NATIONAL TALENT SEARCH EXAMINATION (NTSE-2018) STAGE -1
STATE : UTTARAKHAND PAPER : SAT

Date: 05/11/2017

Max. Marks: 100 **SOLUTIONS** **Time allowed: 90 mins**

1. In which state the step (terrace) cultivation is in practice :

(A) Punjab (B) Haryana (C) Uttar Pradesh (D) Uttarakhand

Ans. (D)

Sol. Terrace cultivation is practiced in Uttarakhand

2. According to the National Forest Policy (1952), area covering forest should have been :

(A) 33% (B) 50% (C) 31% (D) 23%

Ans. (A)

Sol. According to National Forest Policy 1952, 33 % area should be covered under forest in India

3. Match columns A and B and choose correct option :

A		**B**
(a) Rajaji National Park	(i)	Rajasthan
(b) Kajiranga National Park	(ii)	Gujarat
(c) Gir National Park	(iii)	Assam
(d) Ranthambor National Park	(iv)	Uttarakhand

(A) a (ii), b (iii), c (iv), d (i) (B) a (i), b (ii), c (iii), d (iv)

(C) a (iv), b (iii), c (ii), d (i) (D) a (iii), b (ii), c (i), d (iv)

Ans. (C)

Sol. Rajaji National Park is in Uttarakhand

Kajiranga National Park in Assam

Gir National Park in Gujarat

Ranthambhor National Park in Rajasthan

4. Who said Dams are "Temples of Modern India"?

(A) Vinoba Bhave (B) Medha Patkar (C) Jawahar Lal Nehru (D)Mahatma Gandhi

Ans. (C)

Sol. Jawaharlal Nehru termed Dams as "Temples of Modern India"

5. In which state the underground tank or 'tanka' are made for water harvesting ?

(A) Uttarakhand (B) Nagaland (C) Rajasthan (D) Goa

Ans. (C)

Sol. Underground tanks or tankas are made in Rajasthan for Rainwater Harvesting

6. Which one is not an example of Plantation Agriculture?

(A) Tea (B) Coffee (C) Rubber (D) Wheat

Ans. (D)

Sol. Wheat is not an example of Plantation Agriculture

7. Which crop is called the 'Golden fiber'?

(A) Jute (B) Cotton (C) Rubber (D) Tea

Ans. (A)

Sol. Jute is known as Golden Fiber

8. Golden Quadrilateral Project is related to :

(A) Rail (B) Road (C) Air (D) Water

Ans. (B)

Sol. Golden Quadrilateral is related with Road transport

9. Longitudinal extensuion of India is:

(A) 68°7'E - 97°25'E (B) 67°7'E - 98°25'E (C) 68°5'E - 96°25'E (D) 67°20'E - 95°7'E

Ans. (A)

Sol. Longitudinal extension of India is 68 Degree 7 Minutes to 97 Degree 25 Minutes East

10. The wind blowing in the northern plains in summer is called :

(A) Kaal Baishakhi (B) Loo (C) Trade Winds (D) None of these

Ans. (B)

Sol. Winds blowing in Northern plains in summer are known as Loo

11. Party of Young Annan was formed in :

(A) Vietnam (B) Thailand (C) Camboda (D) Laos

Ans. (A)

Sol. Party of Young Annan was found in Vietnam

12. 'Imperial Forest Research Institute' was established in :

(A) 1906, Dehradun (B) 1916, Shimala (C) 1908, Puna (D) 1902, Madras

Ans. (A)

Sol. Imperial Forest Research Institute was established in 1906 in Dehradun

13. The Folklore of Southern India was published by :

(A) K.A. Nilakanta (B) Natesha Shastri (C) Subramaniam Bharathi (D) Chidambaram Pillai

Ans. (B)

Sol. Folk lore of southern India was published by Pandit Natesha Shastri

14. Weimar Republic was established in :

(A) France (B) Germany (C) Russia (D) Austria

Ans. (B)

Sol. Weimar Republic was established in Germany

15. 'Collectivisation Programme' in Russia was initiated by :

(A) Lenin (B) Stalin (C) Czar (D) Kerensky

Ans. (B)

Sol. Stalin initiated collectivisation programme in Russia

16. Vellum was a :

(A) Copper plate (B) Inscription (C) Birch leaf (D) Parchment

Ans. (D)

Sol. Vellum is a parchment

17. 'Agent Orange' is a :

(A) Chemical (B) Fruit (C) Plan (D) Spy

Ans. (A)

Sol. Agent Orange is Chemical

18. Terminology 'Doosra' and 'Reverse Swing' is related to which sport :

(A) Hockey (B) Polo (C) Chess (D) Cricket

Ans. (D)

Sol. Doosra and Reverse Swing is related with Cricket

19. In which Movement of India foreign goods were boycotted ?

(A) Quit India Movement (B) Civil Disobedience Movement

(C) Non Cooperation Movement (D) Champaran Satyagrah

Ans. (C)

