143, 90   (4) 235 , 92

Sol.   (2)

No. of neutrons =   A – Z = 235-92 = 143

No. of protons   =   Z   =   d2

35.   The element exhibiting variable valency is :

(1) Mg   (2) K

(3) Ca   (4) Cu

Sol.   (4)

Cu shows valencies Cu^+ & Cu^{2+}

36.   The molecular formula of aluminium sulphate among the following is:

(1) $AlSO_4$ (2) Al_2SO_4

(3) $AL_2(SO_4)_3$ (4) $Al (SO_4)_3$

Sol.   (3)

Al3+ $SO_4 2^-$

          3   2   ⟶ $Al_2(SO_4)_3$
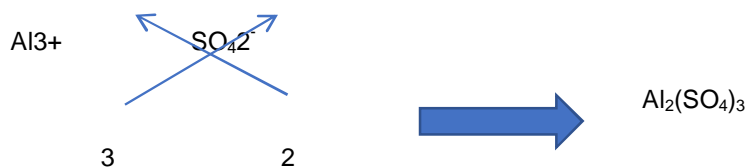
37.   Molecule having triple bond among the following is:

(1) Cl_2 (2) O_2

(3) N_2 (4) O_3

Sol. (3)

N=N

38. The chemical formula of bleaching powder is

(1) CaOCl   (2) CaOCl$_2$

(3) CaO   (4) CaCl$_2$

Sol. (2)

39. Lewis acid among the following is :

(1) H$_2$O   (2) NH$_3$

(3) OH   (4) AlCL$_3$

Sol. (4)

Lewis acid is electron acceptor. AlCl3 is electron deficient molecule.

40. The 'King of Acids' among the following is

(1) HCl   (2) HNO$_3$

(3) H$_2$SO$_4$ (4) CH$_3$COOH

Sol. (3)

41. Example of homogeneous catalysis among the following is ;

(1) N$_2$ (g) + 3H$_2$ (g) ------------------ 2NH$_3$ (g)

(2) Vegetable oil (l) + H$_2$ (g) ------------------ Vegetable ghee (l)

(3) 2SO$_2$ (g) + O$_2$ (g) ------------------ 2SO$_3$ (g)

(4) CH$_2$ = CH$_2$ (g) +H$_2$ (g) ------------------ CH$_3$ - CH$_3$(g)

Sol. (3)   When catalyst & reactants are present in same physical state, it is called homogeneous catalyst .

42. The name of product [X] in the following reaction is :

2CHCl$_3$ + O$_2$ ----------------- 2 [X] + 2HCl

(1) Carbon monoxide   (2) Carbon dioxide

(3) Phosgene   (4) Phosphine

Sol. (3) $2\ CHCl_3 + O_2 \xrightarrow{\text{sunlight}} 2\ COCl_2 + 2HCL$
(Chloroform) (Oxygen)   (Phosgene) (Hydrochloric acid)

43. The pH of the solution obtained by talking equal mole of reactants in the following reaction will be :

   $HCl + NaOH$ ----------------- $NaCl + 2H_2O$
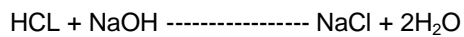
   (1) 7.0   (2) Above 7.0

   (3) Below 2.0   (4) Zero.

Sol. (1)

   NaC l is salt of strong acid & strong base

      pH of salt solution is 7

44. Transuranic element among the following is :

   (1) Ac   (2) Pb

   (3) Np   (4) La

Sol. (3)

         Np is having atomic number is 93

         Comes after uranium (z = 92)

45. Element having largest atomic radius among the following is :

   (1) Li   (2) Na

   (3) Rb   (4) Cs

Sol. (4)

   Atomic radius increases down the group

46. The groups related to d-block elements is the modern periodic table :

   (1) group 3-12   (2) group 13-18

   (3) group 1-2   (4) group 13-17

Sol. (1)

47. Non-crystalline allotrope of carbon is :

   (1) Diamond   (2) Graphite

   (3) Fullerene   (4) Gas carbon

Sol. (4)

