**XIV SCIENCE TALENT SEARCH EXAMINATION, DEC-2001**

**(Dr.A.S.Rao Awards Council)**

**10 th Standard (E.M.) Time: 3 hours**

**Marks: 250**

### INSTRUCTIONS

1. You have to mark your answers ***ONLY ON THE ANSWER SHEET*** provided. ***Indicate your answer by completely blackening the corresponding square block (s) provided in the answer sheet using a HB pencil.***

***1/4th mark will be deducted for every wrong answer.***

2. The questions given are of **three** types:

## Section – A

**Q.Nos.** ***1 to 80 are multiple choice with only one correct answer***. Blacken the square block completely corresponding to the correct answer (a/b/c/d) in the answer sheet provided.

##### Section – B

**Q.Nos. *81 to 120 are Assertion-Reason*** type questions. Blacken the square block completely corresponding to the correct answer (a/b/c/d) in the answer sheet.

##### Section – C

**Q.Nos. *121 to 150 are multiple choice which may have more than one answer.*** Blacken the square block(s) completely corresponding to the correct answer (s) (a/b/c/d) in the answer sheet. ***No credit for part of the answer.***

3. If you wish to change the answer, you have to erase the corresponding square block completely and then blacken the correct square block.

4. Attempt all questions.

5. Write your Hall Ticket number completely and legibly on the answer sheet in the space provided.

6. No calculator or logarithm tables are allowed for use in the Hall.

7. Return only the Answer sheet to the invigilator at the end of the examination.

***Section -A***

40 x 1=40 marks

Each question given below is provided with four options, of which **only one option is correct.** Blacken the correct one in the answer sheet.

1. A circular ground of radius 10m. is to be paved by 2001 identical tiles in the shape of isosceles triangles with lateral sides equal to 10m. If all the vertices should be at the centre, the length of the base of the tile is

a) 20 Sin (π / 2001) b) 10 Sin (π / 2001)

c) 10 Sin (2π / 2001) d) 10 Sin (π / 2002)

2. The minimum value of (x-1)2 + (x-2)2 +…+(x-2001)2 is attained at x equal to

a) 2001 b) 1001 v) 2000 d) 1000

3. A lattice point in a plane is a point with integral coordinates. The number of lattice points in the interior of the rectangle whose vertices are (30,70), (100,70), (30,100) and (100,100) is

a) 2201 b) 2100 c) 2001 d) 1904

4. C1 is a fixed vertical circle. A circle C2 of smaller radius moves on the horizontal common tangent of both the circles. C2 starts its motion when it is in contact with C1. It moves such that it overlaps the first circle. Let Δ1 denote the area of the overlap and Δ2 denote the difference of the non-overlapping areas. Then

1. Δ2 increases as Δ1 increases
2. Δ2 increases as Δ2 decreases
3. Δ2 is a constant
4. Δ1 / Δ2 is a constant

5. Consider the following statements:

S: x2+y2=a2, x≤y has a solution in positive integers

T: The octant of the circle intercepted between the lines x=0 and y=x is cut by a ray through the point (a,0) in a lattice point (p,q) such that p≠0. (A lattice point is one both coordinates of which are integers). Then

a) S⇒T, but T⇒S b) T⇒S, but S⇒T

c) S⇔T d) S⇒T and T⇒S

6. Let S = R – { i is an integer / 1 ≤i≤ 2001, -2001≤i≤-1}

f: S→R and g: S→R are defined by

f(x) =  and

g(x) = 2002.  . Then

a) f(x) > g(x) for all x∈S b) f(x) < g(x) for all x∈S

c) f(x) = g(x) for all x∈S d) f(x) = -g(x)for all x∈S

7. AD is the altitude of the equilateral triangle ABC. The circle with diameter AD cuts AB in E and AC in F. Then EF / BC is equal to

a) ½ b) 2/3 c) ¾ d) 4/5

8. If a positive integer n leaves a remainder of p on division by a positive integer m>1, then the remainder obtained on dividing (n-p)m by m2 is