Sol. Foreign goods were boycotted during Non-Cooperation Movement

20. Armed volunteers under the Garibaldi was called :

(A) Black Shirt (B) Brown Shirt (C) Red Shirt (D) White Shirt

Ans. (C)

Sol. Armed volunteers under Garibaldi were called Red Shirts

21. Men's singles title of Australia was won by :

(A) Rafael Nadal (B) Roger Federar (C) Novak Djokovik (D) Andy Murray

Ans. (B)

Sol. Roger Federer won Men's Singles title in Australian Open

22. 2016 ICC Twenty -20 Cricket World Cup was won by :

(A) England (B) Was Indies (C) Australia (D) India

Ans. (B)

Sol. West Indies won the ICC T20 World Cup 2016

23. Leader of militant guerilla movement in the Gudem Hills of Andhra Pradesh was :

(A) Kalluri Chandrawmouli (B) T. Prakasharn

(C) E.V. Ramaswany Naicker (D) Alluri Sitaram Raju

Ans. (D)

Sol. Alluri Sitaram Raju led the militant guerilla movement in the Gudam hills of Andhra Pradesh

24. Right to Information Act. came into effect from :

(A) 2005 (B) 2006 (C) 2007 (D) 2004

Ans. (A)

Sol. Right to Information Act came in to existence in 2005

25. Which sector has largest contribution in Gross Domestic product :

(A) Agriculture sector (B) Manufacturing sector (C) Construction sector (D) Service sector

Ans. (D)

Sol. Service Sector has the largest contribution in Gross Domestic Product

26. Which organisation is related to World Trade Organisation?

(A) NATO (B) WTO (C) WHO (D) SAARC

Ans. (B)

Sol. World Trade Orgnisation is also known as WTO

27. Human Development Index repro published at world level by :

(A) UNO (B) UNDP (C) WHO (D) WTO

Ans. (B)

Sol. Human Development Index Report is published by UNDP at World Level

28. Match column I with column II and choose correct option :

I	II
(a) Tata Motors	(i) Paint
(b) Infosys	(ii) Medicine
(c) Ranbaxy	(iii) I.T.
(d) Asian Paint	(iv) Motor Vehicles

(A) a (iv), b (ii), c (i), d (iii) (B) a (iv), b (iii), c (ii), d (i) (C) a (i), b (ii), c (iii), d (iv) (D) a (iii), b (ii), c (iv), d (i)

Ans. (B)

Sol. (a) Tata Motors - (iv) Motor Vehicles,

(b) Infosys - (iii) I.T.

(c) Ranbaxy - (ii) Medicine

(d) Asian Paint - (i) Paint

29. Which of the following logo is not authentic?

(A) I.S.I (B) Agmark (C) Hallmark (D) Regmark

Ans. (D)

Sol. Regmark is not an authentic logo.

30. Poverty line in India is estimated by :

(A) C.S.O. (B) Finance Ministry (C) NSSO (D) NITI Aayong

Ans. (C)

Sol. Poverty Line in India is estimated by NSSO.

31. Form of Human Resurce is :

(A) Machine (B) Money (C) Raw Material (D) Teacher

Ans. (D)

Sol. A Teacher is the example of Human Resource.

32. What kinds of unempolyment is found in the rural areas :

(A) Educated unempolyment (B) Seasonal and Disguised unemployment

(C) Both (A) and (B) (D) None of the above

Ans. (B)

Sol. Seasonal & Disguised unemployment is mainly found in rural areas.

33. When power is taken away from the central and state government and given to local goverment, it is called :

(A) Federalism (B) Decentralisation

(C) Unitary from of government (D) Centralisation

Ans. (B)

Sol. When some powers are taken away from central and state government and given to local government, is called Decentralization.

34. Rural local government is popularly known as :

(A) Panchayati Raj (B) Muncipality (C) Municipal Corporation (D) Mayor

Ans. (A)

Sol. Panchayat Raj is the popular name for Rural Local Government in India.

35. Which of the following is not a component of a political party :

(A) The leaders (B) The active members (C) The rulers (D) The followers

Ans. (C)

Sol. The rulers are the component of political parties.

36. Pressure Groups are :

(i) Organisation that attempt to influence government policies.

(ii) Do not aim to directly control or share political power.

(A) Only (i) is correct (B) Both (i) and (ii) are correct

(C) Only (ii) is correct (D) None of the statement is correct

Ans. (B)

Sol. Pressure groups are organisations attempt to influence government policies and do not aim to directly share or control political powers.

37. In some countries, only one political party is allow to control and run the government. This is called :

(A) Single party administrative system (B) Uni Cameral system

(C) Bi-Party system (D) Bi-Cameral system

Ans. (A)

Sol. In a Single Party System only a single party is allowed to contest the elections.

