FIITJEE

SCHOLASTIC APTITUDE TEST – 2014

Time: 90 minutes **Maximum Marks: 90**

Please read the instructions carefully.

INSTRUCTIONS

Instruction to the Candidates

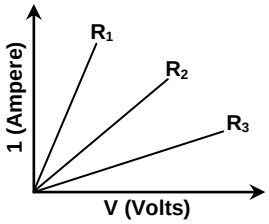
Read the following instructions carefully before you answer the questions:

1. **Answers are to be given on a SEPARATE ANSWER SHEET.**
2. **Pleas write your twelve digits Roll Number very clearly on the Test-Booklet and Answer Sheet as given in your admission card.**
3. **Please note and follow the instructions, given on the answer sheet for writing the answers.**
4. **Darken the CIRCLE with pen for answering the question in the appropriate space against the number corresponding to the question you are answering.**
5. **There are 90 questions in the test.**
6. **Since all questions are compulsory, do not try to read the whole question paper before beginning to answer it.**
7. **If you do not know the answer to any question, do not spend much time on it and pass on to the next one. Time permitting, you can come back to the question, which you have left in the first instance and try them again.**
8. **Since the time allotted for this question paper is very limited you should make the best use of it by not spending too much time on any one question.**
9. **Rough work can be done anywhere in the Test Booklet but not on the Answer sheet/loose paper.**
10. **Every correct answer will be awarded one mark.**
11. **Please return the Answer Sheet to the invigilator after the test.**

Please Turn Over The Page And Start Your Work.

PHYSICS

1. A student carries out an experiment and plots the V–I graph of three samples of Nicrome wire with resistance R_1, R_2 and R_3 respectively. Which ofeth following is true?



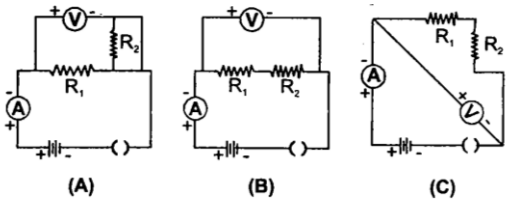
(A) $R_1 = R_2 = R_3$

(B) $R_1 > R_2 > R_3$

(C) $R_3 > R_2 > R_1$

(D) $R_2 > R_3 > R_1$

2. While doing their experiment on finding the equivalent resistance of two resistors connected in series, the students A, B and C set up their circuits as shown. The correct set up is that of:



(A) Students A and B (B) Students B and C
(C) Students C and A (D) All the three students

3. Commercial electric motors do not use:
(A) An electromagnet to rotate the armature
(B) Effectively large no. of turns of conducting wire in the current carrying coil
(C) A permanent magnet to crate the armature
(D) A soft iron core on which the coil is wound

4. What is the angle of incidence when the incident ray is normal to the interface or boundary separating two media?
(A) 0^o (B) 90^o
(C) 180^o (D) 45^o

5. In an experiment with a rectangular glass slab, for an angle of incidence of 60^o in air, angle of refraction is measured to be r_1. When the glass slab is replaced by a hollow slab filled with water, angle of refraction is measured to be r_2. Then:
(A) $r_2 = r_1$ (B) $r_2 > r_1$
(C) $r_2 < r_1$ (D) Cannot say

6. If angle of minimum deviation through an equilateral prism is 40^o, angle of incidence (being equal to angle of emergence) would be:
(A) 50^o (B) 60^o
(C) 40^o (D) None of these

7. A convex lens of focal length f_1 is held in contact with a concave lens of focal length f_2. We cab find rough focal length of the combination only when:
(A) $f_1 = f_2$ (B) $f_1 < f_2$
(C) $f_1 > f_2$ (D) None of these

8. An apple falls from a tree because of gravitation between the earth and apple. If F_1 is the magnitude of force exerted by the earth on the apple and F_2 is the magnitude of force exerted by apple on earth, then:
(A) F_1 is very much greater than F_2 (B) F_2 is very much greater than F_1
(C) F_1 is only a little greater than F_2 (D) F_1 and F_2 are equal