a) m b) n

c) 0 d) none of these

9. Consider the five statements given in order below:

S1: All of the following are true

S2: None of the following is true

S3: Some of the following are true

S4: All of the above are true

S5: None of the above is true

Given that precisely one of the statements is true, the true statement is

a) S5 b) S4 c) S3 d) S1

10. P is a point outside a circle with centre 0. The locus of the midpoints of chords cut off the secants through P by the circle is a circle with centre at

a) P b) 0

c) the mid point of OP d) None of the above

11. The number of solutions of real numbers of the system x1x2=1, x2x3=2, x3x4=3,----- x2000 x2001=2000, x2001.x1 = 2001 is

a) 0 b) 1

c) 2 d) infinitely many

12. If x2+ax+b and x2+cx+d are real quadratics with determinants Δ1 and Δ2 respectively and (x-2) (x+3) divides (x2+ax+b)(x2+cx+d) then it is impossible that

a) Δ1Δ2>0, Δ1+Δ2<0 b) Δ1Δ2>0, Δ1+Δ2>0

c) Δ1Δ2<0, Δ1+Δ2<0 d) Δ1Δ2<0, Δ1+Δ2>0

13. C is a point on the line segment AB. In a semicircle on AB two smaller semicircles are drawn, one on AC and another on BC. Let S be the area of the region bounded by the 3 semicircles. Let the common tangent at C to smaller semicircles meet the bigger semicircle in T. Let Δ be the area of the semicircle on CT. The Δ/S is equal to

a) 1 b) 2 c) ½ d) None of these

14. D is a point in the side AB of ΔABC. Parallel to BC through D meets AC in E. Parallel to DC through E meets AB in F. If AF=4 and FD=6 then DB is

a) 10 b) 15 c) 20 d) 25

15. A 4m x 4m square GI sheet rests against a vertical wall making an angle of 300 with it. The area of ground in square meters that is protected from the vertical rain is

a) 8√3 b) 8

c) 8/ √3 d) None of these

16. Let I(x) denote the greatest integer less than or equal to x for any real x. The number of integral solutions of the equation

I(x) + I(2x)+I(3x)=2001 is

a) 0 b) 1 c) 2 d) 3

17. The sum of the cubes of all positive fractions in their lowest terms which are less than the integer n and have 7 for their denominator is

a)  b) 

c)  d) 

18. If two sides of a triangle are given, then the area

1. increases as the included angle increases
2. decreases as the included angle increases
3. is least when the included angle is a right angle
4. None of these

19. The radii of two concentric circles in a plane are 13 and 8. AB is a diameter of the larger circle and BC a chord of the larger circle tangential to the smaller circle at D. Then the length of AD is

a)  b) 

c) 19 d) None of these

20. The remainder which 72001 leaves on division by 31 is

a) 0 b) 30 c) 7 d) 4

1. The total number of electrons present in all the orbitals corresponding to the quantum number l = 2, is

a) 2 b) 4 c) 8 d) 10

1. The correct increasing order of energy of the atomic orbitals shown below is

a) 3p < 3d < 4s < 4p b) 3p < 4s < 4p < 3d

c) 3p < 4p < 4s < 3d d) 3p < 4s < 3d < 4p

1. ‘f’ orbitals are present in the

a) N-shell b) M-shell c) L-shell d) K-shell

1. The molecule which is pyramidal in shape is

a) NH4+b) NH3 c) H3O+ d) PCl5

1. The compound which has all the three types of bonds – covalent, coordinate covalent as well as ionic, is :

a) H3O+ b) PCl3 c) NH4Cl d) PH3

1. The most electropositive element is :

a) F b) Cs c) C d) H

1. Across a period in the periodic table, the property which decreases from left to right is

a) electronegativity b) oxidizing property

c) atomic size d) electron affinity

1. Which one of the following outermost electronic configurations represents an element with the lowest ionization energy?

