NATIONAL TALENT SEARCH EXAMINATION-2019-20, M.P.

SCHOLATIC APTITUDE TEST (SAT) PAPER

1. (A) Least on equator

Sol. Radius of equator is greater than radius of pole so acceleration due to gravity less at equator

2. (D) = or < 1

Sol. Distance is always greater or equal to displacement

3. (B) Always act on different bodies in opposite direction

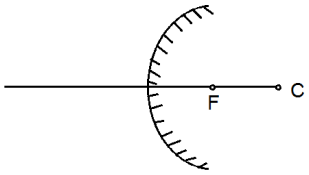
4. (B) ms^{-2}

Sol. Unit of acceleration and retardation are same which is ms^{-2}

a = change in velocity/time

5. (A) the Focal point

Sol. Focal point of convex mirror is opposite to real object



6. (A) Red

Sol. Refractive index of red is less as compare to refractive index of violet so red deviates least

7. (B) Not flow

Sol. Current flow due to potential difference

8. (B) repel to each other

Sol. Due to Flaming's LH rule

9. (C) Same at all points except at its eds

10. (C) South to North pole

Sol. Magnetic line of forces moves outside North to South pole and inside magnet South to North

11. (D) Length

Sol. $R = \frac{\rho \ell}{A}$.

12. (D) Air

Sol. Refractive index of air is least in the following materials.

13. (C) of Net force

Sol. Acceleration in a body present due to Net force acting on them

14; (B)

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

Carbon is being added with Oxygen therefore gets oxidized and Oxygen is being removed from PbO therefore it is getting reduced.

15. (A)

$Fe(s) + dil\ HCl\ (aq) \rightarrow FeCl_2\ (aq) + H_2\ (g)$

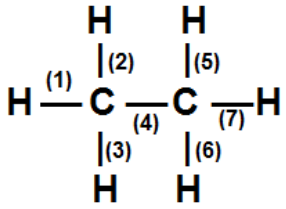
Hydrogen gas so formed act as reducing agent therefore Cl- can not get oxidised into Cl_2 neither Fe^{2+} get oxidised into Fe^{3+}.

16. (B)

C- H bond = 6

C-C bond = 1

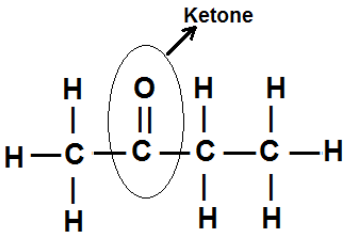
Total bonds =



17. (C)

Atomic Number = 2+8+7= 17

18. (C)



19.(B) Atomic Number = 2+8+2 = 12

Therefore it is Mg

20. (B)

S → 2,8,6, three shells

Ne→2,8, two shells

N →2,5, two shells but second shell is not completed

He →2, only one shell

21. (A)

It is a substitution reaction where H is being substituted by Cl in presence of Sunlight.

22. (B)

Addition of Hydrogen is Reduction reaction.

23. (C)

A: Cyclopropane

B . Cyclobutane

C. Cyclopentane

D. Cyclohexane

24. (D) It is Methanal and its common name is Formaldehyde.

25. (D) (All are alkane as all follow general formula C_nH_{2n+2}

26. (B)

XCl_2 solid has metal X with valency 2 therefore it is Magnesium which form $MgCl_2$ with melting point 714^oC

27. (D) Telephase, Prophase, Metaphase is dvisional phase while interphase is growth phase.

28. (D) Organelles present in hyloplasm or cytoplasm.

29. (D) Cambium is responsible for the secondary xylem & phloem formation & the ring formed.

30. (D) Stored food in plant is generally starch (They also store in the form of floredein etc)

31. (D) Approx 71% of land of coved by water. So.

32. (A) Xylem $\rightarrow$ helps in water.

33. (B) As budding term use for animals & vegetative for plant but according to NCERT ans is B.

34. (A) Ascorbic acid, Citrus Fruits & that is Rich in Vitamic C.

35. (B) At root tip (Root + Cap is present so slow division activity or No growth at Root tip.

36. (C) Cyto $\rightarrow$ Cell Kinin $\rightarrow$ division done in plant, where insulin, thyroxin & oestrogen is Human hormone.

37. (C)

r-RNA $\rightarrow$ Ribosomal RNA + Protein } Ribosomal unit

38. (D) Anther male reproductive part & Pollen grain carry male gemele.

39. (C) $\rightarrow$ Peroxisome Responsible for photo respiration.

40. (C) Pollination $\rightarrow$ Monocots plant shows wind pollination generally.

