NATIONAL TALENT SEARCH EXAMINATION (NTSE-2020) STAGE -1

STATE : MADHYAPRADESH **PAPER : SAT**

Code : N-3

Date: 03/11/2019

Max. Marks: 100 **SOLUTIONS** **Time allowed: 120 mins**

PHYSICS

1. The value of acceleration due to gravity is

(A) least on equator (B) least on poles

(C) same on equator & poles (D) increases from pole to equator

Ans. (A)

Sol. 'g' is least on equator because equatorial radius of earth is maximum and $g = \frac{GM}{R^2} \Rightarrow g \alpha \frac{1}{R^2}$

2. The numerical ratio of displacement to distance covered by a moving object is :

(A) always < 1 (B) always = 1 (C) always > 1 (D) = or < 1

Ans. (D)

Sol. distance ≥ displacement so $\frac{\text{displacement}}{\text{distance}} \leq 1$

3. According to third law of motion, action and reaction :

(A) always act on the same body (B) always act on different bodies in opposite direction

(C) have same magnitude and direction (D) act on any one of the body at normal to each other

Ans. (B)

Sol. Always act on different bodies in opposite direction.

4. The S.I. unit of retardation is :

(A) ms^{-1} (B) ms^{-2} (C) ms^2 (D) m

Ans. (B)

Sol. m/s^2

5. _____ is located behind a convex mirror :

(A) the focal point (B) a ray (C) a real image (D) the object

Ans. (A)

Sol. The focal point is located behind the convex mirror.

6. When white light passes through the prism, colour which deviates the least is :

(A) red (B) blue (C) voilet (D) green

Ans. (A)

Sol. Red colour deviates the least

deviation $\alpha \mu$ & $\left(\mu = A + \frac{B}{\lambda^2}\right)$

7. Two charged bodies having equal potential are connected through a conducting wire. In this case :

(A) current will flow (B) not flow

(C) can't say (D) current will flow if a resistance is connected

Ans. (B)

Sol. The current will not flow because potential difference is zero.

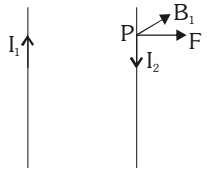
8. Two parallel wires carrying current in opposite directions :

(A) attract each other (B) repel each other

(C) do not affect each other (D) get moved perpendicular to each other

Ans. (B)

Sol.



Since the direction of magnetic field at point P due to I_1 is perpendicular inwards, and in accordance with Fleming's left hand rule, the direction of force will be away from the first wire means repulsive.

9. The magnetic field inside a solenoid is :

(A) non uniform (B) variable

(C) same at all points except at its ends (D) zero

Ans. (C)

Sol. Magnetic field is uniform inside solenoid and decrease near ends.

10. Inside a magnet lines of force move from :

(A) north to south pole (B) away from north pole

(C) south to north pole (D) away from south pole

Ans. (C)

Sol. Magnetic field lines move from south to north.

11. The resistance of a conductor is directly proportional to :

(A) its area of cross section (B) density

(C) melting point (D) length

Ans. (D)

Sol. $R \alpha l$ $\qquad R = \frac{\rho l}{A}$

12. Light travels fastest in which of the following materials :

(A) diamond (B) water (C) glass (D) air

Ans. (D)

Sol. Speed of light is inversly proportional to the optical density of medium and the optical density of air is minimum.

13. Acceleration always acts in the direction :

(A) of displacement (B) of the initial velocity (C) of net force (D) of final velocity

Ans. (C)

Sol. Acceleration acts in the direction of net force.

CHEMISTRY

14. Which statements are correct regarding the following reaction?

$$2PbO(s) + C(s) \rightarrow 2Pb(s) + CO_2(g)$$

(i) Lead is reduced

(ii) Carbon dioxide is oxidised

(iii) Carbon is oxidised

(iv) Lead oxide is reduced

(A) (i) and (ii) (B) (iii) and (iv) (C) (i), (ii) and (iii) (D) All

Ans. (B)

Sol. PbO is getting reduced as it is loosing oxygen. While carbon is getting oxidised as it is gaining oxygen.