9. A body floats with $\frac{1}{3}$ of its volume outside water and $\frac{3}{4}$ of its volume outside another liquid. The density of the other liquid is:

(A) $\frac{9}{4}\times10^3$ kg/m^3 (B) $\frac{4}{9}\times10^3$ kg/m^3

(C) $\frac{8}{3}\times10^3$ kg/m^3 (D) $\frac{3}{4}\times10^3$ kg/m^3

10. A hydrometer floats with half of its stem outside water surface. It is now placed in alcohol (R.D = 0.8). The hydrometer floats:
(A) with stem at the same position
(B) with more stem inside the alcohol
(C) with more stem outside alcohol
(D) in tilted pos8ition

11. A key of a mechanical piano is struck gently and then struck again but much harder this time. In the second case:
(A) Sound will be louder but pitch will not be different
(B) Sound will be louder and pitch will also be higher
(C) Sound will be louder but pitch will be lower
(D) Both loudness and pitch will remain unaffected

12. The intensity of sound wave gets reduced by 20% on passing through a slab. The reduction in intensity on passing through two consecutive slabs is:
(A) 40%
(B) 36%
(C) 30%
(D) 50%

CHEMISTRY

13. A dilute Ferrous sulphate solution was gradually added to the beaker containing acidified Permanganate solution. The light purple colour of the solution fades and finally disappears. Which of the following is the correct explanation for the observation?
(A) $KMnO_4$ is an oxidizing agent, it oxidizes $FeSO_4$
(B) $FeSO_4$ acts as an oxidizing agent and oxidizes $KMnO_4$
(C) The colour disappears due to dilution: no reaction is involved
(D) $KMnO_4$ is an unstable compound and decomposes in presence of $FeSO_4$ to a colourless compound

14. In the double displacement reaction between aqueous potassium iodide and aqueous lead nitrate, a yellow precipitate of lead iodide is formed. While performing the activity if lead nitrate is not available, which of the following can be used in place of lead nitrate?
(A) Lead sulphate (insoluble)
(B) Lead acetate
(C) Ammonium nitrate
(D) Potassium sulphate

15. Which of the following are exothermic processes?
(A) Reaction of water with quick lime
(B) Dilution of an acid
(C) Evaporation of water
(D) Sublimation of Camphor (Crystals)
1.(a) and (b)
2.(b) and (c)
3.(a) and (d)
4.(c) and (d)

16. If a few drops of a concentrated acid accidently spill over the hand of a student, what should be done?
(A) Wash the hand with saline water
(B) Wash the hand immediately with plenty of water and apply a paste of sodium hydrogen carbonate
(C) After washing with plenty of water apply solution of sodium hydroxide on the hand
(D) Neutralise the acid with a strong alkali

17. Which of the following is acidic in nature?
(A) Lime juice
(B) Human blood
(C) Lime water
(D) Antacid

18. Which of the following represent saponification reaction?
(A) $CH_3COONa + NaOH \xrightarrow{CaO} + Na_2CO_3$
(B) $CH_3COOH + C_2H_5OH \xrightarrow{H_2SO_4} CH_3COOC_2H_5 + H_2O$
(C) $2CH_3COOH + 2Na \rightarrow CH_3COONa + H_2$
(D) $CH_3COOC_2H_5 + NaOH \rightarrow CH_3COONa + C_2H_5OH$

19. Hard water does not easily produce lather with soap because it contains:
(A) Only Mg^{2+} ions
(B) Only Ca^{2+} ions
(C) Both Mg^{2+} and Ca^{2+} ions
(D) Both Na^{+} and K^{+} ions

20. Which of the given element A, B, C, D and E with atomic number 2, 3, 5, 7, 10 and 30 respectively belong to the same period?
(A) A, B, C
(B) B, C, D
(C) A, D, E
(D) B, D, E

