JSTSE – 2014

GENERAL – KNOWLEDGE

1. Which of the following Indus civilization site give evidence of a dockyard?
   (1) Harappa (2) Mohenjodaro
   (3) Lothal (4) Rakhigarhi

1. 3

2. Which of the following country have an unwritten constitution:
   (1) USA (2) India
   (3) UK (4) Pakistan

2. 3

3. Which amongst the following organised “Ashwa Medha Yojya”?
   (1) Ajatshatru (2) Ashoka
   (3) Samundragupta (4) Chandragupta

3. 3

4. The original name of great musician Tansen was:
   (1) Lal Kulwant (2) Banda Bahadur
   (3) Ramtanu pandey (4) Markandey

4. 3

5. Japan’s parliament is known as:
   (1) Diet (2) National Assembly
   (3) Yuan (4) National Peoples Congress

5. 1

6. How many languages are recognised by the Indian Constitution?
   (1) 15 (2) 18
   (3) 22 (4) 24

6. 3

7. Which article of Constitution of India says “No Child below the age of fourteen years shall be employed to work in any hazardous employment”
   (1) Article 24 (2) Article 45
   (3) Article 330 (4) Article 368

7. 1

8. First national park developed in India is
   (1) Gir (2) Sariska
   (3) Kaziranga (4) Jim Corbett

8. 4

9. In India, forest area accounts for about ___ of land surface:
   (1) 22% (2) 33%
   (3) 14% (4) 25%

9. 1

10. Which one of the following river forms an “Estuary”.
    (1) Kaveri (2) Krishna
    (3) Mahanadi (4) Narmada

10. 4

11. Leading producer of Coffee is
(1) India (2) Brazil
(3) Russia (4) Sri Lanka
11. 2

12. In Parliament session zero house is at the discretion of
(1) Prime Minister (2) Speaker
(3) Opposition Leader (4) President
12. 2

13. “Right to education” become a fundamental right on
(1) March 15, 2010 (2) April 01, 2010
(3) July 17, 2010 (4) October 10, 2010
13. 2

14. Which one of the following battles led to the foundation of Mughal rule at Delhi?
(1) Third battle of Panipat (2) Second battle of Panipat
(3) Battle of Haldighati (4) First battle of Panipat
14. 4

15. Which Indian city is known as Manchester of India?
(1) Delhi (2) Kolkata
(3) Surat (4) Ahmedabad
15. 4

16. First Lok Sabha elections in India held in the year
(1) 1947 - 48 (2) 1948 - 49
(3) 1949 - 50 (4) 1951 – 52
16. 4

17. Till July 2013, number of coastal States in India is:
(1) 7 (2) 8
(3) 9 (4) 5
17. 3

18. Which of the following state is smallest in area?
(1) Sikkim (2) Meghalaya
(3) Arunachal Pradesh (4) Goa
18. 4

19. Which state is famous for Stepwells?
(1) Maharashtra (2) Gujarat
(3) Odisha (4) Manipur
19. 2

20. Taxation is a toll of:
(1) Monetary policy (2) Fiscal policy
(3) Price policy (4) Wage policy
20. 2

21. What is ‘dual pricing’ system
(1) Wholesale price and retail prices
(2) Real prices and monetary prices
(3) Prices fixed by Government and price is open market
(4) Daily prices and weekly prices
21. 3

22. A rocket works on the principle of conservation of:
(1) Mass (2) Linear momentum
(3) Energy (4) Angular momentum
22. 2

23. Crocodiles store fat in:
(1) Head (2) Stomach
(3) Tail (4) Arteries
23. 3

24. What is the difference between C.F.L. and an L.E.D lamp?
(1) To produce light, a CFL uses mercury vapour and phosphor, while LED lamp used semi conductor material
(2) The average life span of CFL is much more larger than LED lamp
(3) A CFL is less energy efficient as compared to an LED lamp
Which of the statement given above is / are correct?
(1) Only 1 (2) 1 and 3
(3) 2 and 3 (4) 1, 2 and 3
24. 2

25. Among the given nutrients, milk is a poor source of:
(1) Calcium (2) Protein
(3) Vitamin C (4) Carbohydrate
25. 3

26. Most abundant element on the earth's crust by weight is
(1) Oxygen (2) Silicon
(3) Iron (4) Aluminium
26. 2

27. In whole body mass the percentage of blood is
(1) 8% (2)9%
(3) 10% (4) 11%
27. 1

28. The colour change in the chameleon is due to the presence of
(1) Haemoglobin (2) Chromatophore
(3) Chlorophyll (4) Pneumatophore
28. 2

29. "Fire-Fighting Clothes" are made from
(1) Mica (2) Asbestos
(3) Talk (4) Steatite
29. 2

30. One Byte is equal to
(1) 8 bits (2) 12 bits
(3) 16 bits (4) 20 bits
30. 1

31. What is the other name of Vitamin B_2
(1) Thiamine (2) Haemoglobin
(3) Riboflavin (4) Dextrose
31. 3

32. Which of the following is known as 'grave yard' of RBCs?
(1) Liver (2) Bone marrow
(3) Spleen (4) Appendix
32. 3

33. Blubber is a
(1) milky secretion of rubber plant
(2) layer of thick fat
(3) device to trap insects by some aquatic plants
(4) fungal infection of rice plants
33. 2

34. Permanent hardness of water may be removed by addition of
(1) Alum (2) Sodium carbonate
(3) Lime (4) Potassium permanganate
34. 2

35. A transformer works with
(1) Alternating current only (2) Direct current only
(3) Both A.C and D.C (4) Any signal
35. 1

36. Sound travels fastest in
(1) Water (2) Air
(3) Glass (4) Glycerin
36. 3

37. At what temperature with the density of water be maximum?
(1) $0^{o}C$ (2) $32^{o}C$
(3) $-4^{o}C$ (4) $4^{o}C$
37. 4

38. Electron was discovered by
(1) Ernest Rutherford (2) Max Planck
(3) Joseph Thomson (4) Albert Einstein
38. 3

39. pH value of natural rain water is:
(1) 5.6 (2) 6.2
(3) 7.0 (4) 7.5
39. 1

40. Laughing gas is
(1) Nitiric oxide (2) Nitrous oxide
(3) Nitrogen penta oxide (4) Nitrogen
40. 2

41. Dehradun is famous for
(1) textile industry (2) medicines
(3) forest research institute (4) leather industry
41. 3

42. Which scheme was launched in June 2013 for the aim of providing employment opportunities to youth in naxalite hit areas:
(1) Swabhiman (2) Roshni
(3) Sabla (4) Ujjawala
42. 2

43. Mithali Raj belongs to which sports
(1) Tennis (2) Cricket
(3) Archery (4) Badminton
43. 2

44. Who was appointed as Lt.Governor of Delhi in July 2013?
(1) Tejinder Khanna (2) Banwari Lal Joshi
(3) Najeeb Jung (4) Romesh Bhandari
44. 3

45. Cricket world cup 2015 will be hosted by
(1) India (2) Australia and New Zealand
(3) England (4) South Africa
45. 3

46. The largest Union Territory of India is
(1) Chandigarh (2) Punducherry
(3) Andaman and Nicobar Island (4) Lakshadweep
46. 3

47. Which city's local time indicated India Standard Time (IST)
(1) New Delhi (2) Madras
(3) Kolkatta (4) Allahabad
47. 4

48. SIM is the abbreviations of
(1) Signal Information Mode (2) Simple Identity Mode
(3) Subscriber Identification Module (4) Sailing International Matrix
48. 3

49. Match the items given in List – I with those of List-II.

List – I		List– II	
(i)	Antyodiya Yojna	(a)	2006
(ii)	Mahatma Gandhi National Rural Employment Guarantee Programme	(b)	1997
(iii)	Targeted Public Distribution System	(c)	2000
(iv)	Swarn Jayanti Gram Swarojgar Yojna	(d)	1999

Select the correct answer
(1) i – c, ii – a, iii – b, iv – d (2) i – c, ii – d, iii – b, iv – a
(3) i – b, ii – d, iii – a, iv – c (4) i – d, ii – c, iii – b, iv – a
49. 1

50. Which one of these Indian monument is not enlisted in 'UNESCO'S WORLD HERITAGE' list?
(1) Taj Mahal, Agra (2) Chhatrapati Shivaji Terminal, Mumbai
(3) Akshardham Temple, Delhi (4) Jantar Mantar, Jaipur
50. 3

JSTSE – 2014

SCIENCE AND MATHEMATICS

PHYSICS

51. Select the true statement:
(1) Velocity of any object is zero then acceleration is not necessarily zero.
(2) Velocity of any object is zero then acceleration must be zero.
(3) An object moves with uniform speed then its acceleration is also uniform.
(4) An object moves with non-uniform speed then its acceleration is zero.