15. What will happen on putting dilute HCl on iron powder?

(A) Hydrogen gas and $FeCl_2$ will form (B) Chlorine gas and $FeCl_2$ will form

(C) $FeCl_2$ and H_2O will form (D) Will be no reaction

Ans. (A)

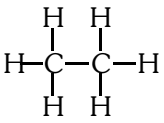
Sol. $Fe(s) + HCl(dil) \rightarrow FeCl_2 + H_2(\uparrow)$

16. The number of covalent bonds in ethane are :

(A) 6 (B) 7 (C) 8 (D) 9

Ans. (B)

Sol. The structural formula of ethane is-



Thereare 7 covalent bonds, Six C–H bonds and One C–C bond.

17. If electronic configuration of an atom is 2, 8, 7, then atomic number of the atom will be :

(A) 15 (B) 16 (C) 17 (D) 18

Ans. (C)

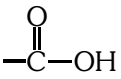
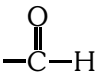
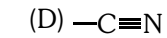
Sol. Given electronic configuration is

K, L, M

2, 8, 7

Atomic No. = 2 + 8 + 7 = 17

18. Which functional group is present in Butanone

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

Ans. (C)

Sol. (ketone) functional group is present in butanone.

19. Which will have electronic configuration 2, 8, 2 ?

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

Ans. (B)

Sol. Atomic No. of Magnesium (Mg) is 12 and its electronic configuration is 2, 8, 2.

20. Which element have two shells and both these shells are fulfilled with electrons

(A) S (B) Ne (C) N (D) He

Ans. (B)

Sol. Atomic no. of Neon (Ne) is 10 and its electronic configuration is 2, 8.

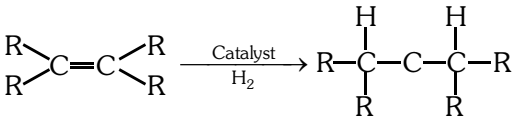
So, its both shells are fully filled.

21. $CH_4 + Cl_2 \xrightarrow{\text{sun light}} CH_3Cl + HCl$ This reaction is

(A) Substitution (B) Oxidation (C) Combination (D) Reduction

Ans. (A)

Sol. The given reaction is substitution reaction in which hydrogen is substituted by chlorine.

22. 

The given reaction is

(A) Oxidation (B) Reduction (C) Substitution (D) Decomposition

Ans. (B)

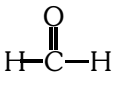
Sol. It is hydrogenation reaction i.e. addition of hydrogen hence it is reduction.

23. The structural formula of cyclopentane is :

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

Ans. (C)

Sol. Prefix cyclo indicates closed chain compound and pentane means it contains five carbon atoms.

24. The name of  is :

(A) Acetone (B) Acetic acid (C) Ethanol (D) Formaldehyde

Ans. (D)

Sol. The name of given compound is Formaldehyde.

25. Which among the following is/are saturated compound?

(A) CH_4 (B) C_3H_8 (C) C_5H_{12} (D) All the above

Ans. (D)

Sol. All the given compounds have general formula C_nH_{2n+2} i.e. all are saturated compounds.

26. XCl_2 is a solid and high melting point compound. X will be

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

Ans. (B)

Sol. As valency of X in given compound is 2 so X is Mg.

BOTANY

27. Which of the following is not a divisional stage -

(A) Telophase (B) Prophase (C) Metaphase (D) Interphase

Ans. (D)

Sol. Interphase is resting stage between two successive cell division. Prophase, metaphase, telophase are stages of karyokinesis. (Nuclear division)

28. Cell organelles embeded in-

(A) Cytoplasmic memrane (B) Muccin

(C) Protoplasm (D) Cytoplasm

Ans. (D)

Sol. Cell organells are embedded in cytoplasm.

29. Growth rings are formed by the activity of -

(A) Xylem (B) Phelom (C) Both Xylem and Phloem (D) Cambium

Ans. (D)

Sol. Growth rings are formed by the activity of combium in dicot plant, during secondary growth of stem and roots.