21. A mixture of sulphur and carbon disulphide is:
(A) Heterogeneous and shows Tyndall effect
(B) Heterogeneous and does not show Tyndall effect
(C) Homogeneous and shows Tyndall effect
(D) Homogeneous and does not show Tyndall effect

22. Which of the following contains maximum number of molecules?
(A) 1 gm of CO_2
(B) 1 gm of N_2
(C) 1 gm of H_2
(D) 1 gm of CH_4

23. Which of the following correctly represent 360 gms of water?
(i) 2 moles of H_2O
(ii) 20 moles of water
(iii) 6.022×10^{23} molecules of water
(iv) 1.2044×10^{25} molecules of water
(A) (i)
(B) (i) and (iv)
(C) (ii) and (iii)
(D) (ii) and (iv)

BIOLOGY

24. Which one of the following is not an Annelid?
(A) Nereis
(B) Earthworm
(C) Leech
(D) Urchin

25. If salivary amylase is lacking in the saliva, which of the following functions in mouth cavity will be affect?
(A) Proteins breaking down into amino acids
(B) Starch breaking down into sugars
(C) Fats breaking down into fatty and gyycerol
(D) None of these

26. Reproduction is essential for living organisms in order to:
(A) Keep the individual organism alive
(B) Fulfil their energy requirements
(C) Maintain growth
(D) Continue the species generation after generation

27. A cross between a tall plant (TT) and short pea plant (tt) resulted in progeny that were all tall plants because:
(A) Tallness is recessive trait
(B) Tallness is dominant trait
(C) Dwarfness is dominant trait
(D) All of these

28. According to evolutionary theory, formation of new species is due to:
(A) New needs and changes in environmental conditions
(B) Sudden change in climatic conditions
(C) Accumulation of variations over several generations
(D) Inheritance of acquired characteristics

29. Which is correct sequence of air passage during inhalation?
(A) Nostrils $\rightarrow$ Larynx $\rightarrow$ Pharynx $\rightarrow$ Trachea $\rightarrow$ Lungs
(B) Nasal Passage $\rightarrow$ Trachea $\rightarrow$ Pharynx $\rightarrow$ Larynx $\rightarrow$ Alveoli
(C) Larynx $\rightarrow$ Nostrils $\rightarrow$ Pharynx $\rightarrow$ Lungs
(D) Nostrils $\rightarrow$ Pharynx $\rightarrow$ Larynx $\rightarrow$ Trachea $\rightarrow$ Alveoli

30. If testa is removed from water soaked gram seed, the remaining structure is:
(A) Full mature embryo
(B) Cotyledons with endosperm
(C) Cotyledons filled with starch
(D) Half mature embryo

31. Which of the following statement is incorrect?
(A) For every hormone there is a gene
(B) For every protein there is a gene
(C) For production of every enzyme there is a gene
(D) For every molecule of fat there is a gene

32. Some dinosaurs had feathers although they could not fly but birds have feathers that help them to fly. In the context of evolution this means that:
(A) reptiles have evolved from birds
(B) there is no evolutionary connection between reptiles and birds
(C) feathers are homologous structures in both the organisms
(D) birds have evolved from reptiles

33. Excessive exposure of human to UV rays results in:
(i) Damage to immune system
(ii) Damage to lungs
(iii) Skin cancer
(iv) Peptic Ulcers
(A) (i) and (ii) (B) (ii) and (iv)
(C) (i) and (iii) (D) (iii) and (iv)

34. Making antiviral drugs is more difficult than making anti bacterial medicines because:
(A) Viruses make use of host machinery
(B) Viruses are on the border line of living and nonliving
(C) Viruses have very few biochemical mechanisms of their own
(D) Viruses have a protein coat

35. In desert plants, rate of water loss gets reduced due to the presence of:
(A) Cuticle (B) Stomata
(C) Lignin (D) Suberin

SOCIAL SCIENCE

36. The term 'Tavern' stands for a:
(A) Place where people gathered to dance and dine
(B) Place where people carried political discussions
(C) Place where people gathered to drink alcohol
(D) Place where people gathered to discuss their problems