51. 1

Sol. When body is at highest point in vertical motion.

52. A passenger in a moving train tosses a coin which falls behind him, this shows that the motion of train is:
(1) Accelerated (2) Uniform
(3) Retarded (4) Along circular track

52. 1

Sol. Coin has constant velocity in horizontal direction while train is accelerated.

53. The numerical ratio of displacement to distance for a moving object is:
(1) always less than 1 (2) equal to or more than 1
(3) always more than 1 (4) equal to or less than 1

53. 4

Sol. Magnitude of displacement is always less than or equal to distance.

54. The correct expression for the force acting on an object moving in a circular path is given by:
(1) $F = mvr$ (2) $F = \frac{mv}{r}$
(3) $F = \frac{mv^2}{r}$ (4) $F = mv^2r$

54. 3

Sol. $F = \frac{mv^2}{r}$

55. A person pushes a box with force 100 N. In this statement we talk of a force acting on box which usually means force is:
(1) electrostatic force (2) balanced force
(3) unbalanced force (4) nuclear force

55. 1

Sol. Force will be electrostatic.

56. A fielder pulls his hands in backward direction after catching the cricket ball. This is due to:
(1) Apply large force on ball
(2) Reduce the rate of change of Momentum
(3) Increase the rate of change of Momentum
(4) Keep the ball in hand firmly

56. 2

Sol. $F = \frac{\Delta P}{\Delta t}$

If Δt increase then force will decrease.

57. In case of negative work the angle between the force and displacement is:
(1) 0° (2) 45°
(3) 90° (4) 180°

57. 4

Sol. $\Delta W = FS \cos 180° = -FS = -ve$

58. Two bodies of equal masses move with a uniform velocities V and 3V respectively. The ratio of their kinetic energy is:

(1) 1 : 9 (2) 1 : 3

(3) 2 : 9 (4) 4 : 9

58. 1

Sol. $\frac{k_1}{k_2} = \frac{\frac{1}{2}mV^2}{\frac{1}{2}m(3V)^2} = 1 : 9$

59. Four appliances each of 500 watt run for 10 hours a day. The energy spent in kwh will be:

(1) 10 kwh (2) 20 kwh

(3) 30 kwh (4) 5 kwh

59. 2

Sol. $E = P \times t = \frac{4 \times 500 \times 10}{1000} = 20$ kwh

60. In which of the following the final image is erect:

(1) Simple Microscope (2) Compound Microscope

(3) Astronomical telescope (4) Retina of the eye

60. 1

Sol. Simple microscope forms erect image.

61. Which of the following does a Dentist use to view the teeth for treatment:

(1) Concave Mirror (2) Convex lens

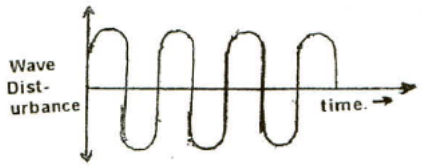
(3) Concave lens (4) Convex Mirror

61. 1

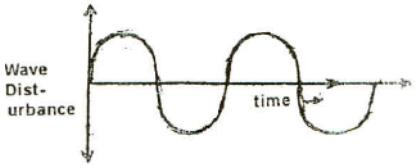
Sol. Dentists uses concave mirror to focus light at a point.

62. Which of the following graph represents sound of Maximum Pitch:

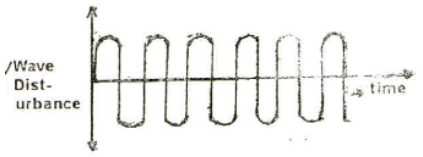
(1)



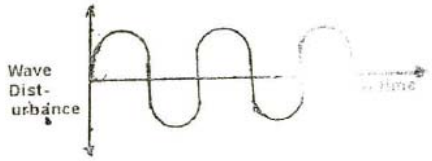
(2)



(3)



(4)



62. 3

Sol. Pitch depends on frequency and frequency is number of oscillation per second.

63. Which sound waves are emitted by a bat to catch its prey:

(1) Infrasonics (2) Ultrasonics

(3) Sound of frequency 15 kHz (4) Sound of frequency 19 kHz

63. 2

Sol Sound wave emitted by a bat to catch its prey is ultrasonics

64. When we change a feeble sound to a loud sound, we increases its:

(1) frequency (2) amplitude

(3) velocity (4) wavelength

64. 2

Sol. Loudness depends upon intensity (and intensity depends on square of amplitude)

$I \propto A^2$

65. We can distinguish between the sounds produced by different singers on the basis of the characteristics of sound called:

(1) Frequency (2) Timbre

(3) Pitch (4) Loudness

65. 2

Sol. Sound is distinguished by quality or timbre.

66. According to one of the Kepler's Laws of Planetary Motion:

(1) $r^2 \propto T^3$ (2) $r \propto T^2$

(3) $r^3 \propto T^2$ (4) $r^2 \propto \frac{1}{T^2}$

66. 3

Sol. According to Kepler's 3rd law

$T^2 \propto r^3$

67. If the distance between two objects is halved and their masses are doubled, then the gravitational force between them will become:

(1) 16 times (2) 4 times

(3) 2 times (4) No change

67. 1

Sol. $$\frac{F_1}{F_2} = \frac{\frac{G(2M)(2m)}{\left(\frac{r}{2}\right)^2}}{\frac{GMm}{r^2}} = 16 : 1$$

68. In which direction do the stars appear to move:

(1) East to West direction (2) West to East direction

(3) North to South direction (4) South to North direction

68. 1

Sol. Star appear to move from east to west because earth rotates about its axis from west to east.

69. A car moves from A to B with speed 20 km/hr and back to A with speed 30 km/hr. The average speed during the whole journey is:

(1) 25 km/hr (2) 24 km/hr

(3) 50 km/hr (4) 5 km/hr

69. 2

Sol. $$V_{average} = \frac{2s}{\frac{S}{20} + \frac{S}{30}} = 24 \text{ km/hr}$$

70. Acceleration of any particle changes, if:

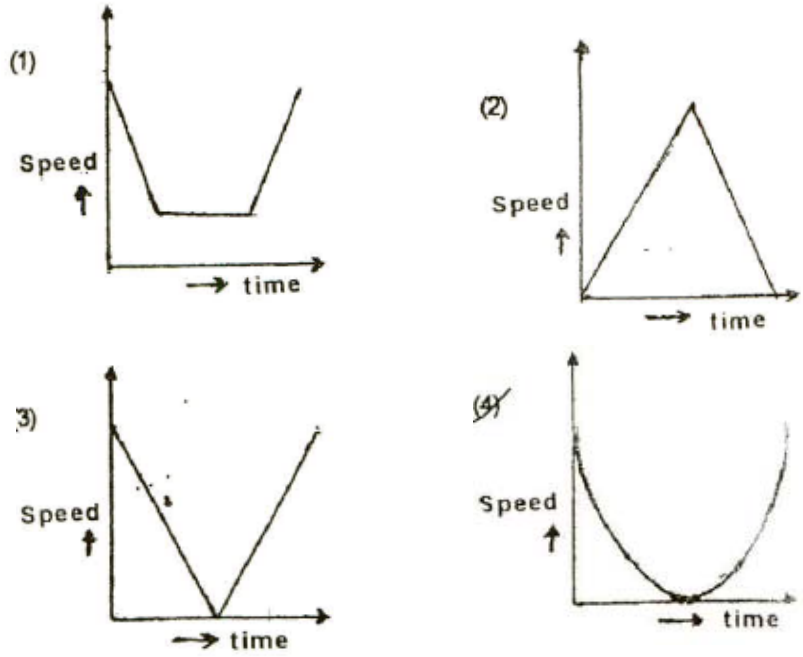
(1) Direction of velocity changes (2) Magnitude of velocity changes

(3) Both are changing (4) All the above options are correct

70. 4

Sol. Acceleration depends upon magnitude and direction of velocity.

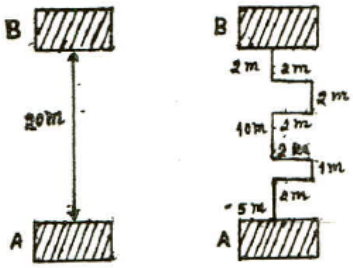
71. Which graph represents the case of a cricket ball thrown vertically upwards is returning to the hands of the thrower:



71 3

Sol. In upward motion ; V = u – gt graph will be straight line with –ve slope; in downward motion, V = gt graph will be straight line with +ve slope.