a) ……ns1 b) ……ns2np3 c) ……ns2np5 d) ……ns2np6

1. The element which gives a peroxide on heating in excess of air is

a) Be b) Ca c) Mg d) Ba

1. The mineral which contains the metals magnesium and potassium is

a) Dolomite b) Carnallite c) Beryl d) Asbestos

1. The weight percentage of a solute in a solution is 10. The weight of the solution is 150 gm. The weight of water in the solution is

a) 90 gm b) 100 gm c) 135 gm d) 140 gm

1. The weight of glucose (Mol.wt.=180) required to prepare 250 ml of 0.1 M solution is

a) 4.5 gm b) 6.0 gm c) 9.0 gm d) 18 gm

1. A gas mixture contains equal masses of methane (Mol.wt.=16) and sulphur dioxide (Mol.wt.=64). The mole fraction of methane in the mixture is :

a) 0.25 b) 0.5 c) 0.75 d) 0.8

1. Which one of the following is a weak electrolyte ?

a) NaCl b) KNO3 c) CH3COOH d) BaCl2

1. At 25o C the ionic product of water in a solution of 0.1 M NaOH is

a) 1.0 x 10-10 b) 1.0 x 10-14 c) 1.0 x 10-4 d) 1.0 x 10-7

1. The linkage –C-O-C- in organic compound represents an

a) alcohol b) aldehyde c) ether d) ester

1. The compound used in artificial ripening of fruits is

a) acetylene b) ethylene c) methane d) propene

1. Which one of the following compounds is an oligosaccharide ?

a) fructose b) mannose c) starch d) maltose

1. Which one of the following is NOT an essential amino acid ?

a) Valine b) Glycine c) Threonine d) Leucine

1. The fatty acid present in coconut oil is

a) stearic acid b) lauric acid

c) linoneic acid d) oleic acid

41. If the value of 1 MSD is ‘s’ and ‘N’ is the total no.of vernier scale divisions, then the least count of the vernier callipers is

a)  b)  c) SN d) N+S

42. The length of a seconds pendulum at a place where g=9.8 m/s2 is approximately equal to

a) 100 m b) 100 cm c) 200 cm d) 200 m

43. The weight of 400 gm stone is (g=10 m/s2)

a) b) c) d)

44. If a body starting from rest covers distances in direct proportion to the square of time elapsed, then the body is moving with

a) constant velocity b) zero acceleration

c) varying acceleration d) uniform acceleration

45. In a stationary wave, the points at which the displacements is minimum are called

a) nodes b) antinodes c) crests d) troughs

46. On a curved road of radius of curvature and angle of banking θ, a car moves with velocity ν, then (g acceleration due to gravity)

1. centripetal force is equal to weight of car
2. the normal reaction is equal to weight of car
3. tan θ = γ2 / log γ
4. tan θ = centrifugal force / weight of car

47. Bending of light waves around an obstacle is known as

a) refraction b) reflection

c) diffraction d) interference

48. The process of achieving population The magnetic induction B at a point distance r, due to a straight current carrying conductor is (current flowing = i)

a)  b) 

c)  d) 

53. A uniform wire is in the form of a triangle with sides of length 3,4 and 5 units. The ratio of resistance of system across side 3 to across side 5 is

a) b) c) d)

54. The magnetic field lines due to current in a straight wire are

1. perpendicular to the wire
2. parallel to the wire
3. circular, around the wire
4. circular with centres outside the wires