30. Reserve Food Product of most of the algae is -

(A) Glycogen (B) Fat (C) Cellulose (D) Starch

Ans. (D)

Sol. Reserve food product of most of the algae is starch.

31. Largest Ecosystem of the world are -

(A) Forest (B) Grassland (C) Great lakes (D) Oceans

Ans. (D)

Sol. Largest ecosystem of the world are oceans.

32. The Xylem is plants are responsible for-

(A) Transport of water (B) Transport of oxygen

(C) Transport of food (D) Transport of Amino acid

Ans. (A)

Sol. The xylem in plants are responsible for transport of water from root to the leaves.

33. Budding type of Reproduction is found in -

(A) Peepal (B) Bryophyllum (C) Rose (D) Sugar Cane

Ans. (B)

Sol. Bryophyllum can reproduce asexually through vegetative propagation by leaf bud (budding). These leaf buds are called epiphyllous buds.

34. Which of the following acid is also a vitamin -

(A) Ascorbic acid (B) Formic acid (C) Malic acid (D) Palmatic acid

Ans. (A)

Sol. Vitamin C is also known as Ascorbic acid.

35. Which of the following plant tip has Quiescent centre -

(A) Stem (B) Root (C) Leaf (D) Sepal

Ans. (B)

Sol. Quiescent centre is a group of cells with the flat face towards the root tip. Where cell division proceeds very slowly or not at all found in root tip of plant.

36. Which of the following is a plant Hormone-

(A) Insulin (B) Thyroxin (C) Cytokinin (D) Oestrogen

Ans. (C)

Sol. Cytokinin is a plant hormone which help in cell division.

37. Ribosomes are granules formed of-

(A) Only m-RNA (B) Only Proteins (C) r RNA + Proteins (D) Only DNA

Ans. (C)

Sol. Ribosome are granules formed of rRNA + Proteins and is therefore a ribonucleoprotein.

38. The Anther contains -

(A) Sepals (B) Ovules (C) Pistil (D) Pollen-grains

Ans. (D)

Sol. The anther contains pollen grains.

39. Cell Organelles essential for photorespiration is -

(A) Ribosome (B) Dictyosome (C) Peroxisomes (D) Glyoxisome

Ans. (C)

Sol. Cell organelles essential for photorespiration is chloroplast, **peroxisomes** and mitochondria.

40. Pollination in Maize held by -

(A) Insect (B) Water (C) Air (D) Animal

Ans. (C)

Sol. Pollination in maize held by air.

HISTORY

41. Which of the following cities is not related to the Indus civilization ?
(A) Mohanjodaro (B) Kalibangan (C) Lothal (D) Patliputra

Ans. **(D)**

Sol. Patliputra is not associated with Indus civilisation. It became the capital of major powers in ancient India such as Shishunaga Empire, Nanda Empire, Maurya Empire etc.

42. Who was the Governor General during the 1857 the first war of Independence ?
(A) Lord Dalhousie (B) Lord Ripon (C) Lord Curzon (D) Lord Canning

Ans. **(D)**

Sol. Lord Canning served as Governor General of India from 1856 to 1862. In 1858 he became first Viceroy of India.

43. Who was the founder of Satya Sodhak Samaj ?
(A) Ram Mohan Roy (B) Dayanand Saraswati
(C) Jyotiba Phule (D) Swami Vivekanand

Ans. **(C)**

Sol. Satya Sodhak Samaj was a social reform society founded by Jyotirao Phule in Pune, Maharashtra in 1873.

44. Which of the following foreign travellers came to India during Chandra Gupta Maurya's Period ?
(A) Fa-Xian (B) Arean (C) Xuan Zang/Hiuen Tsang (D) Megasthenes

Ans. **(D)**

Sol. Megasthenes came to India during Chandra Gupta Maurya's period. He wrote about Mauryan administration in his book Indica.

45. Who among the following is called the "Bhoja of Andhra" ?
(A) Krishnandeva Rai (B) Veer Narsimha (C) Immadi Narsimha (D) Rajendra Chola

Ans. **(A)**

Sol. He was the emperor of the Vijaynagar Empire. He was the third ruler of Tuluva Dynasty. He was called 'Bhoja of Andhra' due to his literary works.