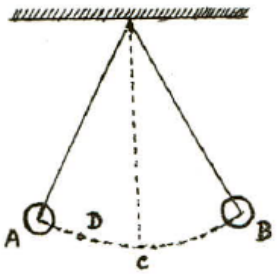
72. Work done in lifting the object of mass 1 kg from point A to point B in both the situations respectively (g = 9.8 m/sec^2) is:
(1) 196 J, 294 J
(2) 196 J, 196 J
(3) 294 J, 196 J
(4) 0 J, 0 J



72. 2

Sol. Work done is change in gravitational potential energy and G.P.E. is independent of path
W = mgh = 1 × 9.8 × 20 = 196 j in both cases

73. A pendulum bob is oscillating. In which position does it has maximum kinetic energy:
(1) at A
(2) at B
(3) at C
(4) at D



73. 3

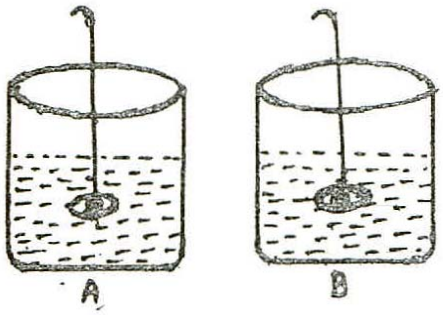
Sol. K.E. of a pendulum bob is maximum at mean position.

74. An object of mass ‘m’ is moving with a constant velocity ‘v’. How much work should be done on it to stop it?
(1) mv
(2) mv^2
(3) $\frac{m^2v}{2}$
(4) $\frac{1}{2}mv^2$

74. 4

Sol. Work done = ΔK.E. = $\frac{1}{2}mv^2 - 0 = \frac{1}{2}mv^2$

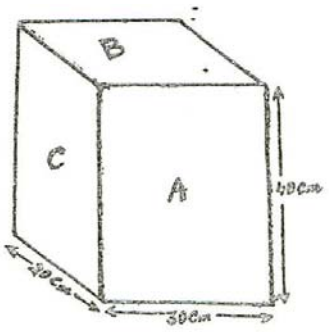
75. A stone is tied to a thread and is immersed in two different breakers completely. Both the beakers were filled with the same level of liquid. On measuring with the help of a spring balance, it was found that the weight of the stone in beaker A was more than that in beaker B. The reason is:
(1) Density of liquid A is more than B.
(2) Density of liquid B is more than A.
(3) Both the liquids have the same density.
(4) None of the above



75. 2

Sol. $W_A = mg - B_A$ and $W_B = mg - B_B$
If $W_A > W_B$ then $B_A < B_B$
$\Rightarrow V\rho_A g < V\rho_B g$
$\Rightarrow \rho_A < \rho_B$

76. The pressure exerted by the shown wooden block on a surface will be highest when:
(1) B Surface is downward
(2) A Surface is downward
(3) C Surface is downward
(4) None of the above



76. 1

Sol. $P = \frac{F}{A}$

Surface B has minimum area it means maximum pressure.

77. The perpendicular force acing on a surface is called:
(1) Frictional force (2) Centripetal force
(3) Thrust (4) Magnetic force

77. 3

Sol. Perpendicular force acting on the surface is thrust.

78. Unit of Relative Density is:
(1) kg/m^3 (2) kg m^3
(3) kg/cm^3 (4) No unit

78. 4

Sol. Relative density is ratio and ratio has no units.

79. 50 gm of a substance has a volume of 20 cm^3. The density of water is 1 gm/cm^3, then it will
(1) Float on water:
(2) Sink in water
(3) Will move up and down in water
(4) Half of it will be immersed and half of it will be above the surface of water

79. 2

Sol. $\rho_{subsance} = \frac{50}{20}$ = 2.5 gm/cc

Density of substance is greater than density of water. Hence, substance will sink.

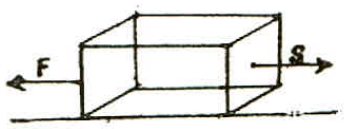
80. A car is moving with a velocity of 10 m/sec. Its mass is 1000 kg. If the velocity-time graph for this car is a horizontal line parallel to the time axis, then the velocity of car at the end of 25 sec. will be:

(1) 25 m/sec (2) 40 m/sec
(3) 10 m/sec (4) 250 m/sec

80. 3

Sol. Since V – t graph is parallel to time axis hence car has constant velocity.

81. In the diagram shown, the work done by the force will be:



(1) Positive
(2) Negative
(3) Zero
(4) None of the above

81. 2

Sol. Force and displacement are in opposite direction hence work done will be negative.

82. According to 3rd Law of Motion which one of the following statement is not true?

(1) When one object applies force on the other, the other also applies force on the first object simultaneously
(2) Magnitude of both the force is same.
(3) Direction of both the forces is opposite
(4) Both the forces act on one object but in opposite direction

82. 4

Sol. According to Newton's 3rd law action and reaction acts on different objects.

83. A ball is thrown up with a speed of 15 m/sec. How high will it go before it begins to fall? ($g = 9.8$ m/sec^2)

(1) 22.8 m (2) 13.9 m
(3) 17.2 m (4) 11.4 m

83 4

Sol. $h = \frac{v^2}{2g} = \frac{15 \times 15}{2 \times 9.8}$ = 11.4 m

84. The unit of measuring momentum per unit time of a moving body is:

(1) m sec^{-1} (2) kg m sec^{-1}
(3) Newton (4) Nm^2 kg^{-2}

84. 3

Sol. Momentum per unit time is force and unit of force is Newton (N).

85. When sound waves travel from air to water then the quantity which does not changes is

(1) Velocity (2) Frequency
(3) Wavelength (4) Loudness

85. 2

Sol. Frequency of sound wave is independent of medium.

86. Which one is true statement?

(1) Light and sound waves both are transverse in nature.
(2) Light and Sound waves are longitudinal in nature
(3) Light and Sound waves can propagate in space (vaccum)
(4) Light wave is transverse and sound wave is longitudinal in nature

86. 4

Sol. Light wave is transverse while sound wave is longitudinal in nature.

87. If a thunder is heard by a man 4 seconds after the lightning is seen, how far is lightning from the man: (speed of sound in air = 330 m/sec)
(1) 660 m (2) 1320 m
(3) 1450 m (4) 1920 m

87. 2

Sol. $d = v \times t = 330 \times 4 = 1320$ m

88. An object of weight 20 N is taken from equator to Pole. Find change in mass of the object: ($g = 10$ m/sec^2)
(1) 2 kg (2) zero
(3) 2 N (4) 10 N

88. 2

Sol. Mass of object remains same.

89. An object falls freely towards earth. If air friction is considered then total energy of object
(1) Increases (2) Decreases
(3) Remains constant (4) First increases and then decreases

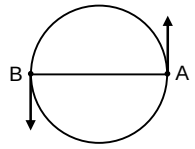
89. 2

Sol. There is loss of energy due to work done against air friction.

90. An athlete takes 40 sec. to move in a circular path of diameter 200 m. What will be his displacement after 2 min. 20 sec.
(1) 100 m (2) 200 m
(3) 0 m (4) 400 m

90. 2

Sol. After 2 minutes 20 seconds athlete will be diametrically opposite side of circular path. Hence, displacement will be equal to diameter of circular path.



CHEMISTRY

91. In paints dispersed phase and dispersion medium are
(1) solid and liquid (2) liquid and solid
(3) liquid and liquid (4) gas and liquid

91. 1

Sol. In paints dispersed phase is ‘solid’ and dispersion medium is ‘liquid’.

92. Which statement is incorrect?
(1) U-238 is used as fuel in nuclear reactor (2) Co-60 is used in the treatment of cancer
(3) C-14 is used in carbon dating (4) I-139 is used in treatment of goiter

92. 4

Sol. I-139 is not used in treatment of goiter

93. Constituents of “German Silver” are
(1) Cu, Zn, Ni (2) Ag, Zn, Ni
(3) Ag, Cu, Fe (4) Zn, Cu, Ag

93. 1

Sol. Constituents of “German Silver” are: Cu, Zn, Ni

94. Density of Air will be highest at
(1) 0^oC and 1 atm (2) 73^oC and 1 atm
(3) -10^oC and 2 atm (4) -73^oC and 2 atm

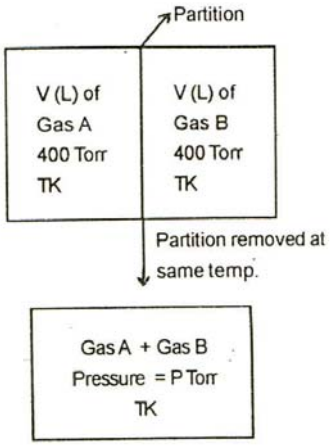
94. 4

Sol. $PM = dRT$

$d\alpha \frac{P}{T}$

Lesser the temperature, higher the pressure, higher the density.