48. IUPAC name of neopentane is :

   (1) 2,3-dimethylpropane   (2) 2,2-dimethylpropane

   (3) 2-methylbutane   (4) 2-ethylpropane

Sol.   (2)
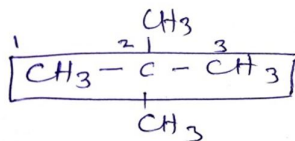
2,2- Dimethylpropane

49.   Natural polymers among the following is :

(1) Nylon-6, 6   (2) Terylene

(3) Polythene   (4) Starch

Sol.   (4)

50.   The ratio of numbers of hydrogen atoms in benzene and cyclohexane is :

(1) 1:1   (2) 1:2

(3) 2:1   (4) 2:3

Sol.   (2)

Benzene is C_6H_6

    Cyclohexane is C_6H_{12}

    No of H atoms in Benzene   :   No of H atoms in cyclohexane

        6   :   12

        1   :   2

51.   The water absorbed by roots of the planet is :

(1) Hygroscopic water   (2) Capillary water

(3) Gravitational water   (4) All of these

Sol.   (2)

52.   The disease caused by infectious bacteria present in sewage is

(1) Malaria   (2) Hydrophobia

(3) Ascariasis   (4) Jaundice

Sol.   (4)

53. The writer of well known test "Ras Ratnakar" of Ayurveda is

    (1) Charak   (2) Sushruta

    (3) Nagarjuna   (4) Maharshi Patanjali

Sol.   (3)

54. Three nucleated structure is formed by fertilization in embryo sac of floering plant from

    (1) Antipodal   (2) Egg

    (3) Synergid   (4) Polar nuclei.

Sol.   (4)

55. Sunderban National Park is situated in

    (1) Thallophyta   (2) Bryophyta

    (3) Pteridophyta   (4) Gymnosperm.

Sol.   (3)

56. Sunderban National Park is situated in

    (1) Rajasthan   (2) West Bengal

    (3) Assam   (4) Gujarat.

Sol.   (2)

57. Medicine is obtained from which part of *Aloe Vera* plant ?

    (1) Root   (2) Stem

    (3) Bark   (4) Leaf

Sol.   (4)

58. The most abundant element found on earth is

    (1) Silicon   (2) Gold

    (3) Iron   (4) Oxygen

Sol.   (4)

59. The total number of biodiversity hotspots in the world is

    (1) 34   (2) 20

    (3) 25   (4) 33.

Sol.   (1)

60. The correct pair of plants having AIDS resistant properties is

(1) Tulsi, Giloya   (2) Giloya , Mint

(3) Shatavari , Turmeric   (4) Opium , Arjun.

Sol. (1)

61. Example of unicellular organism is

(1) Salamander   (2) Chlamydomonas

(3) Ascaris   (4) Hydra.

Sol. (2)

62. In Human, the normal resting diastolic pressure is

(1) 120 mm/hg   (2) 100 mm/Hg

(3) 90 mm /Hg   (4) 80 mm/Hg

Sol. (4)

63. Deficiency of which vitamin may lead to excessive bleeding in case of injury?

(1) Vitamin K   (2) Vitamin A

(3) Vitamin C   (4) Vitamin D

Sol. (1)

64. Open circulatory system is a characteristic feature of which phylum?

(1) arthropoda   (2) amphibia

(3) Reptilia   (4) Aves.

Sol. (1)

65. The main wild animal in Kailadevi Sanctuary is

(1) Gharial   (2) Jungle fowl

(3) Bear   (4) Black Deer

Sol. (3)

66. The point of joining of the dendrite of one neuron with the axon of other is called

(1) Dendron   (2) Axon

(3) Cell Body   (4) Synapse

Sol. (4)

67. Genotypic ratio in F_2 generation of monohybrid cross is

    (1) 1:3   (2) 1:2:1

    (3) 3:1   (4) 2 :1:1

Sol.   (3)

68. The disease caused by deficiency of insulin in blood is

    (1) Goitre   (2) Diabetes

    (3) Tetany   (4) Rickets.

Sol.   (2)

69.   Mineral essential for strengthening bones and teeth is

    (1) Sodium   (2) Iron

    (3) Potassium   (4) Calcium.