46. Kandariya Mahadev Temple is located at -
(A) Khajuraho (B) Badami (C) Ajanta (D) Ellora

Ans. **(A)**

Sol. Kandariya Mahadev Temple is the largest and most ornate Hindu temple in the medieval temple group found at Khajuraho in M.P.

47. Where is the ancient coastal settlement Arikamedu located ?
(A) Vishakhapattnam (B) Chennai (C) Puducherry (D) Port Blair

Ans. **(C)**

Sol. Arikamedu is an archaeological site in southern India in Puducherry.

48. Who wrote "Humayun nama" ?
(A) Gulbadan Begam (B) Abul Fazl
(C) Badayuni (D) Barni

Ans. **(A)**

Sol. Gulbadan Begam was a Mughal Princess and the danghter of emperor Babur. She wrote Humayun-Nama on the request of her nephew, Emperor Akbar.

49. Who wrote "Kiratarjuniya" ?
(A) Shudraka (B) Bharvi (C) Kalhan (D) Bilhan

Ans. **(B)**

Sol. Kiratarjuniya is a Sanskrit Kavya by Bharvi written in the 6th century or earlier. It describes the combat between Arjuna and Lord Shiva.

50. Who founded Forward Bloc ?

(A) Subhash Chandra Bose (B) Jawaharlal Nehru

(C) Gandhiji (D) Mohammad Ali Jinnah

Ans. (A)

Sol. It emerged as a faction within the Indian National Congress in 1939, led by Subhash Chandra Bose.

51. Lothal the port city of Indus Valley civilization is located -

(A) Gujarat (B) Rajasthan (C) Punjab (D) Haryana

Ans. (A)

Sol. It was one of the southernmost cities of the ancient Indus Valley civilization located in Gujarat.

52. Rani Durgawati was the queen of _____.

(A) Garha (B) Riwa (C) Jaipur (D) Jhansi

Ans. (A)

Sol. Rani Durgawati was a Chandel princess of Mahoba. She was married to the king of Garha, Dalpat Shah.

53. Who established "Khalsa" in 1699 A.D. ?

(A) Guru Gobind Singh (B) Guru Angad

(C) Guru Arjundev (D) Guru Tej Bahadur

Ans. (A)

Sol. Guru Gobind Singh, last sikh Guru established an organisation called Khalsa in 1699 A.D.

54. Who was the author of Prayag Prashati ?

(A) Kalidas (B) Harishena (C) Varahmihir (D) Shudrak

Ans. (B)

Sol. Harishena wrote Prayag Prashasti which is also known as Allahabad pillar inscription, associated with Samudra Gupta.

55. Ashvaghosha writer of Buddhacharita belonged to the court of which Ruler -

(A) Kanishka (B) Ashoka (C) Chandragupta Maurya (D) Bimbisara

Ans. (A)

Sol. Ashvaghosha was a Buddhist philosopher lived in the court of king Kanishka.

GEOGRAPHY

56. The largest area under mangroves is in which of the following state/union territory?

(A) Andaman and Nicobar (B) Andhara Pradesh (C) West Bengal (D) Gujarat

Ans. (C)

Sol. Sunderban mangroves is the largest mangrove forest tract of the world spread over India and Bangladesh. The part lying in West Bengal in India is also the largest mangrove forest tract of India.

57. River in its last stage forms-

(A) Water Fall (B) Flood Plains (C) Delta or estuary (D) Ox-Bow lake

Ans. (C)

Sol. Rivers in their last stage depending upon the topography / physiography of the coast forms estuary or delta.

58. Sundari trees are found in

(A) Tropical forest (B) Himalayan forest (C) Mangrove forest (D) Tropical deciduous forest

Ans. (C)

Sol. Sundari trees are found in sunderban forests, the largest mangrove forest tract

59. Which scale is a Representative Fraction (R.F.)?

(A) One inch is equal to ten miles (B) 1 cm = 1km

(C) One cm for an km (D) 1 : 1,00,000

Ans. (D)

Sol. In an RF scale numerator is 01 and denominator is distance on ground and is independent of any particular unit of measurement.