95.



In the above experiment the final pressure P will be

(1) 400 Torr (2) 600 Torr

(3) 800 Torr (4) Between 400 and 800 Torr

95. 1

Sol. $P_1V_1 + P_1V_2 = P_{result}.V_{result}$

$P_1 = P_2 = P.\ V_1 = V_2$

$PV + PV = P_R\ (2V)$

$$P_R = \frac{2PV}{2V} = P = 400 \text{ torr}$$

96. Which of the following mixture is heterogeneous mixture?

(1) Blood (2) Steel

(3) Diesel (4) Aqueous solution of Ammonium chloride

96. 1

Sol. Blood is colloid i.e. heterogeneous mixture.

97. The correct order of increasing inter molecular forces of attraction in the following substances is

(1) Water < Sugar < Carbon dioxide < Acetone

(2) Carbon dioxide < Acetone < Water < Sugar

(3) Sugar < Water < Acetone < Carbon dioxide

(4) Carbon dioxide < Water < Acetone < Sugar

97. 2

Sol. Increasing order of intermolecular forces of attraction.

$$\underset{(gas)}{\text{Carbon dioxide}} < \underset{(volatile\ liquid)}{\text{Acetone}} < \underset{(liquid)}{\text{Water}} < \underset{(solid)}{\text{Sugar}}$$

98. Which technique is used in diagnostic laboratories for blood and urine tests?

(1) Filteration (2) Sublimation

(3) Distillation (4) Centrifugation

98. 4

Sol. Centrifugation is used in diagnostic laboratories for blood and urine tests.

99. In rainy season, common salt get moistened due to the presence of ……..

(1) $MgCl_2$ (2) $CaCl_2$

(3) $BaCl_2$ (4) $SrCl_2$

99. 1

Sol. $MgCl_2$ is more hygroscopic substance present in common salt responsible of moistening.

100. At 100^oC steam has more heat energy than the energy of boiling water because
(1) Steam has lesser kinetic energy than boiling water
(2) Steam has latent heat of vaporization
(3) Steam has lesser potential energy than boiling water
(4) All the reasons given above

100. 2

Sol. At 100^oC steam has more heat energy than the energy of boiling water because steam has latent heat of vaporization.

101. At 20^oC the solubility of salt x is 34.7 g in 100 g of water. If the density of saturated solution is 1.3 g/mL, the weight/volume (w/v) percentage of solution is:
(1) 25.76 (2) 32.98
(3) 33.49 (4) 22.56

101. 3

Sol. Mass of solution = 134.7 g
Density of solution = 1.3 g/L

Volume of solution = $\frac{134.7}{1.3} = 103.62$

$$W/v \text{ percentage} = \frac{\text{Mass of solute}}{\text{Volume of solution}} \times 100$$

$$= \frac{34.7 \times 100}{103.62} = 33.49\%$$

102. Polymer used in making of covering of medicine capsules
(1) PEA (2) PHBV
(3) PAN (4) PEEA

102. 2

Sol. PHBV = Poly hydroxyl butyra valerate. It is a biodegradable polymer.

103. Chemical formula of Potash Alum is
(1) $K_2SO_4.Al(SO_4)_2.24H_2O$ (2) $K_2SO_4.Al_2(SO_4)_2.24H_2O$
(3) $K_2SO_4.Al_2(SO_4)_3.24H_2O$ (4) $K_2SO_4.Al_2(SO_4)_3.12H_2O$

103. 3

Sol. $K_2SO_4.Al_2(SO_4)_3.24H_2O$.

104. The Anion O^{2-} is iso-electronic with
(1) F^+ (2) F^-
(3) N^2 (4) N^{+3}

104. 2

Sol. Anion O^{2-} has 10 electrons.
Anion F^- has 10 electrons.

105. The maximum no. of oxygen atoms are present in
(1) 1 g of H_2O (2) 1 g of H_2O_2
(3) 1 g of Na_2O (4) 1 g of CO_2

105. 2

Sol. For $H_2O = \frac{N_A}{18}(O\,atom)$

For $H_2O_2 = \frac{N_A}{34} \times 2(O\,atom)$

For $Na_2O = \frac{N_A}{62}(O\,atom)$

For $CO_2 = \frac{N_A}{44} \times 2(O\,atom)$

106. Choose the element which react with Acid as well as base
(1) Mg (2) Cu
(3) S (4) Al

106. 4

Sol. Aluminium is the element which react with Acid as well as base

$$\underset{(\text{Acid})}{6HCl} + 2Al \longrightarrow 2AlCl_3 + 3H_2$$

$$2Al + 2NaOH + 2H_2O \longrightarrow \underset{\left(\begin{smallmatrix}\text{Sod.meta}\\ \text{eliminate}\end{smallmatrix}\right)}{2NaAlO_2} + 3H_2 \uparrow$$

107. For the given reaction which statement is incorrect

$$2H_2 + O_2 \longrightarrow 2H_2O$$

(1) Two molecule of hydrogen combine with one molecule of oxygen to form two molecule of water.
(2) 4 u of hydrogen combine with32 u of oxygen to form 36u of water.
(3) 20 volume of hydrogen combine with 10 volume of oxygen to form 20 volume of water
(4) 40 volume of hydrogen combine with 30 volume of oxygen to form 70 volume of water

107. 4

Sol. $2H_2 + O_2 \longrightarrow 2H_2O$

2 vol 1 vol 2 vol

$\therefore$ 40 volume of hydrogen will combine with 20 volume of oxygen to form 40 volume of water

108. A mixture of water and diesel can be separated by
(1) Filtration (2) Centrifugation
(3) Evaporation (4) Separating funnel

108. 4

Sol. A mixture of water and diesel can be separated by separating funnel due to difference in densities.

109. For the balanced equation given below:

$aP_4 + bCl_2 \longrightarrow cPCl_5$, the value of a, b, c are

(1) 1, 2, 2 (2) 1, 3, 4
(3) 2, 3, 4 (4) 1. 10, 4

109. 4

Sol. $aP_4 + bCl_2 \longrightarrow cPCl_5$

$P_4 + 10Cl_2 \longrightarrow 4PCl_5$

110. The highest temperature among the following is
(1) 200^oF (2) 273 K
(3) 105^oC (4) 298 K

110. 3

Sol. 105^oC is the highest temperature

$200^oF = 93.3^oC$

$273\ K = 0^oC$

$298\ K = 25^oC$

111. In extraction of metals coke is used as
(1) Oxidising agent (2) Reducing agent
(3) Dehydrating agent (4) Catalyst

111. 2

Sol. In the extraction of metal coke is used as reducing agent.

112. Choose the correct order of cooling from evaporation:
(1) Water < Ether < Alcohol (2) Ether < Alcohol < Water
(3) Water < Alcohol < Ether (4) Alcohol < Water < Ether

112. 3
Sol. Cooling from evaporation
Water < Alcohol < Ether

113. Which metals is present in Haemoglobin
(1) Cu (2) Fe
(3) Mg (4) Cr
113. 2
Sol. Fe is present in Haemoglobin.

114. Which of the following is a natural polymer:
(1) Nylon (2) Rayon
(3) Protein (4) Polythene
114. 3
Sol. Nylon, Rayon & Polyethene are synthetic polymer only protein is a natural polymer.