Sol.   (4)

70.   The excretory waste of reptiles is

    (1) Uric acid   (2) Urea   (3) Hydrochloric acid   (4) Ammonia

Sol.   (1)

71.   What will be the cube root of perfect cube number 105823817?

    (1) 463   (2) 473   (3) 483   (4) 493

Sol.   (2) 473

72.   If α and β are the zeroes of quadratic polynomial $x^2 + px + q$ then what will be the value of $\alpha - \beta$?

    (1) $\sqrt{q^2 - 4P}$ (2) p - q   (3) q - p   (4) $\sqrt{p^2 - 4q}$

Sol 72   (4) $\sqrt{p^2 - 4q}$

$$(\alpha + \beta)^2 = \alpha^2 + \beta^2 + 2\alpha\beta$$

$$\alpha^2 + \beta^2 = p^2 - 2q$$

$$\alpha - \beta = \sqrt{p^2 - 4q}$$

73. If a polynomial $f(x) = x^3 - 6x^2 + 10x + b$, where b is constant, is divided by x+2 then remainder   is -55. What will be the value of b?

(1) 10   (2) -10   (3) -3   (4) 3

Sol 73   (3) -3 $f(x) = x^3 - 6x^2 + 10x + b$

given, f(-2) = -55   (Remainder theorem)

(-8) – 6(4)-20 +b = -55

-52 + b = -55

b = -3

74. If $\sqrt{1 + \dfrac{22}{144}} = (1 + \dfrac{x}{12})$, then what will be the value of x?

(1) 1   (2) 5   (3) 13   (4) $\dfrac{1}{5}$

Sol 74 (1) $\sqrt{\dfrac{169}{144}} = 1 + \dfrac{x}{12} = \dfrac{13}{12} - 1 = \dfrac{x}{12}$

$= \dfrac{1}{12} = \dfrac{x}{12}$

= x =1

75. If n is an even natural number then the product n (n + 1) (n + 2) will be divisible by

(1) 24   (2) 15   (3) 7   (4) 0

Sol 75. (1)   for   n(n+1) (n+2)

put n = 2

76. In the given figure, if AC = AE, AB is parallel to CD, $\angle BAC = 84°$, $\angle ADC = 40°$, the value of
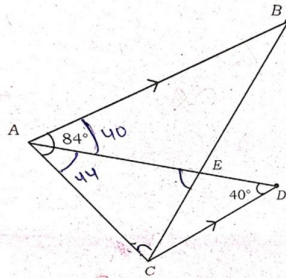
$\angle AEC$ is equal to

(1) 42°   (2) 40°   (3) 68°   (4) 58°

Sol 76.   (3)68°

77. In the given figure, two circles are shown with diameters AB and AC, where the AB = 7 cm and BC = 2.8 cm. Which one out of the given options represents the area of shaded region?

(1) $\pi(4.9-3.5)^2$ (2) $\pi(4.9^2-3.5^2)$ (3) $\pi(7^2-2.8^2)$ (4) $\pi(9.8^2-7^2)$
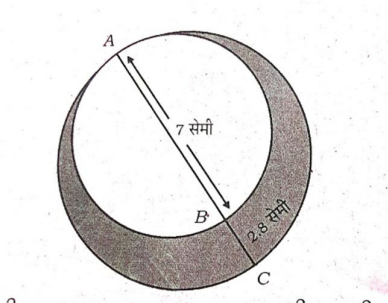
Sol 77. (2) $\pi[(4.9)^2-(3.5)^2]$

$$\frac{AC}{2}=\frac{9.8}{2}=4.9$$

Area of Bigger Circle = $\pi(4.9)^2$

$$\frac{AB}{2}=\frac{7}{2}=3.5$$

Area of smaller Circle = $\pi(3.5)^2$

Area of should region = $\pi(4.9^2-3.5^2)$

78. If equations 2x + 3y = 13 and 4x-ky = 4 are representing two parallel lines then what will be the value of k?

(1) 8   (2) -8   (3) 6   (4) -6

Sol. 78   (4) -6   2x + 3y = 13

4x – ky = 4

for 11el lines,

$$\frac{2}{4}=\frac{3}{-k}\neq\frac{13}{4}$$

k = -6

79. In the given diagram, what will be the sum of $\angle A + \angle B + \angle C + \angle D + \angle E$?
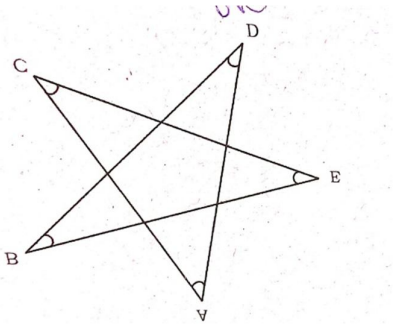
(1) $150°$ (2) $180°$ (3) $270°$ (4) $360°$