55. In a nuclear reaction 2He4 + X → 8O17+1H1 the element X is

a) 1H1 b) 2He4 c) 7N15 d) 7N14

56. Electromagnetic radiation observed in radio-activity is

a) α emission b) β emission

c) γ emission d) X-ray emission

57. In the forward bias condition a junction diode will have

a) high resistance b) low resistance

c) low current d) low charge

58. The element used for making control rods in a nuclear rector is

a) calcium b) sodium c) carbon d) cadmium

59. The relation between decay constant λ and half life of a radioactive substance

a)  b) λ = 0.693 T

c) λ = 1/T d) λ = T

60. Different elements having same number of neutrons are called

a) isotopes b) isotones c) isobars d) isomers

1. The process in which energy stored in carbohydrates is released, is known as

a) Photosynthesis b) Respiration

c) Reproduction d) Excretion

1. Electron acceptor is

a) Carbon dioxide b) Starch

c) Glucose d) NADP

1. Pyruvic acid is converted into lactic acid by

a) Rhizopus b) Clostridium

c) Lactobacillus d) Euglena

1. Cell division in vascular cambium is promoted by

a) IAA b) NAA

c) Cytokinins d) Ethylene

1. Amino acids are found in

a) Fats b) Proteins

c) Oils d) Cholesterol

1. The important anion in the body is

a) Potassium b) Bromide

c) Chloride d) Calcium

1. Hypothyroidism is due to the deficiency of

a) Iodine b) Calcium

c) Potassium d) Fluorine

1. The vitamin required for the synthesis of nucleic acid is

a) Tocoferol b) Folic Acid

c) Riboflavin d) Calciferol

1. Female gametophyte at the time of fertilization is

a) One celled b) 4-celled

c) 7-celled d) 8-celled

1. The idea of tissue culture was given by

a) Hulfweister b) Hanstein

c) Haberlaudt d) Hanning

1. The total number of ATP molecules produced when one molecule of glucose is converted to 2 molecules of pyruvate is

a) 2 b) 4 c) 6 d) 8

1. Pulmonary respiration is seen in

a) Fish b) Earthworm

c) Insects d) Bird

1. Ventricle is incompletely divided in

a) Crow b) Cat

c) Camel d) Lizard

1. In earthworm, the sperms are stored in

a) Seminal Vesicles b) Testis lobes

c) Spermathecae d) Clitellum

1. The discharge of the ovum from the ovarian follicle is called

a) Oviposition b) Oogenesis

d) Ovulation d) Menstrual cycle

1. One gram glucose gives this much of energy

a) 2 Kilo calories b) 4 Kilo calories

c) 6 Kilo calories d) 8 Kilo calories

1. The disease due to deficiency of both protein and calories is

a) Marasums b) Kwashiorkor

c) Pellagra d) Scurvy

1. A fracture in which the bone bends but not breaks is called

a) Compound fracture b) Complicated fracture

c) Green stick fracture d d) Comminuted fracture

1. Glycogen is stored in

a) Liver b) Kidney

c) Fat body d) All the above

1. Filariasis is caused by

a) Protozoa b) Nematode

c) Insect d) Virus

###### Section - B

40 x 2 = 80 marks

The following questions consist of two statements, one labeled the **ASSERTION ‘A’** and the other labeled **REASON ‘R’.** You are required to examine these two statements carefully and decide if the **ASSERTION ‘A’ & REASON ‘R’** are individually true and if so, whether the Reason is a correct explanation of the Assertion. Select your answers using the codes given below and mark your answer sheet accordingly.

**Code**

Both A & R are true and R is the correct explanation of A **a**

Both A & R are true but R is not a correct explanation of A **b**

A is true but R is false **c**

A is false but R is true **d**

81. Assertion A: 2001 can be written as a difference of 2 perfect

squares in precisely 4 different ways.

REASON R : 2001 can be written as a product of two odd

positive integers in precisely 4 different ways.

82. Assertion A: The vertical angle of the isosceles triangle of

sides 5,5,6 is supplementary to the vertical angle of the isosceles triangle of sides 5,5,8.

REASON R : The above two triangles have the same area.

83. Assertion A: If p,m,n are natural numbers and p/m,p/n then p

/ m+n.

REASON R : If p,m,n are natural numbers and p/m, p/n then

p/m+n.

84. Assertion A: No parallelogram can be cyclic.

REASON R : In a parallelogram the opposite angles are equal

where as in a cyclic quadrilateral the opposite angles are supplementary.

85. Assertion A: If non-empty finite sets S and T have

respectively m,n elements and there exists a bijection f:S→T then m=n.