115. When iron nails are added to $CuSO_4$ solution
(1) A colourless solution is formed (2) A light green coloured solution is formed
(3) A yellow coloured solution is formed (4) No change in colour of solution
115. 2
Sol. $\underset{(\text{Iron nails})}{Fe} + CuSO_4 \longrightarrow \underset{\left(\begin{array}{c}\text{Green coloured}\\ \text{solutionis formed}\end{array}\right)}{FeSO_4} + Cu$

116. Which of the following is not a property shows by plaster of paris $\left(CaSO_4.\frac{1}{2}H_2O\right)$
(1) It solidifies after mixing with water
(2) It is used for setting of broken bones
(3) When kept open in air it easily loses its water
(4) A large amount of energy is released on mixing it with water
116. 3

117. Match the Columns and mark the correct option

Column – I		Column – II	
(A.)	PVC	(i)	Artificial silk
(B.)	PHBV	(ii)	Artificial wool
(C.)	Orlon	(iii)	Coating of electrical wires
(D.)	Rayon	(iv)	Biodegradable polymer

(1) A – i, B – ii, C – iii, D – iv (2) A – ii, B – iii, C – iv, D – i
(3) A – iii, B – iv, C – i, D – ii (4) A – iii, B – iv, C – ii, D – i
117. 4

118. Allotropes have
(1) Same physical properties (2) Same structure
(3) Same chemical properties (4) Same boiling point
118. 3

119. A student dissolved 50 g sugar in 200 mL water at room temperature. He then heated the solution, till the final volume became 100 mL. How much sugar is still present in the solution?
(1) 0 g (2) 25 g
(3) 50 g (4) 100 g
119. 3
Sol. Sugar is non volatile, only solvent will evaporate on heating, so solute amount will remain constant.

120. Which of the following elements has the last electron present in the N shell?
(1) Potassium (2) Sodium

(3) Chlorine (4) Oxygen

120. 1

Sol. Potassium =19

K	L	M	N
2	8	8	1

121. Which of the following option can't save an iron instrument from rusting?
(1) Galvanization
(2) Electroplating with tin
(3) Keeping the object wrapped with copper wire
(4) Keeping the object wrapped with magnesium wire

121. 3

Sol. According to reactivity series iron is more reactive than copper

122. The oxide of a metal has molecular formula M_2O. If the molecular weight of oxide is 94 u. The molecular weight of chloride salt of this metal will be
(1) 118.5 u (2) 74.5 u
(3) 114.0 u (4) 110.0 u

122. 2

Sol. $M_2O = 94$
$2M + 16 = 94$
M =39, Cl = 35.5
Metal is K. Metal chloride KCl = 74.5 u

123. Match the Columns

Column – I		Column – II	
(A.)	Nitrite ion	(i)	SO_3^{2-}
(B.)	Sulphite ion	(ii)	SO_4^{2-}
(C.)	Sulphate ion	(iii)	NO_3^-
(D.)	Nitrate ion	(iv)	NO_2^-

(1) A – iv, B – i, C – ii, D – iii (2) A – ii, B – ii, C – iii, D – iv
(3) A – iii, B – i, C – ii, D – iv (4) A – iv, B – ii, C – i, D – iii

123. 1

Sol. (A) Nitrite ion - NO_2^-, (B) Sulphite ion - SO_3^{2-} (C) Sulphate ion - SO_4^{2-} (D) Nitrate ion - NO_3^-

124. Identify the endothermic process from the following
(1) Addition of conc.H_2SO_4 to water (2) $CH_4(g) + 2O_2(g) \longrightarrow CO_2(g) + 2H_2O(l)$
(3) $H_2O(l) \longrightarrow H_2O(g)$ (4) $CaO(s) + H_2O(l) \longrightarrow Ca(OH)_2(aq)$

124. 3

Sol. Conversion of liquid to gas is endothermic process.

125. In a mixture iron filling and sulphur powder, the components of mixture can be separated by
(1) Using a magnet
(2) Dissolving the mixture in CS_2 and then filtering
(3) Heating the mixture and then adding CS_2 to black mass
(4) Using both techniques (1) and (2)

125. 4

Sol. Mixture of iron filling & sulphur powder can be separated either by using a magnet or dissolving the mixture in CS_2.

126. Weight of a molecule of $C_6H_{12}O_6$ is
(1) 180 g (2) $\frac{1}{180}$ g

(3) 180 u (4) $\frac{1}{180}$u

126. C

Sol. $C_6H_{12}O_6$

$6 \times 12 + 12 \times 1 + 16 \times 6 = 180$ u.

127. X is a yellow coloured non-metal, when X is burnt it produces a pungent smelling gas Y. Gas Y gets mixed with rain water to cause acid rain, which is harmful for building and crops both. Identify X and Y

(1) P_4, P_2O_5 (2) N_2, NH_3

(3) C, CO_2 (4) S, SO_2

127. 4

Sol. $\underset{X}{S} + O_2 \longrightarrow \underset{\text{(Pungent smelling gas)}}{SO_2} \uparrow$

$SO_2 + H_2O \rightleftharpoons \underset{\text{(Sulphurous acid)}}{H_2SO_3}$

128. In Shimla, where the atmospheric pressure is less than the normal atmospheric pressure (1 atm). The boiling point of water will be

(1) less than 100^oC (2) more than 100^oC

(3) 0^oC (4) 100^oC

128. 1

Sol. At higher altitude atm pressure is less, so boiling point is less than 100^oC .

129. During laboratory preparation CH_4 gas is collected by downward displacement of water because

(1) CH_4 is lighter than Air (2) CH_4 is a poisonous gas

(3) It does not dissolve in water (4) All the above statements are correct

129. 3

Sol. CH_4 is non-polar compound, so it cannot be dissolved in water.

130. Which of the following is an example of neutral oxide

(1) Fe_2O_3 (2) Al_2O_3

(3) CO (4) NO_2

130. 3

Sol. Fe_2O_3 is basic

Al_2O_3 is amphoteric

Co is neutral

NO_2 is acidic

BIOLOGY

131. 'The Origin of Species' is written by:

(1) Charles Brown (2) Lamark

(3) Mendel (4) Charles Darwin

131. 4

Sol. 'Origin of Species' written by Charles Darwin.

132. What is the Basic Unit of classification?

(1) Species (2) Genus

(3) Family (4) Class

132. 1

Sol. Species is the basic unit of classification. Because the members of the same species are Reproductive isolates.

133. The girth of the stem increases due to the activity of:

(1) Intercalary Meristem (2) Apical Meristem

(3) Laterial Meristem (4) Epithelium

133. 3

Sol. Lateral Meristem causes the organ to increase in diameter and girth.

134. The figure below represents:

(1) Fibres (2) Tracheids

(3) Vessels (4) Companion cell

134. 2

Sol. Trachieds are generally with bordered pits and Tepering ends.

135. The organelle involved in membrane biogenesis‘ is:

(1) Ribosome (2) Mitochondria

(3) Endoplasmic Reticulam (4) Lysosome

135. 3

Sol. Endolplasmic Reticulum helps in the formation of fat and lipid (SER) and protein (RER).

136. Majority of children in many parts of India are already immune to one of the disease by the time they are five years old. The disease is:

(1) Jaundice (2) Typhoid

(3) Hepatitis A (4) Rabies

136. 3

Sol. In the children of India Autoimmunity develops against hepatitis – A because of water quality.

137. Concentrates given as feed to the cattle are:

(1) high in fibres and proteins (2) high in fibres but low in proteins

(3) low in fibres and proteins (4) low in fibres but high in proteins

137. 1

Sol. Concentrates given as feed to the cattle to improve immunity and lactation because it has high fibrous and Nutritional value.

138. The cell organelle involved in the formation of Lysosome is:

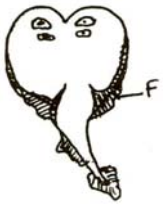
(1) Vacuoles (2) Mitochondria

(3) Golgi Apparatus (4) Chloroplast

138 3

Sol. Golgi apparatus involved in the formation of lysosome.

139. The figure given below shows as Electric Ray (Torpedo). The part Labelled as ‘F’ called:



(1) Pelvic fin (2) Candal fin

(3) Dorsal fin (4) Pectroal fin

139. 1

Sol. In the given diagram the labelled part ‘F’ is Pelvic fin.

140. Who was the writer of the book ‘Systema Naturae’:

(1) Robert Whittaker (2) Carolres Linnaeus
(3) Charles Darwin (4) Robert Brown

140. 2

Sol. Carolres linnaeus is the author of “Systema Naturae”.

141. Kala – azar disease caused by:
(1) Round worm (2) Leishmania
(3) Amoeba (4) Trypanosoma

141. 2

Sol. Leishmania donovani is the caused organism of Kala – azar.

142. A cell becomes turgid when placed in a:
(1) Hypertonic solution (2) Hypotonic solution
(3) Isotonic solution (4) Concentrated solution

142. 2

Sol. Cell becomes turgid when placed in Hypotonic solution due to Endosmosis.

143. Cancer can be caused due to:
(1) High blood pressure (2) Low blood pressure
(3) Genetic abnormalities (4) High blood sugar level

143. 3

Sol. Cancer occurs due to unregulated cell division and it causes genetic abnormalities.