38. Lok Sabha Speaker can exercise his right to vote in the House :

(A) As per his will

(B) When house desires

(C) When his party directs

(D) When votes for and against becomes equal for any bill

Ans. (D)

Sol. When votes for and against becomes equal for any bill, Lok Sabha speaker exercises the right to vote and decision is taken

39. Which one is not a permenent member of United Nation Organisation (UNO) ?

(A) China (B) USA (C) England (D) India

Ans. (D)

Sol. India is not a permanent member of UNO

40. Match list I with list II :

	I	**II**
(i)	Union of India	(a) Prime Minister
(ii)	States	(b) Sarpanch
(iii)	Municipal Corporation	(c) Govemor
(iv)	Village Panchayat	(d) Mayor

	(i)	(ii)	(iii)	(iv)
(A)	d	a	b	c
(B)	b	c	d	a
(C)	a	c	d	b
(D)	c	d	a	b

Ans. (C)

Sol. Union of India - Prime Minister

States - Governor

Municipal Corporation - Mayor

Village Panchayat - Sarpanch

41. A person who is not a member of Parliament can be appointed as a Minister by the President for a maximum period of :

(A) One Year (B) 9 Month (C) 6 Month (D) 5 Years

Ans. (C)

Sol. A person who is not a member of Parliament can be appointed as a minister by the President for a maximum period of Six months

42. A movable pulley is used as

(A) Force multiplier (B) Speed multiplier

(C) Device to change the direction of effort (D) All the above

Ans. (D)

Sol. A movable pulley can be used as force multiplier, speed multiplier and can change the direction of effort.

43. A body of mass 0.1 kg has momentum 20 kg m/sec. Kinetic energy of the body will be

(A) 2×10^3 J (B) 5×10^3 J (C) 2.5×10^3 J (D) 5.2×10^3 J

Ans. (A)

Sol. K.E. $= \frac{p^2}{2m} = \frac{(20)^2}{2 \times 0.1} = 2000$ J

K.E. $= 2 \times 10^3$ J

44. The power of a lens is –2.5 D. It's focal length will be

(A) 100 cm (B) 40 cm (C) –40 cm (D) –50 cm

Ans. (C)

Sol. P = –2.5 D $\quad P = \frac{100}{f}$

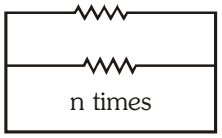
$f = \frac{100}{-2.5} \quad f = -40$ cm

45. 'n' equal resistance each of value 'R' connected in parallel, the equivalent resistance is

(A) $\frac{R}{n}$ (B) $n \times R$ (C) $\frac{n}{R}$ (D) $n + R$

Ans. (A)

Sol.



$\boxed{R_{eq} = \frac{R}{n}}$

46. The speed of light in air is 3×10^8 m/s. In medium 'X' its speed is 2×10^6 m/s and in medium 'Y' the speed of light is 2.5×10^8 m/s. Refractive index of 'Y' with respect to 'X' is

(A) $\frac{5}{4}$ (B) $\frac{4}{5}$ (C) $\frac{3}{2}$ (D) $\frac{4}{3}$

Ans. (B)

Sol. $n_{yx} = \frac{n_y}{n_x} = \frac{v_x}{v_y}$

$n_{yx} = \frac{2 \times 10^8}{2.5 \times 10^8} = \frac{20}{25}$

$n_{yx} = \frac{4}{5}$

47. A stone is dropped from the top of a tower 500 m high into a pond of water at the base of the tower. When is the splash heard at the top? Given, g = 10 ms^{-2} and speed of sound = 340 ms^{-1}.

(A) 10 s (B) 14.70 s (C) 11.47 s (D) None of these

Ans. (C)

Sol. $t_{total} = t_{sound} + f_{free\ fall}$

$$= \frac{500}{340} + \sqrt{\frac{2\times 500}{10}} = 1.47 + 10$$

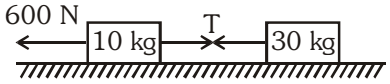
t_{total} = 11.47 sec.

48. Two bodies of masses 10 kg and 30 kg respectively kept on a smooth, horizontal surface are tied to the end of sofa with light string. A horizontal force F = 600 N is applied to A along the direction of string. What is the tension in the string?

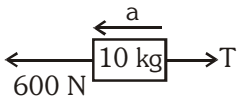
(A) 225 N (B) 450 N (C) 375 N (D) None of these

Ans. (B)

Sol.



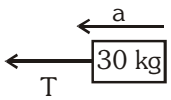
On 10 kg body



600 – T = 10a

T = 600 –10a .....(1)

On 30 kg body



T = 30a ....(2)

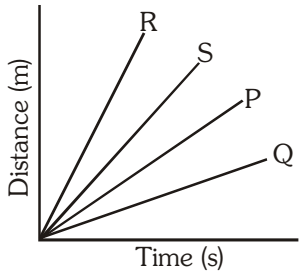
From equation (1) and (2)

600 – 10a = 30a

$a = \frac{600}{40}$ $a = 15\ m/s^2$

T = 30 ×15 T = 450 N

49. Four cars P, Q, R and S are moving on a levelled road. Their distance versus time graphs are shown in Figure.



Choose the correct statement.