Sol 79   (2) $180°$

80. If $\sec\theta + \tan\theta = p$, then the value of $\sec\theta$ is

(1) $\dfrac{2P}{p^2+1}$ (2) $\dfrac{1}{p}$ (3) $\dfrac{p^2+1}{2p}$ (4) $\dfrac{p}{2}$

Sol 80   (3) $\sec\theta = \dfrac{p^2+1}{2P}$ $\sec\theta + \tan\theta = P$

then $\sec2\theta - \tan2\theta = 1$

$$\sec\theta - \tan\theta \ = \ \frac{1}{\sec\theta + \tan\theta} = \frac{1}{p}$$

$$\sec\theta + \tan\theta = p$$

$$\underline{\sec\theta - \tan\theta = p} \qquad\qquad \sec\theta = \frac{p^2+1}{2p}$$

$$\sec\theta \ = \ p = \frac{1}{p}$$

81. In a group of cows and buffaloes, the number of cows are double than the number of buffaloes. 10 more cows and 10 more buffaloes came and mixed with the group. How does this affect the probability of selecting a cow at random from the group newly formed?

(1) Probability will increase   (2) Probability will not change

(3) Probability will decrease   (4) None of these

Sol. 81 (3)   No. of Buffaloes = x = Let 10

No. of cows = 2x = 20

$$P\ (C) = \frac{2x}{3x} = \frac{2}{3} = \frac{20}{30} = 0.667$$

then No. of cows = 2x + 10 = 20 + 10

No. of buffalous = x + 10

$$= \frac{2x+10}{3x+20} = \frac{30}{50} = \frac{3}{5} = 0.6$$

$$= \frac{15 \times 20}{25} = 12\ cm$$

82.   In the given figure, ΔPOQ is a right angled triangle in which $\angle POQ = 90°$, OR is perpendicular to PQ. If OP= 20 cm, OQ = 15 cm, then the length of OR will he
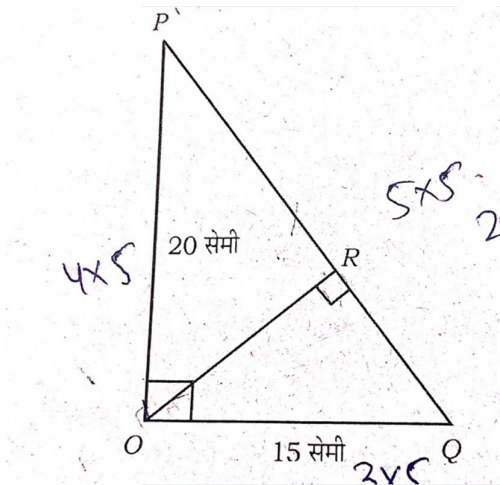
(1) 12 cm   (2) 12.5 cm   (3) 15 cm   (4) 10 cm

Sol   (1) 12 cm

83.   If the length of a rectangle is increased by 50%, by what percentage would the width have to be decreased so that the area of rectangle does not change?

(1) 37.5%   (2) 60%   (3) 50%   (4) $33\frac{1}{3}\%$

Sol. 83 (4) $33\frac{1}{3}\%$

I   A = l x b

II   Newl = 1.5l x b

Ib = 1.5l x b$_1$

$b_1 = \dfrac{b}{1.5}$

$\dfrac{b - \dfrac{b}{1.5}}{b} \times 1w$

$= \dfrac{1.5b - b}{15 \times b} \times 100 \quad \dfrac{15b}{15b} = \dfrac{1}{3} \times 100 = 33\dfrac{1}{3}\%$