37. "When France sneezes, the rest of Europe catches cold", who remarked these words?
(A) Duke Metternich (B) Giuseppe Mazzini
(C) Otto Von Bismarck (D) Frederic Sorrieu

38. The Tripartite Pact (1940) was signed by:
(A) Britain, France and Germany (B) Germany, Italy and Japan
(C) Japan, Britain and Russia (D) Russia, Britain and USA

39. Philanthropsis mainly work for:
(A) industrial workers (B) peasants
(C) social and religios reforms (D) social uuliftment and charity

40. The Vernacular Press Act (1878) was prepared to:
(A) provide the government with right to censor reports and editorials
(B) provide the government with rights to promote vernacular press
(C) provide the government with right to favour Indian vernacular press for growth of nationalism
(D) provide the government with rights to finance vernacular press

41. "Civil Code of 1804: is usually known as:
(A) Habsburg Code (B) Napolenoic Code
(C) Germanic Code (D) Dutch Code

42. Which leader is known as the Frontier Gandhi?
(A) M.K. Gandhi (B) Indira Gandhi
(C) Abdul Ghaffar Khan (D) J.L. Nehru

43. Raikas tribe is found in:
(A) Madhya Pradesh (B) Arunanchal Pradesh
(C) Jharkhand (D) Rajasthan

44. Which of the following is not included in the teachings of Jainism?
(A) Fasts and mortification for the body (B) Belief in Karma and rebirth
(C) Non-violence (D) Belief in God

45. The Upanishads are:
(A) A source of Hindu philosophy (B) Books of ancient Hindu law
(C) Books on social behavior man (D) Prayers to god

46. Indian Constitution Federation from:
(A) USA (B) Canada
(C) Australia (D) England

47. Water privitisation protest in Bolivia was led by:
(A) Student union (B) Fedecor
(C) Political Parties (D) Labour Union

48. Universal Adult Franchise was firstly granted in:
(A) Germany (B) USA
(C) Newzealand (D) Britain

49. In a parliamentary form of democracy:
(A) Executive controls the Legislature (B) Executive Controls the Judiciary
(C) Judiciary controls the Executive (D) Legislature controls the Executive

50. Which of the following locations is not correct?

	Name of the organization	**Location of Headquarter**
(A)	UNESCO	Paris
(B)	ILO	Geneva
(C)	FAO	Brussels
(D)	International Court of Justice	the Hague

51. Which of the following statements about the international Court of justice is not correct?
(A) It is the principal judicial organ of the United Nations
(B) Its judges are elected
(C) Its decisions are not enforceable
(D) Nations aggrieved by the non-implementation of the decision have no further redress

52. The civil Court does not deal with:
(A) Land disputes (B) Landloard tenant disputes
(C) Offence like thefts (D) None of these

53. In the context of Panchayati Raj, which one of the following is true about Gram Sabha?
(A) This is the topmost tier of the Panchayati Raj
(B) It consists of all the vboters residing in the jurisdiction of a village panchayat
(C) It is executive body consisting of selected representatives from the village panchayat
(D) It consists of all about males of the village panchayat

54. Eligibility for a regional party to be recognized as a national party is:
(A) To be recognized in at least 3 states
(B) Recognized in at least 4 states
(C) To get $1/10^{th}$ of the seats of Lok Sabha
(D) Get $1/10^{th}$ seats of Parliament

55. What is Zero Hour?
(A) When matters of utmost importance are raised
(B) When a money bill is introduced in the Lock Sabha
(C) when session became zero
(D) At 12'o clock

56. Irrigation facilities should be improved urgently in India because:
(A) irrigation yields better output (B) monsoon is irregular
(C) rivers are dry most of the periods in the year (D) land under irrigation is small

57. Maharashtra state is ideal for cotton cultivation because:
(A) it has a good network of communication
(B) it has sticky black soil
(C) it provides cheap and abundant labour
(D) it has a moderate climate

58. Why is there scanty rainfall in the Deccan Plateau?
(A) It is far away from the sea (B) It is near the sea
(C) It is in the rain shown region (D) None of these