(A) Car P is faster than car S (B) Car Q is the slowest

(C) Car S is faster than car R (D) Car R is the slowest

Ans. (B)

Sol. Slope of distance - time graph gives as speed.

Slope of Q is least so speed of car Q is least.

50. In a nuclear fusion reaction, the loss in mass is 0.3 %. Energy released in the fusion of 1 kg mass will be

(A) 2.7×10^{14} J (B) 2.7×10^{18} J (C) 3.6×10^{14} J (D) None of these

Ans. (A)

Sol. $E = mc^2 = (0.003)(3 \times 10^8)^2$

$$= \frac{3}{1000} \times 9 \times 10^{16} = 27 \times 10^{13}$$

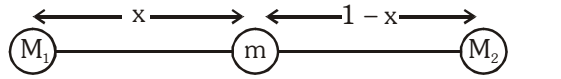
$E = 2.7 \times 10^{14}$ J

51. Two bodies of masses 100 kg and 10,000 kg are at a distance 1 m apart. At which point on the line joining them a third body experiences the net gravitational force zero

(A) 11 m (B) $\frac{1}{11}$ m (C) 10 m (D) $\frac{1}{10}$

Ans. (B)

Sol.



10 kg 10,000 kg

$F_1 = F_2$

$$\frac{G \times 10 \times m}{x^2} = \frac{G \times 1000 \times m}{(1-x)^2}$$

$$\frac{1}{x^2} = \frac{100}{(1-x)^2}$$

$1 - x = 10\,x$

$$x = \frac{1}{11}\ m$$

52. A hammer of mass 500 g moving at 50 m/s strikes a nail. The nail stops the hammer in a very short time of 0.01 s. The force of the nail on the hammer will be

(A) 2000 N (B) 250 N (C) –2500 N (D) 500 N

Ans. (C)

Sol. $F = \frac{\Delta P}{t} = \frac{0.5(0-50)}{0.01}$

$F = -2500$ N

53. If the potential difference between the ends of a fixed resistor is halved, the electric power will become

(A) Double (B) Half (C) Four time (D) One-fourth

Ans. (D)

Sol. $P_1 = \frac{V_1^2}{R}$ $V_2 = \frac{V_1}{2}$

$$P_2 = \frac{V_2^2}{R} = \frac{V_1^2}{4R}$$

$$P_2 = \frac{P_1}{4}$$

54. Due to encephalitis the organ of the body affected is

(A) Lungs (B) Heart (C) Brain (D) Eye

Ans. (C)

Sol. Encephalitis is inflammation of the brain.

55. Main gases in bio gas are :

(A) Methane, Carbon di oxide (B) Methane, Carbon mono oxide

(C) Ethane, Carbon mono oxide (D) Ethane, Carbon di oxide

Ans. (A)

Sol. Main gases in biogas are methane and carbon dioxide.

56. Which of the following is complex permanent tissue ?

(A) Parenchyma (B) Sclerenchyma (C) Phloem (D) Collenchyma

Ans. (C)

Sol. Phloem is a complex permanent tissue made up of different types of cells.

57. Action of bile juice upon fat is known as

(A) Neutralization (B) Emulsification (C) Fermentation (D) None of the above

Ans. (B)

Sol. Emulsification is the action of bile juice on fats in which larger molecules of fats are broken into smaller droplets.

58. Match column I and II then select the correct option

	Column I		**Column II**
(a)	Insulin	(i)	Pituitary gland
(b)	Growth hormone	(ii)	Thyroid gland
(c)	Thyroxin	(iii)	Adrenal gland
(d)	Adrenaline	(iv)	Pancreas

(A) a-i, b-iii, c-iv, d-iv (B) a-iv, b-i, c-ii, d-iii (C) a-iii, b-iv, c-i, d-ii (D) a-ii, b-ii, c-iv, d-i

Ans. (B)

Sol. Insulin is secreted by pancreas. Growth hormone is secreted by pituitary gland.
Thyroxine is secreted by thyroid gland. Adrenaline is secreted by adrenal gland.

59. According to 'Laws of inheritance' which of the following is phenotype results of 'Dihybrid cross'.

(A) 3 : 1 (B) 1 : 2 : 1 (C) 1 : 3 : 1 (D) 9 : 3 : 3 : 1

Ans. (D)

Sol. Phenotypic ratio of F_2 generation in dihybrid cross is 9 : 3 : 3 : 1.

60. Reason of acne is

(A) Protozoa Tripnosoma (B) Leishmania (C) Staphylococci (D) None of above

Ans. (C)

Sol. Staphylococci causes acne.

61. Eutrophication increases -

(A) B.O.D. (B) C.O.D. (C) C.F.C. (D) None of the above

Ans. (A)

Sol. Eutrophication increases biological oxygen demand (B.O.D.) i.e. amount of oxygen required for the decomposition of organic matter increases due to eutrophication.