144. The plant group which does not have ‘Hidden reproductive organ’ are:
(1) Bryophyta (2) Pteridophyta
(3) Thallophyta (4) Angiosperms

144. 4

Sol. Flowers are the Reproductive organs of the plant – it is present in the members of the Division - Angiospermeae.

145. Growing different crops on the same piece of land in a ‘pre-planned succession’ is called as:
(1) Crop rotation (2) Inter cropping
(3) Mixed cropping (4) Intensive cropping

145. 1

Sol. Crop rotation takes place in a Pre – planned succession depend on the area and habitat.

146. Which of these organisms the body is bilaterally symmetrical?
(1) Sea anemone (2) Liver fluke
(3) Sycon (4) Hydra

146. 2

Sol. Liver fluke is the member of phylum – platyhelminthes and their body is bilaterally symmetrical.

147. The part labelled as ‘D’ in the figure of Paramecium given below is called as

(1) Cytosome (2) Oral groove
(3) Cytopyge (4) Eye spot

147. 3

Sol. Cytopyge – Egestion of undigested flood takes place through cytopyge. Which is temporarily formed Anus.

148. The Tissue present in Aquatic plants which enables them to keep floating by giving buoyancy is:
(1) Collenchyma (2) Aerenchyma
(3) Sclerenchyma (4) Chlorenchyma
148 2
Sol. Aerenchyma tissues helps in floating because of the presence of air spaces.

149. The fibrous tissue having great strength but limited flexibility are:
(1) Ligaments (2) Areolar Tissue
(3) Adipose Tissue (4) Tendons
149. 1
Sol. Ligaments connects bone to bone it has limited flexibility and great strength.

150. Which one is not Example of single cell organism?
(1) Amoeba (2) Paramecium
(3) Hydra (4) Cynobacteria
150. 3
Sol. Hydra is a multicellular organism and it is the member of phylum coelentrata.

151. The largest group of Animal Kingdom is:
(1) Annelida (2) Arthropoda
(3) Nematoda (4) Mollusca
151. 2
Sol. Arthropoda is largest group of animal kingdom because of its maximum members.

152. Who discovered the Vaccine for small pox:
(1) Edward Jenner (2) Fleming
(3) Louis Pasteur (4) Robert Koch
152. 1
Sol. Edward Jenner discovered vaccine for small pox in 1798.

153. Pseudocoelom is a characteristic feature of phylum:
(1) Coelenterata (2) Platyhelminthes
(3) Annelida (4) Nematoda
153. 4
Sol. Pseudocoelom is present only in the members of Aschelminthes (Nematoda)

154. Antibiotic penicillin blocks a bio – chemical pathway in bacteria due to which it dies easily as they become unable to make:
(1) Cell wall (2) Cell Membrane
(3) Nucleus (4) Golgi apparatus
154. 1
Sol. Penicillin resists the formation of cell wall in the bacteria due to which they die easily.

155. Antibiotic do not work against viral infections because
(1) Viruses have hard protein coat
(2) Viruses do not follow bio-chemical pathways to make cell wall
(3) Viruses are not infections
(4) Viruses have a rigid cell wall
155. 2
Sol. Antibiotic does not affects viruses because they are Acellular organism.

156. Intercalary Meristem is found in:
(1) Leaf Margin (2) Tip of Stem
(3) Vascular bundle (4) At leaf base
156. 4
Sol. Intercalary meristem is located at the base of internode.

157. Epidermal cells of roots have long hair like parts which help to:
(1) Increase the total absorptive surface (2) Decrease the total absorptive surface
(3) Protect against diseases (4) Provide strength to the roots
157. 1
Sol. Root hair increase the absorption capacity of the root.

158. The Element of Xylem which help in sideways conduction of Water is:
(1) Trachied (2) Xylem Parenchyma
(3) Vessels (4) Xylem fibres
158. 2
Sol. Xylem parenchyma are living cells and they store food material and also help in the conduction of water and mineral.

159. The cell organelle which has its own DNA & Robosomes is:
(1) Mitochondria (2) Golgi Apparatus
(3) Endoplasmic reticulam (4) Lysosomes
159. 1
Sol. Mitochondria is also known as “Semi autonomous cell organelle”.

160. The shape and size of cells are related to:
(1) Temperature (2) Pressure
(3) Specific function they perform (4) Concentration of the surrounding medium
160. 3
Sol. The size and shape of cells depend on their specific functions.

161. Which of the following is not a simple tissue?
(1) Collenchyma (2) Sclerenchyma
(3) Pholem (4) Parenchyma
161. 3
Sol. Phloem is a complex tissue and it is made up of different components:
Sieve tube Phloem parenchyma
Companion cell Phoem fibre

162. Which of the following is not the basis of five kingdom classification?
(1) Cell structure (2) Chromosome behaviour
(3) Mode of Nutrition (4) Body organisation
162. 2
Sol. Five kingdom classification is mainly based on
- Type of cell
- Mode of nutrition
- number of cell (Body organisation)

163. The crop which is a very good source of green manure is:
(1) Paddy (2) Maize
(3) Wheat (4) Guar
163. 4
Sol. Guar is a leguminous plant it is a very good source of green manure.

164. The characteristic shown by local breeds of cow like Red Sindhi, Sahiwal is:
(1) Long lactation periods (2) Well built and strong
(3) Excellent resistance to diseases (4) High milk production
164. 3
Sol. The local breeds of cow like Red Sindhi, Sahiwal carrying high immunity power.

165. The organelle which is primarily associated with storage of starch, oil and proteins etc are
(1) Leucoplasts (2) Inner membrane of Mitochondria

(3) Endoplasmic reticularm (4) Ribosomes

165. 1

Sol. Leucoplasts associated with the storage of starch (Amyloplast) oil (Elaioplast) protein (Proteinoplast).

166. Plants having well differentiated reproductive tissue that ultimately make seeds are called:
(1) Cryptogams (2) Phanerogams
(3) Pteridophytes (4) Bryophytes

166. 2

Sol. Flowers are the reproductive parts of plant and they are phanerogams.

167. Due to active immune system local effects like swelling and pain are seen due to:
(1) Inflamation (2) Antibiotics
(3) Microbial growth (4) Multiplication of pathogen

167. 1

Sol. Inflamation occurs due to swelling and pain.

168. In Nigrogen cycle which bacteria is responsible for nitrification:
(1) Rhizobium (2) Clostridium
(3) Nitrosomonas (4) Azotobactor

168. 3

Sol. Nitrosomonas is responsible for the Nitrification.

169. One of the following is a Green House Gas:
(1) CO_2 (2) N_2
(3) O_2 (4) H_2

169. 1

Sol. CO_2 is the main element of green house gas.

170. Depletion of ozone layer is due to:
(1) CO_2 (2) CFC
(3) NH_3 (4) H_2

170. 2

Sol. Chloroflurocarbons is mainly responsible for the depletion of ozone layer.

MATHEMATICS

171. If $a+b+c=0$, then the value of $\frac{(b+c)^2}{bc}+\frac{(c+a)^2}{ca}+\frac{(a+b)^2}{ab}$ is
(1) 0 (2) 1
(3) 2 (4) 3

171. 4

Sol. $\frac{(b+c)^2}{bc}+\frac{(c+a)^2}{ca}+\frac{(a+b)^2}{ab}$

$=\frac{a^2}{bc}+\frac{b^2}{ca}+\frac{c^2}{ab}$

$=\frac{a^3+b^3+c^3}{abc}$

$=\frac{3abc}{abc}=3$

172. If $x^2-5x-1=0$ then the value of $x^2+\frac{1}{x^2}$ is
(1) 20 (2) 27
(3) 25 (4) –25

172. 2

Sol. $x^2 - 1 = 5x$

$\Rightarrow x - \frac{1}{x} = 5$

$\Rightarrow x^2 + \frac{1}{x^2} = \left(x - \frac{1}{x}\right)^2 + 2$

$= 5^2 + 2 = 27$

173. Factors of $\left(3m^2 - 2m\right)\left(6 - 3m^2 + 2m\right) - 5$ are:

(1) $(3m+1)(3m-5)(m-1)(m+1)$ (2) $-(3m+1)(3m-5)(m-1)(m+1)$

(3) $(3m-1)(3m+5)(m-1)(m+2)$ (4) $-(3m-1)(3m-5)(m-2)(m+1)$

173. 2

Sol. $\left(3m^2 - 2m\right)\left(6 - 3m^2 + 2m\right) - 5$

Let $3m^2 - 2m = y$

$y(6-y) - 5$

$= -y^2 + 6y - 5$

$= -(y-5)(y-1)$

$= -\left(3m^2 - 2m - 5\right)\left(3m^2 - 2m - 1\right)$

$= -(3m+1)(3m-5)(m-1)(m+1)$

174. If $\left(\frac{x^6y^{-3}}{x^{-2}y^3}\right)^{-\frac{1}{2}} + \left(\frac{x^{-1}y^2}{x^3y^{-2}}\right)^{-\frac{1}{3}} = x^a y^b$, then the value of (a + b + 1) is