84.   If the lengths of diagonals of a rhombus are 18 cm and 24 cm, then the perimeter of rhombus is
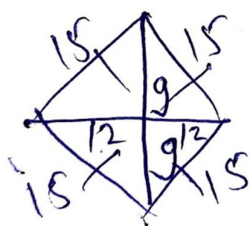
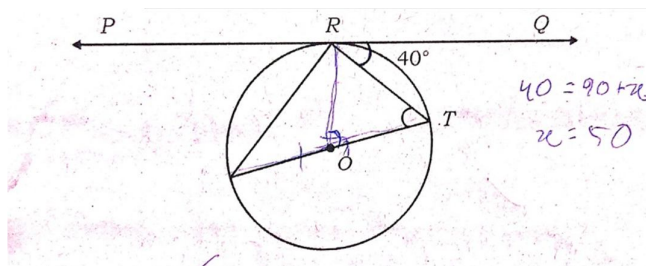(1) 45 cm   (2) 42 cm   (3) 60 cm   (4) 70 cm

Sol 84   (3)   p = 15 x 4 = 60 cm

85.   In the given figure, PQ is a tangent of a circle whose Centre is O which touches the circle at point R. If $\angle TRQ = 40°$, then the measure of $\angle RTO$ will be of
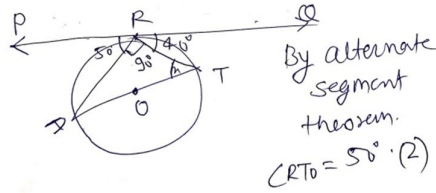

(1) 40°   (2) 50°   (3) 30°   (4) 60°

Sol 85.   (C) By alternate segment therem (RTo = $50°$)

86.   If $\sin^2 \theta + \sin \theta = 1$, then what will be the value of $\cos^8 \theta + 2\cos^6 \theta + \cos^4 \theta$?

        (1) 0   (2) -1   (3) 1   (4) 2

Sol 86.   (3) $Sin\theta = 1 - \sin^2 \theta = \cos\theta$

               $\cos\theta + 2\cos^6 \theta + \cos^4 \theta$

               $(\cos^4 \theta + \cos^2 \theta)^2$

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

87.   Which term of the A.P. 20, $19\dfrac{2}{5}$, $18\dfrac{4}{5}$, $18\dfrac{1}{5}$,............will be the first negative term?

        (1) 35   (2) 34   (3) 36   (4) 37

Sol. 87   (1) a = 20, d = $19\dfrac{2}{5} - 20 = \dfrac{97}{5} - 20 = \dfrac{97-100}{5} = -\dfrac{3}{5}$

               an = 0

               a + (n-1) d = 0

               20 + (n-1) x $-\dfrac{3}{5}$ =0

               20 = (n-1) $\times \dfrac{3}{5}$

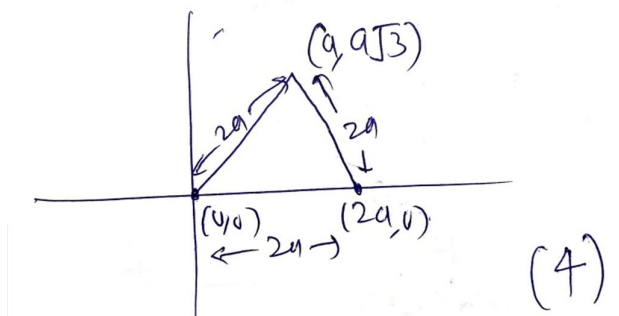 $\dfrac{100}{3} = n - 1$

               $n = 33.33 + 1$

               n = 34.33   n = 35

88. If an equilateral triangle whose two of the vertices are (0, 0) and (2a, 0) then what will be coordinates of its third vertex which is in first quadrant?

(1) $(a\sqrt{2}, a\sqrt{2})$ (2) $(a, 2a)$ (3) (a, a) (4) $(a, a\sqrt{3})$

Sol 88   (4)

89. If the radius of a circular wheel is $\dfrac{7}{4}$ meter, then the number of revolutions after travelling 11 km distance will be (If $\pi = \dfrac{22}{7}$)

(1) 1000   (2) 1100   (3) 1200   (4) 1300

Sol 89   (1) $r = \dfrac{7}{4} m$,   D=11 km = 11000 m

n = $2\pi r = D$

n x 2 x $\dfrac{22}{7} \times \dfrac{7}{4} = 1000$

n = 1000

90. If $x + y = 90°$, then the value of $\cos^2 x + \cos^2 y - 5$ will be

(1) 0   (2) -1   (3) -4   (4) -5

Sol 90   (3) $\cos\theta + \cos^2(90-x) - 5$

$\cos^2 n + \sin^2 n - 5$

1 -5 = -4