62. Pigment haemoglobin is present in

(A) RBC (B) WBC (C) Blood Platelets (D) Bloods Plasma

Ans. (A)

Sol. Pigment haemoglobin is present in RBC.

63. Organelle other then nucleus contain DNA is:

(A) Endoplasmic Reticulum (B) Mitochondria (C) Golgi Appratus (D) Lysosome

Ans. (B)

Sol. Mitochondria is a semiautonomous organelle which has DNA of itself.

64. Endoplasmic Reticulum is present in

(A) Nucleus (B) Nucleolus (C) Cytoplasm (D) Chromosomes

Ans. (C)

Sol. Endoplasmic reticulum is present in cytoplasm.

65. Fluid part of blood after removal of corpuscles is

(A) Plasma (B) Lymph (C) Serum (D) Vaccine

Ans. (A)

Sol. Fluid part of blood after removal of corpuscles is plasma.

66. Which of the following is wrongly matched :

(A) Flagella-Euglena (B) Pseudopodia-Amoeba (C) Cilia-Paramecium (D) Flagella-Plasmodium

Ans. (D)

Sol. Euglena is a flagellate micro organism. Amoeba forms pseudopodia. Cilia are present in paramecium. Plasmodium does not have flagella.

67. Which of the following is not a contagious disease

(A) Typhoid (B) Leprosy (C) Measles (D) Leukemia

Ans. (D)

Sol. Leukemia is a type of cancer and is not a contagious disease.

68. Four stage of binary fission in Amoeba are shown below. The stage at which nuclear fission and cytokinesis are observed is :

I II III IV

(A) I (B) II (C) III (D) IV

Ans. (B)

Sol. II figure shows the stage in which nuclear division and cytokinesis are observed.

69. Match Column I with II and Choose the correct option.

	Column I (Substance)		**Column II (pH value)**
(a)	Vinegar	(i)	7.4
(b)	Milk	(ii)	4.0
(c)	Blood	(iii)	6.5
(d)	Toothpaste	(iv)	8.0

	a	b	c	d
(A)	(i)	(ii)	(iii)	(iv)
(B)	(ii)	(iii)	(iv)	(i)
(C)	(ii)	(iii)	(i)	(iv)
(D)	(iii)	(iv)	(i)	(ii)

Ans. (C)

Sol.

Substance	pH value
Vinegar	4
Milk	6.5
Blood	7.4
Tooth paste	8

70. Mud is an example of :

(A) Aerosol (B) Foam (C) Sol (D) Gel

Ans. (C)

Sol. In mud dispersed phase is solid and dispersion medium is liquid so it is sol type colloid.

71. The solution of one of the following compounds will not conduct electricity this compound is.

(A) NaCl (B) CCl_4 (C) $MgCl_2$ (D) $CaCl_2$

Ans. (B)

Sol. CCl_4 is a covalent compound. So it is a bad conductor of electricity.

72. Number of molecules present in 560 cm^3 of NH_3 at STP are :

(A) 6.022×10^{23} Molecules (B) $4 \times 6.022 \times 10^{23}$ Molecules

(C) $0.25 \times 6.022 \times 10^{23}$ Molecules (D) $0.5 \times 6.022 \times 10^{23}$ Molecules

Ans. (C)

Sol. No. of moles of $NH_3 = \frac{560 \times 10^{-3}}{22.4} = 25 \times 10^{-3}$

No. of molecules in $NH_3 = 25 \times 10^{-3} \times 6.022 \times 10^{23}$

$= 0.25 \times 6.02 \times 10^{22}$ molecules

73. Which one of the following compounds contains an aldehyde group?

(A) C_3H_8O (B) $C_3H_4O_2$ (C) C_3H_6O (D) $C_4H_{10}O$

Ans. (C)

Sol. C_3H_6O contains aldehyde which is a propanal (CH_3CH_2CHO)

74. A compound X when heated with conc. H_2SO_4 at 443 K gives compound Y. Compound Y decolourizes the cold and dilule alkaline $KMNO_4$ solution compound X and Y are :

(A) CH_3OH and CH_3CHO (B) C_2H_5OH and CH_3CHO

(C) CH_3CHO and C_2H_4 (D) C_2H_5OH and C_2H_4

Ans. (D)

Sol. $\underset{\text{Ethanol}}{CH_3CH_2OH} \xrightarrow[443\ K]{\text{Conc.}H_2SO_4} \underset{\text{Ethene}}{CH_2 = CH_2} + H_2O$

Alkenes are redily oxidised by cold dilute alkaline $KMnO_4$. Hence Ethene will decolourise pink colour of $KMnO_4$.

75. Elements A, B, C and D belongs in groups 1, 2 14 and 17 of the periodic table respectively. Which of the following pair of elemetns would produce a covalent bond?

(A) A and D (B) B and C (C) C and D (D) A and C

Ans. (C)

Sol. Element C and D belongs to Non-metals. So they will produce covalent bond.