REASON R : If f has to be onto it is necessary that m≥n and

if f has to be one-one it is necessary that m≤n.

86. Assertion A: 2001 points are given in a plane such that the

distances between pairs of points are distinct. If every point is joined to its nearest point no triangle is formed.

REASON R : 2001 is a multiple of 3.

87. Assertion A: Given a real quadratic, if the sum and the

product of the roots are both positive, then its roots must be positive real numbers.

REASON R : If the product of real roots of a real quadratic is

positive the roots must be of like sign and if their sum is also positive, each of them must be positive.

88. Assertion A: The locus of the vertices of the parabolas

y=ax2+2x+3 is a line.

REASON R : If (Vx,Vy) is the vertex of such a parabola, then

Vx=b/2a and Vy= (b2-4ac) / a.

89. Assertion A: The area of a rectangle of constant perimeter

attains its maximum in a square.

REASON R : The AM of two positive real numbers is not less

than their GM.

90. ASSERTION A : Let x1,x2,……..x2001 be lengths of the sides of a

polygon. Let y1,y2,…..y2001 be a permutation of x1,x2,…x2001 then y1+y2+….y2000 > y2001.

REASON R : The assertion is obviously a generalization of a

statement which is known to be true for a triangle.

1. ASSERTION A : While filling up atomic orbitals, the 3d orbitals are filled first and

only then the 4p orbitals.

REASON R : 3d and 4p orbitals both have the same (n+l) value; since the 3d orbitals have a lower n value, they are filled first.

1. ASSERTION A : In the ethylene molecule, one C– C bond is a “σ” bond, while the other is a “π “ bond.

REASON R : In a reaction involving C = C bond, both the bonds are broken simultaneously.

1. ASSERTION A : Ionic compounds are crystalline solids with relatively high melting points.

REASON R : The ionic bond is formed by the transfer of electron(s) from one bonding atom to the other.

1. ASSERTION A : Magnesium is extracted by the electrolysis of an aqueous solution of magnesium chloride.

REASON R :

1. ASSERTION A : The ionization energy of barium is less than that of calcium.

REASON R : In barium atom the attraction between the nucleus and the most loosely bound electron is far less than that in the calcium atom.

1. ASSERTION A : The electronic configuration of copper is [Ar]4s1 3d10 and not [Ar]4s2 3d9.

REASON R : Copper(II) compounds are coloured.

1. ASSERTION A : At a constant temperature, the ionic product of water has the same value, whether a solution is acidic, basic or neutral

REASON R : The ionic product of water, Kw , is an equilibrium constant and equilibrium constants are independent of all factors except temperature

1. ASSERTION A : Glucose is a non-reducing carbohydrate.

REASON R : Sucrose, on hydrolysis, gives glucose and fructose.

1. ASSERTION A : The energy of a quantum of radiation is directly proportional to its wavelength.

REASON R : Ultraviolet rays are more energetic than infrared rays.

1. ASSERTION A : Methane can be prepared by the hydrolysis of aluminium carbide.

REASON R : Methane can also be prepared by the hydrolysis of calcium carbide.

101. ASSERTION A : The resistance of metals increases with temperature.

REASON R : Metals have large number of free electrons.

102. ASSERTION A: X-rays have more penetrating power than radio-waves.

REASON R : Radio waves are not electromagnetic waves.

103. ASSERTION A: The refractive index of water is more than that of air.

REASON R : The velocity of light in water is less than in air.

104. ASSERTION A: An ammeter is always connected in series in a circuit.

REASON R : The resistance of ammeter is very small compared to circuit

Resistance.

105. ASSERTION A: The value of g is maximum at poles and minimum at the

equator.

REASON R : The value of g at the centre of the earth is zero.

106. ASSERTION A: Superposition of two coherent waves produces an interference

pattern.

REASON R : Coherent waves will have constant phase difference between them.

107. ASSERTION A: The magnetic susceptibility of a diamagnetic substance is

positive.