59. Flood occur frequently in the northern plains of India because of:
(A) Long spells of rainy weather
(B) the presence of many large river courses
(C) Fluctuation of the level of the understand water table
(D) Uncertain and uneven occurrence of rains in the plains

60. Which of the following statements is correct?
(A) Equatorial regions are regions of permanent low pressure
(B) Equatorial regions have low pressure during summer but high pressure during winter
(C) Atmospheric pressure is always high along the equator
(D) None of the above

61. What is Overa?
(A) National park (B) Wild life Sanctuary
(C) Biosphere resource (D) Bird Sanctuary

62. Nagarjuna Sagar dam is on which river?
(A) Ganga (B) Ravi
(C) Krishna (D) Cauvery

63. Milpa farming is practiced in:
(A) Venezuela (B) Brazil
(C) Indonesia (D) Mexico

64. Which country is largest producer of Rice in the world?
(A) India (B) USA
(C) Indonesia (D) China

65. Which of the following is Bio-diesel crop?
(A) Sugarcane (B) Jatropha
(C) Wheat (D) Rice

66. Which of the following is NOT a Directive Principle?
(A) To raise of nutrition
(B) To develop scientific temper
(C) To promote economic interests of weaker sections
(D) To separate judiciary from executive

67. Which is not the cause of low agriculture productivity?
(A) Lack of irrigation facilities (B) Poor techniques
(C) Non-availability of good seeds (D) Lack of demand

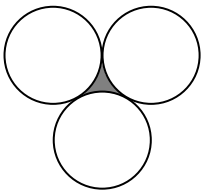
68. The unemployment problem can be solved by:
(A) development of education
(B) development of industries
(C) use of modern means of production in agriculture
(D) efficient administration

69. Economic development of a country is measured on the basis of:
(A) National income only (B) Per National income only
(C) Net domestic product (D) National income and per capital income

70. Second green revolution is related to the production of which crop?
(A) Wheat (B) Rice
(C) Oilseeds (D) Sugarcane

MATHEMATICS

71. If three equal circles of radius 3 cm each touch each other externally as shown, then the area of the shaded portion is:



(A) $\frac{\sqrt{3}}{2}(2-\pi)\ cm^2$ (B) $\frac{9}{2}\left(2\sqrt{3}-\pi\right) cm^2$
(C) $\frac{9}{2}\left(2\sqrt{3}+\pi\right) cm^2$ (D) $\frac{3}{2}\left(\sqrt{3}-\pi\right) cm^2$

72. The distance between the centre of the two circles of radii r_1 and r_2 is d. they will touch each other internally if:
(A) $d = r_1$ or r_2 (B) $d = r_1 + r_2$
(C) $d = r_1 - r_2$ (D) $d = \sqrt{r_1 r_2}$

73. In an equilateral triangle ABC if AD $\perp$ BC, then:
(A) $2AB^2 = 2AD^2$ (B) $4AB^2 = 3AD^2$
(C) $3AB^2 = 4AD^2$ (D) $2AB^2 + 2AD^2$

74. The ratio of the length of a side of an equilateral triangle and its height is:
(A) 2:1 (B) 1:2
(C) $2:\sqrt{3}$ (D) $\sqrt{3}:2$

75. There are four lines in a plane no two of which are parallel. The maximum number of points in which they can intersect is:
(A) 4 (B) 5
(C) 6 (D) 7

76. A balloon of radius r makes an angle α at the eye of an observer and the angle of elevation of its centre is β. The height of its centre from the ground level is given by:
(A) $r\cos\frac{\beta}{2}\sec\alpha$ (B) $r\cos\beta\sec\frac{\alpha}{2}$
(C) $r\sin\frac{\alpha}{2}\operatorname{cosec}\beta$ (D) $r\sin\beta\operatorname{cosec}\frac{\alpha}{2}$