(1) 0 (2) 2

(3) –1 (4) –2

174. 1

Sol. $\left(\frac{x^6y^{-3}}{x^{-2}y^3}\right)^{-1/2} \div \left(\frac{x^{-1}y^2}{x^3y^{-2}}\right)^{-1/3} = x^a y^b$

$\Rightarrow \left(x^8y^{-6}\right)^{-1/2} \div \left(x^{-4}y^4\right)^{-1/3} = x^a y^b$

$\frac{\Rightarrow \left(x^{-4}y^3\right)}{\left(x^{4/3}y^{-4/3}\right)} = x^a y^b$

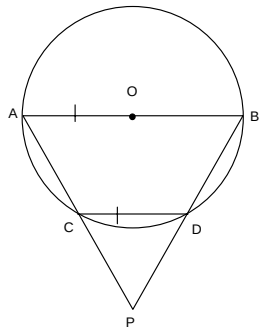
$\Rightarrow x^{\frac{-16}{3}} y^{\frac{13}{3}} = x^a y^b$

$\therefore$, a + b + 1

$= \frac{-16}{3} + \frac{13}{3} + 1$

= – 1 + 1 = 0

175. In the figure, O is the centre of the circle and OA = CD, then $\angle CPD$ is



(1) 45^o (2) 30^o

(3) 70^o (4) 60^o

175. 4

Sol. In the diagram ODC is equilateral triangle

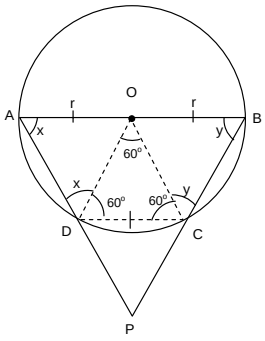
$\Rightarrow \angle ODC = \angle OCD = 60^o$

Now in quadrilateral ABCD

$\Rightarrow x + x + 60 + y + y + 60 = 360^o$

$\Rightarrow x + y = 120^o$

In Δ ABP, $\angle APB = 180 - (x + y) = 60^o$



176. If a polygon has 27 diagonals, then the number of sides of the polygon is

(1) 9 (2) 10

(3) 11 (4) 12

176. 1

Sol. $\frac{n(n-3)}{2} = 27$

$\Rightarrow n^2 - 3n - 54 = 0$

$\Rightarrow (n-9)(n+6) = 0$

$\Rightarrow n = 9, -6$

$\because$ Number of sides won't be negative,

$\therefore n = 9$

177. If $x^2 + 7ax + 40$ and $x^2 + 2ax - 60$ has a common factor, then the value of 'a' is

(1) ± 1 (2) ± 2

(3) ± 3 (4) ± 4

177. 2

Sol. $x^2 + 7ax + 40$ and $x^2 + 2ax - 60$ have a common factor

Solving using cross multiplication method:

$$\frac{x^2}{(7a)(-60)-(2a)(40)} = \frac{x}{(40)(1)-(-60)(1)} = \frac{1}{(2a)(1)-(7a)(1)} \Rightarrow \frac{x^2}{-500a} = \frac{x}{100} = \frac{1}{-5a}$$

$$\Rightarrow \frac{x^2}{-500a} = \frac{1}{-5a} \text{ and } \frac{x}{100} = \frac{1}{-5a}$$

$\Rightarrow x = \pm 10 \quad \Rightarrow a = \pm 2$

178. If $64^{2x-5} = 4 \times 8^{x-5}$, then the value of x is:

(1) $\frac{17}{9}$ (2) $\frac{17}{10}$

(3) $\frac{20}{9}$ (4) $\frac{9}{17}$

178. 1

Sol. $64^{2x-5} = 4 \times 8^{x-5}$

$$\frac{8^{4x-10}}{8^{x-5}} = 4$$

$$\Rightarrow 8^{3x-5} = 4$$

$$\Rightarrow 2^{9x-15} = 2^2$$

$$\Rightarrow 9x = 17 \Rightarrow x = \frac{17}{9}$$

179. If $x = 2^{\frac{2}{3}} + 2^{\frac{1}{3}}$, then

(1) $x^3 - 6x - 6 = 0$ (2) $x^3 + 6x - 6 = 0$

(3) $x^3 - 6x + 6 = 0$ (4) $x^3 + 6x + 6 = 0$

179. 1

Sol. $x = 2^{\frac{2}{3}} + 2^{\frac{1}{3}}$

$$x^3 = \left(2^{\frac{2}{3}} + 2^{\frac{1}{3}}\right)^3$$

$$x^3 = 4 + 2 + (3 \times 2)\left(2^{\frac{2}{3}} + 2^{\frac{1}{3}}\right)$$

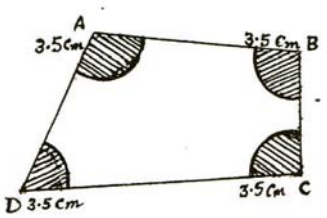
$$\Rightarrow x^3 = 6 + 6(x)$$

$$\Rightarrow x^3 - 6x - 6 = 0$$

180. In figure, area of the shaded region is $\left(\pi = \frac{22}{7}\right)$

(1) 77 cm^2 (2) 154 cm^2

(3) 38.5 cm^2 (4) 90 cm^2



180. 3

Sol. Shaded area = $\frac{\angle A}{360^o} \times \pi \times (3.5)^2$

$$+ \frac{\angle B}{360^o} \times \pi \times (3.5)^2$$

$$+ \frac{\angle C}{360^o} \times \pi \times (3.5)^2$$

$$+ \frac{\angle D}{360^o} \times \pi (3.5)^2$$

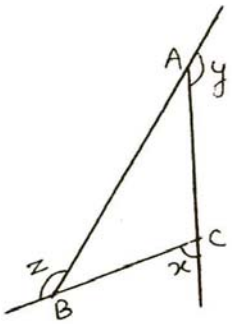
$$\Rightarrow \frac{\angle A + \angle B + \angle C + \angle D}{360^o} \times \pi \times (3.5)^2$$

$$\Rightarrow \frac{360^o}{360^o} \times \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} = 38.5 \text{ cm}^2$$

181. In figure, AB = 7.8 cm, BC = 5.2 cm and CA = 6.1 cm, then angles x, y and z in ascending orders are:

(1) $x < y < z$ (2) $x > y > z$

(3) $y < z < x$ (4) $x < z < y$



181. 4

Sol. The longest side has greatest angle opposite to it and hence supplementary angles will be smallest $x < z < y$

182. If $a = b^{3x}$, $b = c^{3y}$ and $c = a^{3z}$, then value of xyz is

(1) 27 (2) $\frac{1}{27}$

(3) 9 (4) $\frac{1}{9}$

182. 2

Sol. $c = a^{3z}$

$c = \left(b^{3x}\right)^{3z}$

$c = \left(\left(c^{3y}\right)^{3x}\right)^{3z}$

$c^1 = c^{27xyz}$

$xyz = \frac{1}{27}$

183. If 12, 15, 17, 18, x + 2, x + 4, 25, 30, 31, 32 are in ascending order and median of the observations is 22, then value of x is:

(1) 20 (2) 19

(3) 22 (4) 23

183. 2

Sol. $\frac{x+2+x+4}{2} = 22$

$2x + 6 = 44 \Rightarrow x = 19$

184. Value of $\frac{1}{1-x} + \frac{1}{1+x} + \frac{2}{1+x^2} + \frac{4}{1+x^4} + \frac{8}{1+x^8}$ is

(1) $\frac{16}{1+x^{16}}$ (2) $\frac{8}{1-x^{16}}$

(3) $\frac{16}{1-x^{16}}$ (4) $\frac{32}{1+x^{16}}$

184. 3

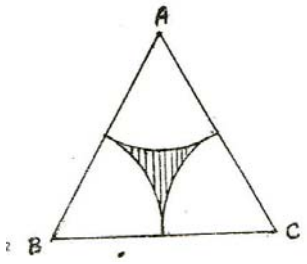
Sol. $\frac{1}{1-x} + \frac{1}{1+x} = \frac{2}{1-x^2}$