60. Jim Corbett National Park is located in-

(A) Himachal Pradesh (B) Uttarakhand (C) Jammu & kashmir (D) Assam

Ans. (B)

Sol. Jim Corbett National Park is situated in Ramnagar district of Uttarakhand.

61. Yellow Revolution is related to-

(A) Fruit Production (B) Sheep rearing (C) Fish Production (D) Edible Oil & Oil Seeds

Ans. (D)

Sol. Launched in India with implantation of hybrid mustard and sesame seeds (both edible Oil & Oil seeds) in 1987.

62. Which of the following Indian States is also known as a 'Land of Red river and Blue Hills'?

(A) Uttarakhand (B) Assam (C) Meghalaya (D) Arunachal Pradesh

Ans. (B)

Sol. Assam is referred to as "Land of Red River and Blue Hills" where Red River is Brahmaputra (Lauhitya River) and its surrounding hills.

63. Which of the following is not a Metallic Mineral ?

(A) Iron (B) Manganese (C) Gold (D) Coal

Ans. (D)

Sol. Coal is a non-metallic mineral.

64. The Clouded Leopard National Park is situated in which of the following states?

(A) Tripura (B) Uttar Pradesh (C) Assam (D) Mizoram

Ans. (A)

Sol. Clouded Lopard National Park is situated in Sipahijola district of Tripura.

65. Silent Valley is located in-

(A) Tamil Nadu (B) Kerala (C) Karnataka (D) Himachal Pradesh

Ans. (B)

Sol. Silent Valley National Park is located in Kerala.

66. River Brahmaputra in Tibet (China) is called

(A) Meghana (B) Tsangpo (C) Padma (D) Debang

Ans. (B)

Sol. Brahmaputra is known as Tsang Po (The Purifier) in Tibet the place of its origin.

67. The largest Iron and Steel Plant in India is-

(A) Tata Iron and Steel Company (B) Indian Iron and Steel Company

(C) Hindustan Steel Ltd. (D) Vishveswariah Iron and Steel Company

Ans. (A)

Sol. TISCO is the largest Iron and steel plant in India.

68. Which of the following separates Indian and Sri Lanka ?

(A) The Gulf of Cambay (B) The Rann of Kutch (C) The Bay of Bengal (D) The Gulf of Mannar

Ans. (D)

Sol. India and Sri Lanka are seperated by Gulf of Mannar and Palk Strait.

69. The best Quality of coal.

(A) Bituminous (B) Anthracite (C) Lignite (D) Peat

Ans. (B)

Sol. Anthracite is the best quality coal while Peat is the most downgraded one rest-lies in between these two.

70. Where is Kalpakkam ?

(A) Uttar Pradesh (B) Maharashtra (C) Gujarat (D) Tamil Nadu

Ans. (D)

Sol. Kalpakkam is famous as a Nuclear Power Generation site from state of Tamil Nadu.

CIVICS

71. The word 'Democracy' is focused by 'Demos' and 'Kratia' which are (both) ____ words.

(A) Greek (B) Latin (C) Spanish (D) English

Ans. (A)

Sol. Democracy is made up of two Greek words. Demos (meaning people) and "Kratia" (meaning rule).

72. Which Article of the constitution states about the working of an election in India?

(A) Article-19 (B) Article-300 (C) Article-324 (D) Article-368

Ans. (C)

Sol. Elections in India are discussed in Part XV of Indian Constitution from Articles 324-329A.

73. 'Fundamental Rights' can be suspended.

(A) By Judiciary (B) By Parliament (C) In emergyency period (D) None of the above

Ans. (C)

Sol. Funamental Rights can be suspended during Emergency Period by President although such suspensions requires Parliamentary approval.

74. Who is responsible for the registration of the voter.

(A) Governor (B) Voters (C) Political parties (D) Election Commission

Ans. (D)

Sol. Elections related works in India are done by or under the guidance & supervision of Election Commission of India.