77. From the top of a light house the angles of depression of two ships on the opposite sides of it are the observed to be α and β. If the height of the light house be h meters and the line joining the ships passes through the foot of the light house, the distance between the ships is:
(A) $\frac{h(\cot\alpha+\cot\beta)}{\cot\alpha.\cot\beta}$ (B) $\frac{h(\tan\alpha+\tan\beta)}{\tan\alpha.\tan\beta}$
(C) $h(\tan\alpha+\tan\beta)$ (D) $\frac{h\tan\alpha.\tan\beta}{\tan\alpha.\tan\beta}$

78. A boat is being rowed away from a cliff 150 m high. At the top of the cliff the angle of depression of the boat changes from 60^o to 45^o in 2 minutes. The speed of the boat is:
(A) 2 km/hr (B) 1.9 km/hr
(C) 2.4 km/hr (D) 3 km/hr

79. $\frac{\cot A+\operatorname{cosec} A-1}{\cot A-\operatorname{cosec} A+1}$ is equal to
(A) cosec A + cot A (B) sec A + cot A
(C) cosec A + tan A (D) cosec A – cot A

80. A bag contains 5 blue and 4 black balls. Three balls are drawn at random. What is the probability that 2 are blue and 1 is black?
(A) $\frac{1}{3}$ (B) $\frac{2}{5}$
(C) $\frac{1}{6}$ (D) None

81. How many terms of the A.P. 3, 6, 9, 12, 15……..must be taken to make the sum 108?
(A) 6 (B) 7
(C) 8 (D) 36

82. If V be the volume and S the surface area of a cuboid of dimensions a, b and c, then $\frac{1}{V}$ is equal to:
(A) $\frac{S}{2}(a+b+c)$ (B) $\frac{2}{S}\left(\frac{1}{a}+\frac{1}{b}+\frac{1}{c}\right)$
(C) $\frac{2S}{a+b+c}$ (D) $2S(a+b+c)$

83. The area of a circular ring between two concentric circles of radii r and (r + h) units respectively is given by:
(A) π (2r + h) h sq. units (B) π (r + h) h sq. units
(C) π (r + 2h) r sq. units (D) π (r –h) r sq. units

84. A man can row three quarters of a km against the stream in $11\frac{1}{4}$ minutes and return in $7\frac{1}{2}$ minutes. The speed of the man in still water is:
(A) 2 km/h (B) 3 km/h
(C) 4 km/h (D) 5 km/h

85. A tank can be filled by one tap in 209 minutes and by another in 25 minutes. Both the taps are kept open for 5 minutes and then the second is turned off. In how many minutes more is the tank completely filled?

(A) 6 (B) 11

(C) 12 (D) $17\frac{1}{2}$

86. The solution set of the equation $x^{2/3} + x^{1/3} - 2 = 0$ is

(A) {8, 1} (B) {8, –1}

(C) {–8, –1} (D) {–8, 1}

87. The roots of the equation $x^2 + px + q = 0$ are 1 and 2. The roots of the equation $qx^2 - px + 1 = 0$ must be:

(A) 1, 1/2 (B) –1/2, –1

(C) –1/2, 1 (D) –1, 1/2

88. The solution of the equations:

$\frac{m}{x} + \frac{n}{y} = a, \frac{n}{x} + \frac{m}{y} = b$ is given by

(A) $= \frac{n^2 + m^2}{am - bn}, y = \frac{m^2 - n^2}{bm - an}$ (B) $x = \frac{m^2 - n^2}{am - bn}, y = \frac{n^2 - m^2}{bm - an}$

(C) $x = \frac{m^2 - n^2}{am - bn}, y = \frac{m^2 - n^2}{bm - an}$ (D) $x = \frac{n^2 - m^2}{am - bn}, y = \frac{n^2 - m^2}{bm - an}$