76. The correct order of the metallic character for the element Mg, Ca, K and Ga :

(A) Mg < Ca < K < Ga (B) Mg > Ca > K > Ga (C) Ga < Ca < Mg < K (D) K > Ca > Mg > Ga

Ans. (C)

Sol. Order of metallic character is Ga < Ca < Mg < K

In a peried from left to right metallic character decreases. In a group from top to bottom metallic character increases.

77. A student while heating solid lead nitrate taken in a test tube would observe :

(A) White residue of PbO_2 (B) Green residue of NO_2

(C) Yellow residue of PbO (D) Brown residue of NO

Ans. (C)

Sol. $2Pb(NO_3)_2 \longrightarrow 2PbO + 4NO_2 + O_2$

Lead nitrate Lead oxide

(Yellow colour)

78. Percentage purity of a sample of gold is 85%. How many atoms of gold are present in 1g sample. (Atomic mass of gold = 197 u)

(A) 2.6×10^{21} (B) 2.6×10^{23} (C) 3.0×10^{21} (D) 4.5×10^{20}

Ans. (A)

Sol. Amount of gold in 85% pure gold = $1 \times \frac{85}{100} = 0.85$ gm

No. of atoms in 0.85 gm gold = $\frac{0.85}{197} \times 6.02 \times 10^{23}$

$= 0.0259 \times 10^{23}$ atom

No. of atoms in 0.85 gm gold = 2.6×10^{21} atoms.

79. The number of g moles of aluminium ion present in 0.051 g of aluminium oxide is :

(A) 0.001 (B) 0.051 (C) 0.102 (D) 2

Ans. (A)

Sol. No. of moles of $Al_2O_3 = \frac{0.051}{102} = 0.5 \times 10^{-3}$ (Molecular mass of Al_2O_3 = 102)

No. of moles of Al^{3+} ion = $0.5 \times 10^{-3} \times 2 = 10^{-3}$ mol

So no. of Al^{3+} ion will be 0.001 mole

80. Which one of the following metal can not be extracted by the electrolysis of their molten chloride :

(A) Na (B) Mg (C) Al (D) Ca

Ans. (B)

Sol. Na, Al and Ca can be extracted by electrolysis by their metal chloride but Mg can not be extracted by electrolysis.

81. If tanA = cotB then the value of (A + B) will be :

(A) 90° (B) 45° (C) 180° (D) None of these

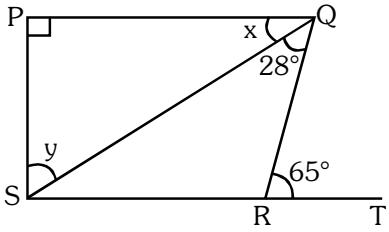
Ans. (A)

Sol. tanA = tan(90° – B)

$\Rightarrow$ A = 90° – B

A + B = 90°

82. In figure PQ ⊥ PS, PQ || SR, ∠SQR = 28° and ∠QRT = 65° then x° and y° will be :



(A) x° = 37°, y° = 53° (B) x° = 53°, y° = 37° (C) x° = 57°, y° = 33° (D) x° = 33°, y° = 57°

Ans. (A)

Sol. In ΔQRS → ∠QSR = 65° – 28°

So x° = 37° [Alternate angles]

y = 90° – 37° = 53°

83. A cuboidal Vessel is 22 meter long and 10 meter wide. How high must it be made to hold 440 cubic meters of water.

(A) 4 meter (B) 2 meter (C) 8 meter (D) 6 meter

Ans. (B)

Sol. $V_{cuboid} = \ell \times b \times h$

$440 = 22 \times 10 \times h$

h = 2 m

84. The H.C.F. and L.C.M. of two numbers are 12 and 240 respectively. If one of these numbers is 48 what the other number will be :

(A) 58 (B) 60 (C) 70 (D) 80

Ans. (B)

Sol. a × b = H.C.F. × L.C.M.

$\Rightarrow$ 48 × b = 12 × 240

$\Rightarrow$ $b = \frac{12 \times 240}{48} = 60$

85. If the points A(6, 1), B(8, 2), C(9, 4) and D(P, 3) are the vertices of a parallelogram then the value of P will be:

(A) 4 (B) 5 (C) 6 (D) 7

Ans. (D)

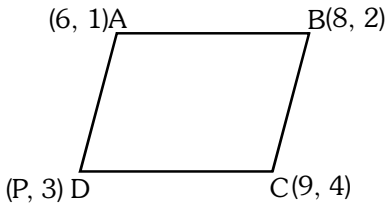
Sol. BC = AD

$(9 - 8)^2 + (4 - 2)^2 = (P - 6)^2 + (3 - 1)^2$

$\Rightarrow$ $1 + 4 = (P - 6)^2 + 4$

$\Rightarrow$ P – 6 = 1

P = 7



86. What least number must be added to each of the numbers 6, 15, 20 and 43 to make them proportional:

(A) 3 (B) 4 (C) 2 (D) 1

Ans. (A)

Sol. $\frac{6 + x}{15 + x} = \frac{20 + x}{43 + x}$

$\Rightarrow$ $258 + 49x + x^2 = 300 + 35x + x^2$

$\Rightarrow$ $14x = 42$

$\Rightarrow$ x = 3

87. Vertical angles of two isosceles triangle are equal. Their corresponding altitudes are in the ratio 4 : 9. Ratio of their areas will be :

(A) 16 : 81 (B) 4 : 9 (C) 2 : 3 (D) None of these

Ans. (A)

Sol. Both the triangles should be similar.