75. Indian constitution is ____

(A) Rigid (B) Flexible (C) Rigid and Flexible (D) None of the above

Ans. (C)

Sol. Indian constitution is rigid with reference to its principles and basic philosophy while it is also flexible as any provision of it can be amended in case of need by a prescribed procedure.

ECONOMICS

76. What is marginal productivity of labour in disguised employment ?

(A) Zero (B) Minimum (C) One (D) Maximum

Ans. (A)

Sol. Marginal productivity of labour in case of disguised employment / unemployment remains zero as the output remains zero with every additional labour unit.

77. What the industrial unit is called, which is run will the help of family members?

(A) Village industry (B) Agricultural industry (C) Cottage industry (D) Small industry

Ans. (C)

Sol. Cottage industry can be started with minimal investments and family labour.

78. Where the first mobile bank was established?

(A) in Ahmadnagar district of Maharashtra (B) in Khargone district of Madhya Pradesh

(C) in Kota district of Rajasthan (D) in Mysore district of Karanataka

Ans. (B)

Sol. Laxmi Vahini - first mobile bank started from Khargone (West Nimad) district of M.P.

79. When Prime Minister Rozgar Yojana started?

(A) 15th August 1947 (B) 26th January 1950 (C) 2nd October 1993 (D) 15th August 2015

Ans. (C)

Sol. PMRY was launched on 02nd october 1993 to tackle menace of unemployment.

80. Which of the following sector contributes maximum in gross domestic product of India?

(A) Primary sector (B) Secondary sector (C) Tertiary sector (D) Foreign sector

Ans. (C)

Sol. Tetriary sector contributes more than 50% to India's GDP.

MATHEMATICS

81. If the sum of 14 terms of an A.P. is 1050 and its first term is 10, the 20^{th} term will be

(A) 140 (B) 160 (C) 180 (D) 200

Ans. (D)

Sol. $S_{14} = \frac{14}{2}[2a+13d]$

$\Rightarrow 1050 = 7(2a+13d)$

$\Rightarrow 2a+13d = 150$

$20+13d = 150 \quad \because a = 10$

$\therefore d = 10$

$T_{20} = a+19d$

$\Rightarrow T_{20} = 10+19\times 10 = 200$

82. The roots of quadrtic equation $ax^2 + bx + c = 0$ are real and distinct if

(A) $b^2 = 4ac$ (B) $b^2 - 4ac > 0$ (C) $b^2 - 4ac < 0$ (D) None of these

Ans. (B)

Sol. $ax^2+bx+c=0$

For real & disinct roots $b^2-4ac>0$

$\therefore$ option (B)

83. If in a triangle, square of longest side is equal to the sum of the squares of the other two sides, then the angle opposite the longest side is

(A) Acute angle (B) Right angle (C) Obtuse angle (D) None of these

Ans. (B)

Sol. Right angle

84. $\frac{\tan 65}{\cot 25}$?

(A) 1 (B) 0 (C) 1/2 (D) None

Ans. (A)

Sol. $\frac{\tan 65^\circ}{\cot 25} = \frac{\tan 65}{\cot(90-65)} = \frac{\tan 65}{\tan 65} = 1$

Here $\cot(90-\theta) = \tan\theta$

85. Which of the following can not be the probability of an event:

(A) 0.78 % (B) 2/5 (C) 73% (D) –0.78

Ans. (D)

Sol. (Negative probability not possible)

$0 \le P(E) \le 1$

86. Cube root of 328509 is

(A) 65 (B) 66 (C) 68 (D) 69

Ans. (D)

Sol. $\sqrt[3]{328509} = 69$

87. The ratio of angles in a triangle is 1 : 2 : 3, then the largest angle is

(A) 60 (B) 90 (C) 120 (D) None of these

Ans. (B)

Sol. Here

$x + 2x + 3x = 180$

$6x = 180$

$x = 30$

$\therefore$ largest angle = 3x = $3 \times 30 = 90°$

88. The point of intersection of lines 7x – 15y – 2 = 0 and 6x + 12y – 18 = 0 is

(A) $\left(\frac{-49}{29}, \frac{19}{29}\right)$ (B) $\left(\frac{49}{29}, \frac{19}{29}\right)$ (C) $\left(\frac{49}{29}, \frac{-19}{29}\right)$ (D) None of these