89. The HCF of two expressions p and q is 1. Their LCM is:

(A) p + q (B) p – q

(C) pq (D) $\frac{1}{pq}$

90. If x –a is a factor of $x^3 - 3x^2a + 2a^2x + b$ then the value of b is:

(A) 0 (B) 2

(C) 1 (D) 3

SCHOLASTIC APTITUDE TEST-2014

ANSWER

SECTION – 1: PHYSICS

1. C	2. B	3. C	4. A	5. B
6. A	7. A	8. D	9. C	10. B
11. A	12. B			

SECTION – 2: CHEMISTRY

13. A	14. B	15. A	16. B	17. A
18. D	19. C	20. B	21. A	22. C
23. D				

SECTION – 3: BIOLOGY

24. D	25. B	26. D	27. B	28. C
29. D	30. B	31. D	32. D	33. C
34. C	35. A			

SECTION – 4: SOCIAL SCIENCE

36.C	37.A	38.B	39.D	40.A
41.B	42.C	43.D	44.D	45.A
46.B	47.D	48.C	49.D	50.C
51.C	52.C	53.B	54.B	55.D
56.D	57.B	58.A	59.B	60.A
61.B	62.C	63.D	64.D	65.B
66.D	67.D	68.D	69.D	70.B

SECTION – 5: MATHEMATICS

71. B	72. C	73. C	74. C	75. C
76. D	77. B	78. B	79. A	80. D
81. C	82. B	83. A	84. D	85. B
86. D	87. B	88. C	89. C	90. A

SOLUTIONS

PHYSICS

1. Slope of I–V graph = $\frac{1}{R}$ = tanθ. Slope is less for R_3, so option three is correct.

2. For figure a R_2 is parallel with ideal wire so the circuit will not work.

3. Permanent magnets are weak.

4. Incidence ray is along the normal so i = 0^o

5. Refractive index of water is less than that of glass. So angle of refraction will be more for water.

6. For minimum deviation i = e

$a + \delta_m = i + e$

$a + \delta_m = 2i$

$60^o + 40^o = 2i$

$i = 50^o$

7. For rough focal length, we assume parallel incidence beam and it emerges out parallel. The combination will behave as a slab.

8. Action and reaction have equal magnitude.

9. $mg = \rho_w \frac{2v}{3} g = \rho_\ell \frac{v}{4} g$

$\rho_\ell = 100 \times \frac{2}{3} \times 4$

10. The density of alcohol (800 kg/m^3) is less than that of water. So hydrometer will dip more than earlier.

11. For a particular key there is fixed frequency.

12. Let initial intensity is I. On first passes the intensity loss will be20% of I. So I_1 = 0.8 I.
On second passage the loss will be 20% of 0.8 I.

$\frac{20}{100} \times \frac{8}{10} I = 0.16I$

So the final intensity will be 0.8 I – 0.16 I = 0.64 I.

So loss will be $\frac{0.64I - I}{I} \times 100$

36%

CHEMISTRY

13. In $KMnO_4$ oxidation state of Mn is +7. So it is a powerful oxidizing agent.

14. $(CH_3COO)_2$ Pb + 2KI $\rightarrow$ PbI_2 + $2CH_3COOK$

15. Addition of quick lime to water and dilution of acid are examples of exothermic reactions.

16. $NaHCO_3$ is added to neutralize acid.

17. Lime juice has pH < 7.

18. Alkaline hydrolysis of ester is called saponification.

19. Hard water contains Mg^{2+} and Ca^{2+} ions.

20. Li, N and Ne belong to same period.

21. It is a fact

22. Mole of H_2 = $\frac{1}{2}$,which is maximum.

23. Number of moles of H_2O = $\frac{360}{18}$ = 20

BIOLOGY

24. Sea Urchin belongs to phylum echinodermata.

25. Salivary amylase is required for breakdown of starch into maltose.

26. Reproduction is required for multiplication of organisms thereby maintaining continuity of species.

27. Tallness is a dominant trait in pea plant, so a cross between TT and tt plant will always result in all tall plants.

28. Continuous accumulation of variation among organisms leads to formation of new species and helps in evolution.

29. During inhalation, air moves from the outermost structure of respiratory tract nostril to pharynx then larynx, trachea and then alveoli.