So, ratio of their areas = $(4)^2 : (9)^2$

$= 16 : 81$

88. If $\tan Q = \frac{a}{b}$ then $\frac{\cos Q + \sin Q}{CosQ - SinQ}$ will be :

(A) $\frac{b+a}{b-a}$ (B) $\frac{1}{b-a}$ (C) $\frac{1}{b+a}$ (D) $\frac{b-a}{b+a}$

Ans. (A)

Sol. $\frac{\cos Q + \sin Q}{\cos Q - \sin Q}$

$\Rightarrow \frac{1+\tan Q}{1-\tan Q} = \frac{1+\frac{a}{b}}{1-\frac{a}{b}} = \frac{b+a}{b-a}$

89. If the points (x, y), (1, 2) and (7, 0) are collinear then the relation between x and y will be :

(A) $x - 3y = 7$ (B) $2x - 3y = 7$ (C) $3x + y = 7$ (D) $x + 3y = 7$

Ans. (D)

Sol. Area $= \frac{1}{2} | x(2-0) + 1(0-y) + 7(y-2) | = 0$

$\Rightarrow 2x - y + 7y - 14 = 0$

$\Rightarrow 2x + 6y = 14$

$\Rightarrow x + 3y = 7$

90. If $\left(x + \frac{1}{x} = 4\right)$ then the value of $\left(x^2 + \frac{1}{x^2}\right)$ will be :

(A) 14 (B) 16 (C) 15 (D) 18

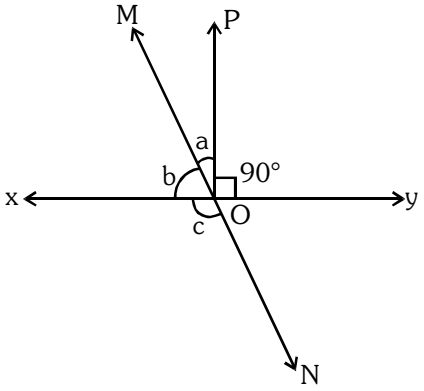
Ans. (A)

Sol. $x + \frac{1}{x} = 4$

$\Rightarrow x^2 + 2 + \frac{1}{x^2} = 16$

$\Rightarrow x^2 + \frac{1}{x^2} = 14$

91. Line XY and MN intersect at the point O in the figure. If $\angle POY = 90°$ and a:b = 4:5. Then the value of c will be:



(A) 120° (B) 135° (C) 125° (D) 130°

Ans. (D)

Sol. Let a = 4x

$\Rightarrow$ b = 5x

$\Rightarrow$ 4x + 5x + 90 = 180

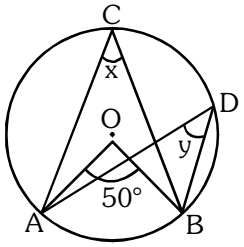
$\Rightarrow$ x = 10°

$\Rightarrow$ b = 5x = 50°

c + b = 180°

$\Rightarrow$ c = 130°

92. In the given figure the value of x° + y° will be :



(A) 60° (B) 50° (C) 2° (D) 30°

Ans. (B)

Sol. $x° = \frac{50°}{2}$

Also $y° = \frac{50°}{2}$

$\Rightarrow$ x° + y° = 50°

93. Observations 11, 12, 14, 18, x + 2, x + 4, 30, 32, 35, 41 have been arranged in ascending order. If median in 24 then the value of x will be :

(A) 22 (B) 21 (C) 24 (D) None of these

Ans. (B)

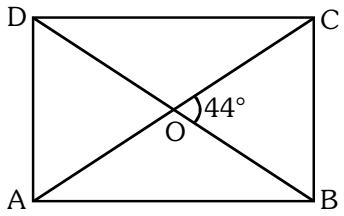
Sol. $\text{Median} = \frac{\left(\frac{10}{2}\right)^{\text{th}} \text{observation} + \left(\frac{10}{2}+1\right)^{\text{th}} \text{observation}}{2}$

$\Rightarrow 24 = \frac{x+2+x+4}{2}$

$\Rightarrow$ 2x = 42

$\Rightarrow$ x = 21

94. The diagonals of rectangle ABCD intersect each other at O. If $\angle BOC = 44°$ the value of $\angle OAD$ will be :



(A) 120° (B) 68° (C) 90° (D) 44°

Ans. (B)