Ans. (B)

Sol. $7x - 15y = 2$

$6x + 12y = 18$

$\Rightarrow x + 2y = 3$

$\therefore x = 3 - 2y$

Now, $7(3 - 2y) = 2 + 15y,$

$21 - 14 = 2 + 15y$

$19 = 29y$

$\therefore y = \frac{19}{29}$

$\therefore \left(+\frac{49}{29}, \frac{19}{29}\right)$

$x = 3 - 2y$

$= 3 - 2 \times \frac{19}{29}$

$= 3 - \frac{38}{29}$

$= \frac{87 - 38}{29}$

$x = +\frac{49}{29}$

89. Pair of equations $5x-8y + 1 = 0$ and $3x-\frac{24}{5}y \quad \frac{3}{5} \quad 0$ have

(A)No solution (B) Unique solution (C) Infinite solutions (D) None of these

Ans. (C)

Sol. $5x-8y=-1$

$$3x-\frac{24}{5}y=\frac{-3}{5}$$

$$5x-8y=-1$$

$$15x-24y=-3$$

$$\therefore \frac{5}{15}=\frac{-8}{-24}=\frac{-1}{3}$$

$$\frac{1}{3}=\frac{1}{3}=\frac{1}{3} \because \frac{a_1}{a_2}=\frac{b_1}{b_2}=\frac{c_1}{c_2}$$

$\therefore$ Infinitely many solution.

90. The area of the triangle with vertices (1 , –1), (–4, 6) and (–3, –5) is

(A) 20 square unit (B) 22 square unit (C) 24 square unit (D) 28 square unit

Ans. (C)

Sol. $(1,-1)(-4,6)\&(-3,-5)$

$$A(\Delta)=\frac{1}{2}\left|x_1(y_2-y_3)+x_2(y_3-y_1)+x_3(y_1-y_2)\right|$$

$$=\frac{1}{2}\left|1(6+5)-4(-5+1)-3(-1-6)\right|$$

$$=\frac{1}{2}\left|1\times 11-4(-4)-3(-7)\right|$$

$$=\frac{1}{2}\left|11+16+21\right|=\frac{1}{2}\left|48\right|=24$$

91. Tenth term of A.P. 2, 7, 12, ... is:

(A) 42 (B) 47 (C) 37 (D) 52

Ans. (B)

Sol. we have A.P. 2, 7, 12 .....

$a = 2$ $d = a_2 - a_1 = 7 - 2 = 5$

$a_{10} = a + 9d$

$= 2 + 9 \times 5$

$= 2 + 45$

$= 47$

92. With usual meanings of notations, formula for assumed mean method for A.M. is

(A) $\bar{x} = A + \frac{\sum_{i=1}^{N} f_i d_i}{\sum_{i=1}^{N} f_i}$ where $d_i = x_i - A$

(B) $\bar{x} = \frac{x_1 + x_2 + \ldots\ldots + x_n}{N}$

(C) $\bar{x} = \frac{\sum_{i=1}^{N} f_i x_i}{\sum_{i=1}^{N} f_i}$

(D) None of these

Ans. (A)

Sol. Formula $\bar{x}$ A $\frac{\sum_{i\ 1}^{n} fidi}{\sum_{i\ 1}^{N} fi}$ where di = xi –A

93. The value of $\frac{\cos 30° \times \sin 60°}{\cos 60°}$ is :

(A) 0 (B) 0.5 (C) 1 (D) 1.5

Ans. (D)

Sol. we have $\frac{\cos 30° \times \sin 60}{\cos 60}$

$= \frac{\frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{2}}{\frac{1}{2}} = \frac{\frac{3}{4}}{\frac{1}{2}} = \frac{3}{2}$

94. For individual series

108, 64, 40, 57, 30, 54, 32, 52

Median is :

(A) 52 (B) 53 (C) 54 (D) 55

Ans. (B)