30. Testa is the outermost covering of seed coat, behind which is present cotyledons filled with endosperm.

31. Proteins, enzymes and proteinicious hormones are produced through gene.

32. Presence of feathers that help birds fly shows that birds have evolved later on after reptiles.

33. Harmful U.V rays are sufficient enough to cause skin cancer and damage the immune system of human body.

34. Viruses completely depend upon host organisms for their multiplication and they don't have any biochemical mechanisms that can be acted upon by antiviral drugs.

35. Cuticle is the outermost covering in the stem of desert plants which helps in preventing water loss.

MATHEMATICS

71. Area = $\frac{\sqrt{3}}{4}(6)^2 - 3\times\frac{60}{360}\pi(3)^2$

72. $d = r_1 - r_2$

73. $AB^2 + AC^2 = 2[AD^2 + BD^2]$

$AB^2 + AB^2 = 2\left[\frac{AB^2}{4} + BD^2\right]$

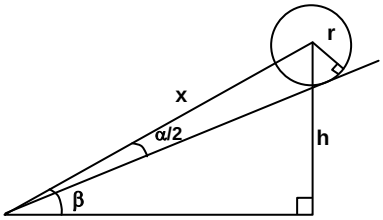
74. Let side3 = a

Height = $\frac{\sqrt{3}}{2}a$

75. Number of points of intersection $4_{C_2} = \frac{4\times3}{2} = 6$

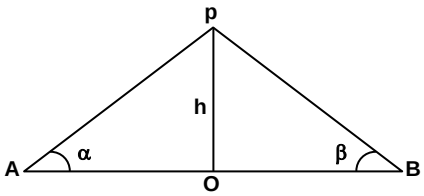
76. $\frac{r}{x} = \sin\frac{\alpha}{2}$

$\frac{h}{x} = \sin\beta$



77. $AO = \frac{h}{\tan\alpha}$ $OB = \frac{h}{\tan\alpha}$

$AB = \frac{h}{\tan\alpha} + \frac{h}{\tan\alpha}$



78. $\frac{1}{1000}\left(150 - \frac{150}{\sqrt{3}}\right) = v\times\frac{2}{60}$

79. Multiply number of direction by cot A + cosec A + 1

80. $P = \frac{{}^5C_2 \times {}^4C_1}{{}^9C_3}$

81. $\frac{n}{2}\left[2.3+(n-1)3\right]=108$

$6n + 3n^2 - 3n = 216$

$3n^2 + 3n - 216 = 0$

$x^2 + n - 72 = 0$

$(x + 9)(x - 8) = 0$

$x = 8$

82. $v = abc$; $s = 2(ab + bc + ac)$

$$\frac{s}{v}=2\left(\frac{1}{a}+\frac{1}{b}+\frac{1}{c}\right)$$

83. $A = \pi (r + h)^2 - \pi r^2$

84. Let + v_m = velocity of man

V_s = velocity of stream

$$\frac{3}{4}=\left(v_m-v_s\right)\frac{45}{4}\times\frac{1}{60}$$

$$\frac{3}{4}=\left(v_m+v_s\right)\frac{15}{2}\times\frac{1}{60}$$

85. Let flow rate of first tank = x m^3/min. Flow rate of 2nd tap = ym^3/min.

Let volume of tank = m^3

$20x = v$

$x = \frac{v}{20}$

$25y = v$

$Y = \frac{v}{25}$

$$5t=\frac{v-5x-5y}{x}=11\,\text{min}$$

86. Put $x^{1/3}$ t

$t^2 + t - 2 = 0$

$(t + 2)(t - 1) = 0$

$t = 1, t = -2$

$x^{\frac{1}{3}}=1 \qquad x^{1/3}=-2$

$x=1 \qquad x=-8$

87. $P = -3$

$q = 2$

Now equation is

$2x^2 + 3x + 1 = 0$

$2x^2 + 2x + x + 1 = 0$

$(2x + 1)(x + 1) = 0$

89. HCF of P and Q = 1

So LCM = PQ

90. x = a is root

So $a^3 - 3a^3 + 2a^3 + b = 0$

B = 0