



# SRI CHAITANYA EDUCATIONAL INSTITUTIONS,INDIA.

A.P,TELANGANA,KARNATAKA,TAMILNADU,MAHARASHTRA,DELHI,RANCHI

SEC : SR ELITE, AIIMS S60, NEET MPL & MEDICON

DATE : 04-02-19

SUB : PHYSICS

AIIMS GRAND TEST - 08

Max. Marks : 200

## IMPORTANT INSTRUCTIONS :

All India Institute of Medical Sciences Exam Pattern

Total Number of Questions : 200,

Physics : 40 Objectives and 20 Assertions and Reasoning,

Chemistry : 40 Objectives and 20 Assertions and Reasoning.

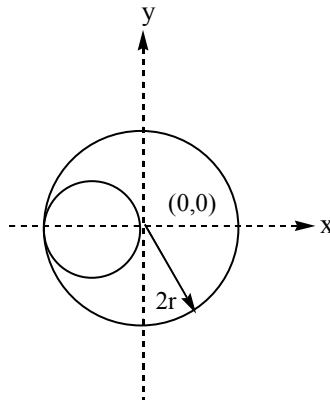
Biology : 40 Objectives and 20 Assertions and Reasoning. General Knowledge : 20 Objectives

For each correct Answer +1 mark. For Each Incorrect Answer - 1/3 marks.

Total marks = 1x200 = 200 marks Duration : 3 1/2 Hours.

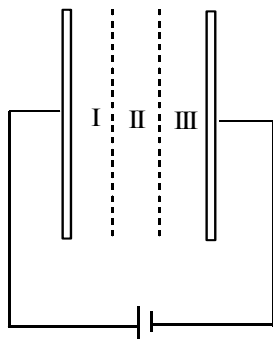
## PHYSICS

01. An electric dipole is placed at an angle of  $30^\circ$  with an electric field intensity  $2 \times 10^5 \text{ N/C}$ . It experiences a torque equal to 4 Nm. The charge on each pole of the dipole, if the dipole length is 2 cm, is
- a) 5 mC                      b)  $7 \mu\text{C}$                       c) 8 mC                      d) 2 mC
02. A spherical cavity of radius 'r' is made in a uniformly charged solid sphere of radius 2r. Find the magnitude of the total electric field at  $(-r,0,0)$ . (Volume charge density is  $\rho$ )

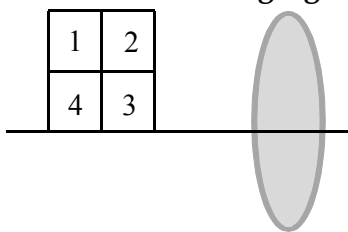


- a) 0                      b)  $\frac{\rho}{3\epsilon_0} r \hat{i}$                       c)  $-\frac{\rho}{3\epsilon_0} r \hat{i}$                       d)  $\frac{2\rho}{3\epsilon_0} r \hat{i}$

03. The figure shows a capacitor having three layers of equal thickness and same area as that of plate. Layer I is vacuum, layer II is conductor and layer III is dielectric of dielectric constant  $K$ . The ratio of energy stored in region III to total energy stored in capacitor is



- a)  $\frac{1}{K+1}$       b)  $\frac{3}{K+1}$       c)  $\frac{4}{K+3}$       d)  $\frac{4}{3K+1}$
04. A small potential difference is applied across a copper wire of radius 1mm which results in a uniform electric field 0.01 V/m along the length of wire. If resistivity of copper under experimental conditions is  $1.7 \times 10^{-8} \Omega - m$ , current in the wire will be  
a) 1.85 A      b) 2.25 A      c) 3.75 A      d) 6.75 A
05. A galvanometer gives full scale deflection with 0.006 A current. By connecting it to a  $4990 \Omega$  resistance, it can be converted into a voltmeter of range 0-30V. If connected to a  $\frac{2n}{249} \Omega$  resistance, it becomes an ammeter of range 0-1.5A. The value of  $n$  is  
a) 5      b) 4      c) 3      d) 2
06. A convex lens is used to form a real image of the object as shown in the figure. Then the real inverted image is as shown in the following figure.



- a) 

1	2
4	3

      b) 

2	1
3	4

      c) 

4	3
1	2

      d) 

3	4
2	1
07. The potential energy of a particle of mass ' $m$ ' is given by  $V(x) = \begin{cases} E_0 & 0 \leq x \leq 1 \\ 0 & x > 1 \end{cases} \lambda_1$  and  $\lambda_2$  are the de Broglie wavelengths of the particle, when  $0 \leq x \leq 1$  and  $x > 1$  respectively. If the total energy of particle is  $2E_0$ , find  $(\lambda_1 / \lambda_2)^2$ .  
a)  $\sqrt{3}$       b)  $\sqrt{2}$       c)  $\sqrt{5}$       d)  $\sqrt{7}$

08. Electrons of mass 'm; with de Broglie wavelength '  $\lambda$  ' fall on the target in an X-ray tube. The cutoff wavelength ( $\lambda_0$ ) of the emitted X-ray is

a)  $\lambda_0 = \frac{2m^2c^2\lambda^3}{h^2}$       b)  $\lambda_0 = \lambda$       c)  $\lambda_0 = \frac{2mc\lambda^2}{h}$       d)  $\lambda_0 = \frac{2h}{mc}$

09. Statement-A: A thin layer of oil floating on water appears coloured due to diffraction, whereas appearance of colours in a compact disc is due to interference

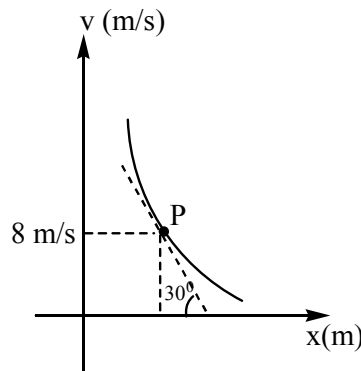
Statement-B: Interference proves transverse nature of a wave.