Sol. we have 30, 32, 40, 52, 54, 57, 64, 108

n = 8(even no.)

$$\text{Median} = \frac{\left(\frac{n}{2}\right)^{th} + \left(\frac{n}{2}+1\right)^{th}}{2}$$

$$= \frac{52 \quad 54}{2} \quad \frac{106}{2} \quad 53$$

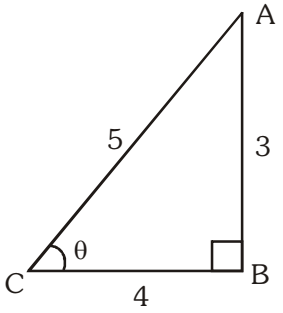
95. If, $\tan\theta = \frac{3}{4}$ then $\sin\theta \times \cos\theta = ?$

(A) 10/25 (B) 11/25 (C) 12/25 (D) 13/25

Ans. (C)

Sol. we have

$$\tan\theta \quad \frac{3}{4}$$



$$\sin\theta = \frac{3}{5}, \cos\theta \quad \frac{4}{5}$$

$$\sin\theta \times \cos\theta = \frac{4}{5} \times \frac{4}{5} \quad \frac{12}{25}$$

96. Total two digit numbers completely divisible by 3 are :

(A) 29 (B) 30 (C) 31 (D) 32

Ans. (B)

Sol. we have

a = 12, ℓ 99 (last term)

$a_n = a + (n - 1)\, d$

$99 = 12 + (n - 1) \quad 3$

$$\frac{87}{3} = n - 1$$

$29 = n - 1$

$n = 30$

97. $\sin 30^\circ \times \tan 30^\circ \times \cot 30^\circ \times \text{cosec } 60^\circ$ = ...

(A) $\tan 30^\circ$ (B) $\cot 60^\circ$ (C) $\sin 30^\circ \times \text{cosec } 60^\circ$ (D) All of the above

Ans. (D)

Sol. we have $\sin 30° \times \tan 30° \times \cot 30° \times \text{cosec} 60$

$$= \frac{1}{2} \times \frac{1}{\sqrt{3}} \times \sqrt{3} \times \frac{2}{\sqrt{3}}$$

$$= \frac{1}{\sqrt{3}}$$

98. $(3x + 6)(x + 1) + 2x = (x + 5)(x + 4)$ has

(A) No roots (B) Imaginary roots (C) Real Roots (D) None of these

Ans. (C)

Sol. we have

$(3x + 6)(x + 1) + 2x = (x + 5)(x + 4)$

$3x^2+3x + 6x + 6 + 2x = x^2+4x+5x+20$

$3x^2+11x+6= x^2 + 9x + 20$

$2x^2+2x - 14 = 0$

$x^2 + x - 7 = 0$

$D = b^2 - 4ac$

$D = (1)^2 - 4 \times 1 \times (-7)$

$D = 1 + 28 = 29$

real roots

99. Which $2x^2 + 3x + 1$ is divided by $x + 2$ then quotient and remainder are :

(A) $Q = 2x - 1, R = 3$ (B) $Q = x + 1, R = 3$ (C) $Q = 2x + 1, R = 3$ (D) None of these

Ans. (A)

Sol. we have

$D = 2x^2 + 3x + 1$, $d = x + 2$

$$\begin{array}{r|l} & 2x-1 \\ \hline x+2 & 2x^2+3x+1 \\ & 2x^2+4x \\ & - \quad - \\ \hline & 0 \quad -x+1 \\ & \quad -x-2 \\ & - \quad + \quad + \\ \hline & \quad 0 \quad +3 \end{array}$$

$Q = 2x - 1$, $R = 3$

100. The zeros of quadratic polynomial $x^2 + 7x + 10$ will be :

(A) 2 and –5 (B) –2 and 5 (C) –2 and –5 (D) None of these

Ans. (C)

Sol. $P(x) = x^2+7x+10$

$x^2 + 7x + 10 = 0$

$x + 5x + 2x + 10 = 0$

$(x + 5)(x + 2) = 0$

zeroes are $\Rightarrow -5, -2$