$\frac{2}{1-x^2} + \frac{2}{1+x^2} = \frac{4}{1-x^4}$

$\frac{4}{1-x^4} + \frac{4}{1+x^4} = \frac{8}{1-x^8}$

$$\frac{8}{1-x^8}+\frac{8}{1+x^8}=\frac{16}{1-x^{16}}$$

185. In figure ABC is an equilateral triangle of side 8 cm. Area of Shaded region is:



(1) $32-\frac{8\pi}{3}$ cm^2 (2) $32-\frac{16\pi}{3}$ cm^2

(3) $16\sqrt{3}-8\pi$ cm^2 (4) $32\sqrt{3}-16\pi$ cm^2

185. 3

Sol. Area of equilateral – 3x (area of sectors of circle)

$$=\frac{\sqrt{3}}{4}(8)^2-3x\left(\frac{\pi(4)^2\times 60^o}{360^o}\right)$$

$$=16\sqrt{3}-8\pi \text{ cm}^2$$

186. If x + y = 8, xy = 15, then the value of $x^4+x^2y^2+y^4$ is:

(1) 34 (2) 1156

(3) 931 (4) 1381

186. 3

Sol. $x^4+2x^2y^2+y^4-x^2y^2$

$$=\left(x^2+y^2\right)^2-x^2y^2$$

$$=\left[(x+y)^2-2xy\right]^2-x^2y^2=\left[(8)^2-2\times 15\right]^2-(15)^2=931$$

187. The coefficient of x^2 in the expansion of $\left(x^2-x+1\right)^2+\left(x^2+x+1\right)^2$ is:

(1) 6 (2) 5

(3) 4 (4) 3

187. 1

Sol. $\left(x^2-x+1\right)^2+\left(x^2+x+1\right)^2$

$$=x^4+x^2+1-2x^3-2x+2x^2+x^4+x^2+1+2x^3+2x+2x^2$$

$$3x^2+3x^2=6x^2$$

Coeff. = 6

188. Mean of 9 observations was found to be 35. Later on, it was detected that an observation 80 was misread as 8. The correct mean is:

(1) 43 (2) 42

(3) 44 (4) 45

188. 1

Sol. $\frac{35\times 9-8+80}{9}=43$

189. If $\frac{3\sqrt{2}+2\sqrt{3}}{4\sqrt{2}+3\sqrt{3}}=a+b\sqrt{6}$, then the value of a and b are:

(1) $a=\frac{-6}{5}, b=\frac{1}{5}$ (2) $a=\frac{1}{5}, b=\frac{6}{5}$

(3) $a=\frac{6}{5}, b=\frac{1}{5}$ (4) $a=\frac{6}{5}, b=\frac{-1}{5}$

189. 4

Sol. $\frac{\left(3\sqrt{2}+2\sqrt{3}\right)}{\left(4\sqrt{2}+3\sqrt{3}\right)}\times\frac{\left(4\sqrt{2}-3\sqrt{3}\right)}{\left(4\sqrt{2}-3\sqrt{3}\right)}$

$=\frac{24+8\sqrt{6}-9\sqrt{6}-18}{32-27}=\frac{6-\sqrt{6}}{5}$

$=\frac{6}{5}+\left(\frac{-1}{5}\right)\sqrt{6}$

$a=\frac{6}{5}, b=\frac{-1}{5}$

190. Value of $\sqrt{\frac{1}{3-\sqrt{8}}-\frac{\sqrt{1}}{\sqrt{8}-\sqrt{7}}+\frac{1}{\sqrt{7}-\sqrt{6}}-\frac{1}{\sqrt{6}-\sqrt{5}}+\frac{1}{\sqrt{5}-2}}$ is :

(1) 1 (2) 5

(3) $\sqrt{5}$ (4) $\sqrt{8}$

190. 3

Sol. Rationalizing denominators

$\sqrt{3+\sqrt{8}-\sqrt{8}-\sqrt{7}+\sqrt{7}+\sqrt{6}-\sqrt{6}-\sqrt{5}+\sqrt{5}+2}$

$=\sqrt{5}$

191. A train of lengths 240 m crosses a platform in 20 seconds. If the speed of the train is 72 km/hr. then the length of the platform is :

(1) 260 m (2) 160 m

(3) 180 m (4) 240 m

191. 2

Sol. Let length of platform = x km

then $\frac{6}{25}+x=72\times\frac{20}{3600}\Rightarrow x=\frac{4}{25}$ km = 160 m.

192. If $\frac{25p+14q}{5p+7q}=\frac{8}{3,}$ then p : q is:

(1) 3 : 5 (2) 2 : 5

(3) 2 : 3 (4) 5 : 4

192. 2

Sol. $75p + 42q = 40p + 56q \Rightarrow 35p = 14q \Rightarrow \frac{p}{q}=\frac{2}{5}$

193. A farmer can plough a farm in 10 days by working 5 hours a day. In how many days can 5 farmers plough 10 such farms working at 5 hours a day?

(1) 20 days (2) 25 days

(2) 15 days (4) 24 days

193. 1

Sol. Time taken to plough the farm = 50 hrs.

Required number of days = $\frac{500}{25}$ = 20 days

194. The difference between the sides at right angle in a right angled triangle is 14 cm. The area of the triangle is 120 cm^2. Perimeter of triangle is:

(1) 50 cm (2) 36 cm

(3) 60 cm (4) 34 cm

194. 3

Sol. Let legs of rt. Δ are x & 14 + x

$\frac{1}{2}x(14+x)=120 \Rightarrow x^2+14x-240=0 \Rightarrow x=-24$ or 10

Third side = $\sqrt{24^2+10^2}=26$.

Hence perimeter = 60 cm

195. Measure of an angle which is 18^o 2' 10" less than its complement is :

(1) $57^o71'50"$ (2) $50^o71'57"$

(3) $71^o57'50"$ (4) $71^o70'9"$

195. Option not matching

Sol. $1^o=60'$ & $1'=60"$

Let the angle be x then its compliment will be 90^o-x

$90^o-x-18^o2'11"=x \Rightarrow x=\frac{71^o57'49"}{2}$

196. The ratio of the volumes of two cubes is 729: 1331. The ratio of their total surface areas is:

(1) 9 : 11 (2) 729 : 1331

(3) 81 : 121 (4) 27 : 121

196. 3

Sol. Let sides of cubes are a_1 and a_2 then $\frac{a_1^3}{a_2^3}=\frac{729}{1331} \Rightarrow \frac{a_1}{a_2}=\frac{9}{11} \Rightarrow \frac{6a_1^2}{6a_2^2}=\frac{81}{121}$

197. The parallel sides of a trapezium are 24 cm and 20 cm. The distance between them is 7 cm. Find the radius of a circle whose area is equal to the area of the trapezium:

(1) 7 cm (2) 14 cm

(3) 9 cm (4) 28 cm

197. 1

Sol. Area of trapezium $=\frac{1}{2}(24+20)\times 7=\pi r^2$

$\Rightarrow 22\times 7=\frac{22}{7}r^2 \Rightarrow r=7$

198. The cost of levelling a rectangular field at the rate of 85 paise per sq. metre is Rs. 624.75. Find the perimeter if its sides are in the ratio 5 : 3 :

(1) 56 cm (2) 32 cm

(3) 24 cm (4) 112 cm

198. 4

Sol. Let sides are 5x & 3x

$15x^2\times\frac{85}{100}=624.75 \Rightarrow x=7$

Perimeter = 2 (35 + 21) = 112 cm

199. If $x=(-23)+22+(-23)+22+.....(40\text{ terms})$ $y=11+(-10)+11+(-10)+.....(20\text{terms})$ then value of (y – x) is

(1) 30 (2) 40

(2) 20 (4) 10

199. 1

Sol. $x=-460+440=-20$ & y = 110 – 100 = 10

$y-x=10-(-20)=30$

200. The value of $0.\overline{235}$ is:

(1) $\frac{233}{900}$ (2) $\frac{233}{990}$

(3) $\frac{235}{999}$ (4) $\frac{235}{990}$

200. 2

Sol. Let $x = 0.2\overline{35} \Rightarrow 1000x = 235.\overline{35}$ (1)

& $10x = 2.\overline{35}$ ……(2)

Subtract (2) from (1)

$990x = 233 \Rightarrow x = \frac{233}{990}$