REASON R :

.108. ASSERTION A: γ-rays are unaffected by electric and magnetic fields.

REASON R : γ-rays are mechanical waves.

109. ASSERTION A: The mass of a body is different at different places.

REASON R : A body weighs more at the poles than at equator.

110. ASSERTION A: The resistance of selenium changes when exposed to light.

REASON R : Selenium is a photo-sensitive material.

1. ASSERTION A : Photolysis is splitting up of water activated by Chlorophyll.

REASON R : Mitochondria are the sites of photolysis.

1. ASSERTION A : Fermentation by yeast occurs in the absence of oxygen.

REASON R : Most production of A.T.P requires the presence of oxygen.

1. ASSERTION A : Photosynthesis maintains the O2 balance in nature.

REASON R : The bye product of photosynthetic reactions is oxygen.

1. ASSERTION A : Apical dominance is suppression of lateral buds by terminal

buds.

REASON R : Indole acetic acid (IAA) induces Apical dominance.

1. ASSERTION A : Conjugation rejuvenates the paramoccia and helps them to recover the strength lost by repeated binary fissions.

REASON R : Through conjugation exchange of genetic material takes place.

1. ASSERTION A : The human brain has more than 10 billion neurons.

REASON R : The human brain can analyze a problem and think of a solution.

117. ASSERTION A : A hormone may act on one or more target tissues.

REASON R : Testosterone helps in the development of secondary sexual characters in the female.

118. ASSERTION A : About 93% of the population in our country are Rh positive.

REASON R : Rh factor is very important at the time of blood transfusion just like blood group.

119. ASSERTION A : Pulmonary artery carries oxygenated blood from heart to lungs.

REASON R : In lungs blood is purified.

120. ASSERTION A: Abscisic acid is a substance which inhibits plant growth.

REASON R: Fall of leaves, flowers and fruits from the plants is due to action of Abscisic acid.

**Section –C**

**Q.Nos. *121 to 150 are multiple choice which may have more than one answer.*** Blacken the square block(s) completely corresponding to the correct answer (s) (a/b/c/d) in the answer sheet. ***No credit for part of the answer.***

121. A set consisting of 2001 elements is partitioned into 58 disjoint subsets, no two sets containing the same number of elements. The smallest subset contains 6 elements and the largest 63. Then there exists a subset in the partition containing

a) 23 elements b) 29 elements

c) 46 elements d) 58 elements

122. Given n positive integers not necessarily distinct three of them can be found such that their sum is divisible by 3 if

1. n=3
2. n=3 and the chosen numbers leave different remainders on

division by 3

1. n=4 d) n=5

123. There is a triangle with sides a,b,c. Then there is a triangle with sides

a) √a, √b, √c b) a2, b2, c2

c) a+b,b+c,c+a d) 

124. f (a,x) = x2-a(2x+1) + (a2-1). Let R+ be the set of all non-negative reals

 then

1. (0,1) ∈ S and (1,2) ∈ S
2. S is a reflexive relation in R+
3. S is a symmetric relation in R+
4. S is an equivalence relation in R+

125. There can not be a century whose last day is a

a) Sunday b) Monday

c) Tuesday d) Wednesday

126. Given two sets of positive real numbers {a,b,c}, {x,y,z} with the same GM and AM the sets are equal

a) always b) if the sets have same HM

c) if {ab,bc,ca} and {xy,yz,zx} have the same AM

d) if the GM’s of {a,b},{b,c},{c,a} are respectively equal

to the G.M.’s of {x,y},{y,z},{z,x}

127. If a rhombus is inscribed in a rectangle the triangles formed in the four corners are

a) equal in area b) similar

c) congruent d) None of these

128. If S= 

and T= then

a) S≤T b) T ≤ S

c) S=T d) SΛT=ϕ

129. If x is a real number, let I(x) denote the greatest integer less than or equal to x and F(x) denote x-I(x) then

1. I(x)+I(-x)=-1 if x is real but not an integer
2. F(x) + F(-x)=1 if x is real but not an integer
3. F(x)≥0 for all real x
4. I(m) = I(-m), if m is an integer