Sol. $\angle OAB = \angle OBA$

$\Rightarrow \angle OAB + \angle OBA = 44°$

$\Rightarrow \angle OAB = 22°$

$\angle OAD = 90° - \angle OAB$

$= 90° - 22°$

$\angle OAD = 68°$

95. If $\sqrt{13 - a\sqrt{10}} = \sqrt{8} + \sqrt{5}$ then value of 'a' will be :

(A) –6 (B) –4 (C) –8 (D) –5

Ans. (B)

Sol. $\sqrt{13 - a\sqrt{10}} = \sqrt{8} + \sqrt{5}$

Squaring both sides we get

$13 - a\sqrt{10} = 8 + 5 + 2\sqrt{40}$

$\Rightarrow a = -4$

96. If $\frac{3^{2x-4}}{225} = \frac{5^2}{5^x}$, then the value of x will be :

(A) 4 (B) 2 (C) 5 (D) None of these

Ans. (A)

Sol. $\frac{3^{2x-4}}{3^2 \times 5^2} = \frac{5^2}{5^x}$

$3^{2x-6} \times 5^x = 3^2 \times 5^4$

On comparing

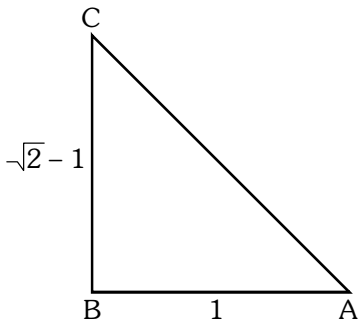
x= 4

97. If tan A = $\sqrt{2} - 1$ then the value of sinA cos A will be :

(A) $\frac{\sqrt{2}-1}{4-2\sqrt{2}}$ (B) $\frac{\sqrt{3}+1}{3-2\sqrt{3}}$ (C) $\frac{\sqrt{2}+1}{4+2\sqrt{3}}$ (D) None of these

Ans. (A)

Sol. $\tan A = \dfrac{\sqrt{2}-1}{1}$



$AC = \sqrt{AB^2 + BC^2}$

$AC = \sqrt{1+2+1-2\sqrt{2}}$

$AC = \sqrt{4-2\sqrt{2}}$

Now $\sin A \cos A$

$= \dfrac{BC}{AC} \times \dfrac{AB}{AC}$

$= \dfrac{\sqrt{2}-1}{4-2\sqrt{2}}$

98. The factors of $\left[\dfrac{2}{x^4} - \dfrac{1}{x^2}\right]$ will be :

(A) $\left(\dfrac{\sqrt{2}}{x^4} + \dfrac{1}{x}\right)\left(\dfrac{\sqrt{2}}{x^4} - \dfrac{1}{x}\right)$ (B) $\left(\dfrac{\sqrt{2}}{x^2} + \dfrac{1}{x}\right)\left(\dfrac{\sqrt{2}}{x^2} - \dfrac{1}{x}\right)$ (C) $\left(\dfrac{\sqrt{2}}{x} + \dfrac{1}{x}\right)\left(\dfrac{\sqrt{2}}{x} - \dfrac{1}{x}\right)$ (D) None of these

Ans. (B)

Sol. $\dfrac{2}{x^4} - \dfrac{1}{x^2} = \left(\dfrac{\sqrt{2}}{x^2}\right)^2 - \left(\dfrac{1}{x}\right)^2$

$= \left(\dfrac{\sqrt{2}}{x^2} - \dfrac{1}{x}\right)\left(\dfrac{\sqrt{2}}{x^2} + \dfrac{1}{x}\right)$

99. If the diameter of sphere is decreased by 25 % then the curved surface area will be decreased by :

(A) $\dfrac{5\pi r^2}{4}$ (B) $\dfrac{2\pi r^2}{4}$ (C) $\dfrac{\pi r^2}{4}$ (D) $\dfrac{7\pi r^2}{4}$

Ans. (D)

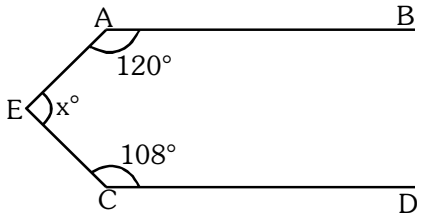
Sol. Curved surface area will decrease by

$4\pi r^2 - 4\pi\left(\dfrac{75r}{100}\right)^2$

$= 4\pi r^2\left(1 - \dfrac{9}{16}\right)$

$= \dfrac{7\pi r^2}{4}$

100. In the given figure AB||CD. Then the value of x is :



(A) 220° (B) 140° (C) 150° (D) None of these

Ans. (D)

Sol. $x_1 + 120° = 180°$

$x_2 + 108° = 180°$

$\Rightarrow x_1 + x_2 = 60° + 72°$

$\Rightarrow x = 132°$