41. (D)

42. (C)

43. (C)

44. (D)

45. (A)

46. (A)

47. (C)

48. (A)

49. (B)

50. (A)

51. (A)

52. (B)

53. (A)

54. (B)

55. (A)

56. (C)

57. (C)

58. (C)

59. (D)

60. (B)

61. (D)

62. (B)

63. (D)

64. (A)

65. (B)

66. (B)

67. (A)

68. (D)

69. (B)

70. (D)

71. (A)

72. (C)

73. (C)

74. (D)

75. (C)

76. (A)

77. (C)

78. (B)

79. (C)

80. (C)

a = 10

$$\frac{14}{2}\left[2a+(x-1)d\right]=1050$$

$$7\left[2x10+13d\right]=1050$$

$$20+13d=150$$

$$13d=130$$

$$\boxed{d=10}$$

$$t_{20}=a+(20-1)d$$

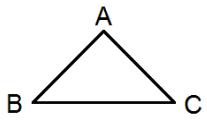
$$=10+19\times10$$

$$=10+190$$

$$t_{20}=200$$ (D)

82. (B)

83. (B)



84. (A) $\frac{\tan 65}{\cot 25}=\frac{\tan(90-65)}{\cot 25}$

$$\frac{\cot 25}{\cot 25}=1.$$

85. (D) $\boxed{0\le p(A)\le 1}$.

86. (D) 69

87. (B) 1 : 2 : 3

X; 2x; 3x

X + 2x + 3x = 180

6x = 180

x = 30

30°, 60°, 90°

Largest angle 90°.

88. (B) $7x-15y-2=0$ ..... (i) x 6

$6x+12y-18=0$ ..... (ii) x 7

$42x-90y-12=0$

$42x+84y-126=0$

$\underline{\quad -\quad -\quad +\quad \quad}$

$-174y+114=0$

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

Put $y=\frac{19}{29}$ in equation (i)

$y=-15y-2=0$

$7x-15\left(\frac{19}{29}\right)-2=0$

$7x-\frac{285}{29}-2=0$

$7x-\frac{285+58}{29}$

$7x=\frac{343}{29}$

$x=\frac{343}{7\times 29}$

$x=\frac{49}{29}$ (B)

89. (C) $5x-8y+1=0$ .....(i)

$3x-\frac{24}{5}y+\frac{3}{5}=0$ .....(ii)

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

$\frac{5}{3}=\frac{8}{\frac{24}{5}}=\frac{1}{\frac{3}{5}}$

$\frac{5}{3}=\frac{5}{3}=\frac{5}{3}$

So, infinite many solution (C).

90. (C) Area of triangle $\frac{1}{2}\left|x_1(y_2-y_3)+x_2(y_3-y_1)+x_3(y_1-y_3)\right|$

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

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

$$=\frac{1}{2}\left|48\right|$$

Area = 24 (C).,

91. (B) a=2, d = 5

T_{10}

93. (D) $\frac{\cos 30^\circ \times \sin 60^\circ}{\cos 60^\circ}$

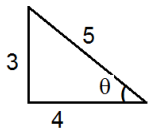
$$\frac{\frac{\sqrt{5}}{2}\times\frac{\sqrt{13}}{2}}{\frac{1}{2}}=\frac{\frac{3}{4}}{\frac{1}{2}}=\frac{3}{4}\times 2=\frac{3}{2}$$ (D)

94. (B) Ascending order $\rightarrow$ 30, 32, 40, 52, 54, 57, 64, 108

Median = $\frac{4^{th}ob+5^{th}ob}{2}$

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

95. (C)



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

$\sin\theta x\cos\theta=\frac{3}{5}\times\frac{4}{5}=\frac{12}{25}$.

96. (B) 12, 15, …….. 99

99 = 12 + (n-1) 3

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

97. (D) $\frac{1}{2}\times\sqrt{3}\times\frac{1}{\sqrt{3}}\times\frac{2}{\sqrt{3}}=\frac{1}{\sqrt{3}}$.

All of the above.

98. (C) $3x+9x+6+2x=x^2+9x+20$

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

$x^2+x-7=0$

$D=1-4(-7)=29$

D > 0

(C) Real roots.

99. (A)

$$\begin{array}{r} 2x-1 \\ x+2\,\overline{)\,2x^2+3x+1} \\ \underline{2x^2+4x} \\ -x+1 \\ \underline{-x-2} \\ 3 \end{array}$$

$\theta = 2x-1$ R = 3

100. (C)

$x^2+7x+10$

$(x+5)(x+2)$.

$x=-5,-2$