130. A solution of the equation |x|-|2x|+|3x|-|4x|+….+\2001.x| =143 is

a) 7 b) 1/7 c) -7 d) -1/7

1. The properties which decrease down a group in the periodic table are

a) electronegativity b) ionization energy

c) atomic size d) reducing property

1. The p-block elements among the following are

a) Sodium b) Calcium c) Carbon d) Fluorine

1. The molecules which contain multiple covalent bonds are

a) N2 b) CH4 c) CO2 d) NH3

1. Which of the following chlorides are covalent ?

a) CaCl2 b) MgCl2 c) BaCl2 d) BeCl2

1. Which of the following solutions are 0.5 M in concentration ?

a) 34.2 gm of sucrose (Mol.wt.=342) in 1 litre of solution

b) 53.0 gm of sodium carbonate (Mol.wt.=100) in 1 litre of

solution

c) 41.5 gm of potassium iodide (Mol.wt.=166) in 500 ml of

solution

d) 58.5 gm of sodium chloride (Mol.wt=58.5) in 500 ml of

solution

1. Which of the following have a pHless than 7 ?

a) vinegar b) grape juice

c) blood d) milk of magnesia

1. The molecules which have a c=c bond are

a) propyne b) ethane c) butane d) pentene

1. The metal oxides which give a green colour when added to glass are

a) Feo b) MnO2 c) Cu2O d) Cr2O3

139. Consider a spring mass system auda simple pendulum

1. The time periods of oscillation depends on mass in spring mass system but not in simple pendulum
2. The time period becomes half if spring length is reduced to half
3. The time period becomes  times if length of simple pendulum is halved
4. If simple pendulum is attached to spring and mass is displaced vertically the time period will depend on the length of string of the simple pendulum

140. In a resonance air column, when resonance takes place

1. Stationary wave is formed
2. In air there could be any number of nodes and antinodes
3. At the open end a node is formed
4. Four times air column length is integral multiple of wave length of sound in air

141. In case of bar magnet

1. magnetic moment has units of momentum
2. far away from magnet, magnetic field along axial line is twice of the field at the same distance along equatorial line
3. the neutral points lie along equatorial line if north pole of the magnet points to north pole of earth
4. the magnetic domains align their magnetization preferentially in one direction.

142. A voltage source E is connected across two parallel resistors R1 and R2

1. Power consumed is more in R1 if R1>R2
2. Voltage across R1 is more if R1>R2
3. Current is more in R1 if R1<R2
4. The total power consumed is two times than in individual resistances when R1=R2

143. Consider a straight wire carrying current

1. the magnetic field lines produced are parallel to the wire
2. the magnetic field at any point is **B**, then electric field at that point is zero
3. in an external magnetic field the wire experiences a force proportional to current in the wire
4. the direction of force on it in an external magnetic field is given by Fleming’s right hand rule

144. In a nuclear reactor

1. fuel elements due to fission produce neutrons
2. boron is used in control rods
3. energy is produced in form of heat
4. heavy water reduces the speed of neutrons
5. Essential amino acids are

a) Isoleucine b) Threonine

c) Aspartic acid d) Alanine

1. Naturally occurring plant growth substances are

a) Indole acetic acid b) 2,4-D

c) Abscisic acid d) Ethylene

1. Which of the following are micronutrients?

a) Sodium b) Molybdenum

c) Zinc d) Chloride

1. Measles is caused by the virus

a) Myxovirus b) Paramyxovirus

c) Arboviruses d) None of the above

1. The biggest of all white blood cells are

a) Lymphocytes b) Monocytes

c) Eosinophils d) Neutrophils

1. In glycolysis

a) 2 ATPS are utilized and 4 ATPS are produced

b) 4 ATPS are utilized and 2 ATPS are produced

c) 2 molecules of NADH are formed

d) 2 pyruvic acids are produced