- a) Both A and B are true      b) A is true but B is false  
c) A is false but B is true      d) Both A and B are false

10. A beaker containing water is placed on a spring balance. If we put our finger in water without touching the beaker, so that water doesn't over flow. How will the reading of balance change? [Take  $\rho_{finger} > \rho_{water}$  ]

- a) increase      b) decrease      c) remain same      d) will be halved

11. Velocity of a particle moving along x-axis changes with displacement x as shown in the diagram. The acceleration of particle at point P is



a)  $\frac{8}{\sqrt{3}} m/s^2$       b)  $-\frac{8}{\sqrt{3}} m/s^2$       c)  $-\frac{64}{\sqrt{3}} m/s^2$       d)  $\frac{64}{\sqrt{3}} m/s^2$

12. In comparing e.m.f. of two cells with the help of a potentiometer, if the balance point is to be shifted to a longer length of the wire, then this can be done by

- a) increasing the current from the comparison cells  
b) decreasing the current from the comparison cells  
c) increasing the current from the main circuit  
d) decreasing the current from the main circuit

13. For C.E configuration of a transistor, in List -I different regions of operations and in List - II different biasing of junctions are mentioned. Match list - I with list - II.

List - I

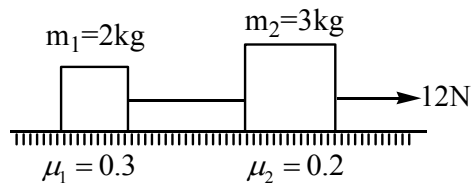
- a) active region  
b) saturation region  
c) cut off region

List - II

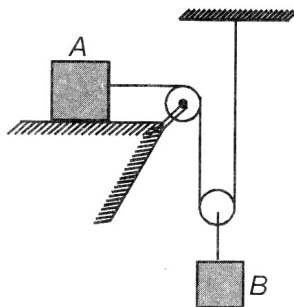
- d) both the junctions are forward biased  
e) both the junctions reverse biased  
f) emitter junction is forward biased and collector junction reverse biased

- a) a - e, b - d, c - f      b) a - f, b - e, c - d      c) a - f, b - d, c - e      d) a - e, b - d, c - f

14. Tension in the string joining  $m_1$  and  $m_2$  as shown in figure is [Take  $g=10 \text{ ms}^{-2}$ ]

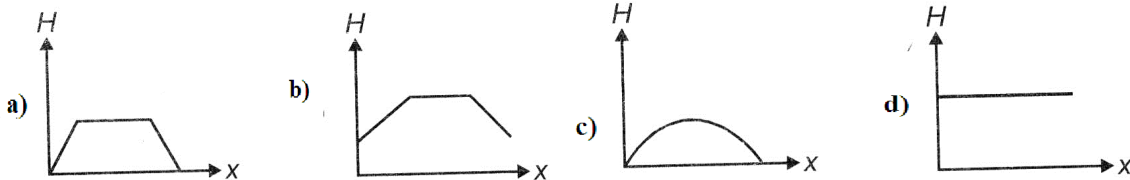
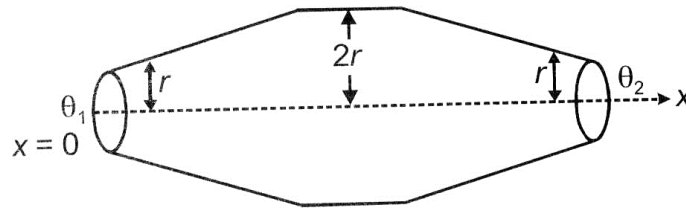


- a) Zero                      b) 6 N                      c) 12 N                      d) 3 N
15. If the work done by the string on block A is  $W$ , then work done by the string on the block B will be

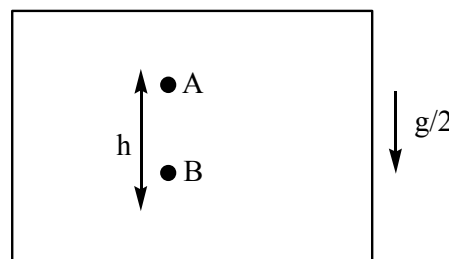


- a)  $-W$                       b)  $-\frac{W}{2}$                       c)  $2W$                       d) Zero
16. Which of the following is the most accurate instrument for measuring length?
- a) Verniercalipers having 20 divisions on the sliding scale which coincide with 19 divisions on the main millimeter scale
- b) A screw gauge having pitch 1 mm and 50 divisions on the circular scale
- c) A vernier scale of least count 0.01 mm
- d) A screw gauge of least count 0.001 mm
17. The maximum range of a projectile is 500 m. If the particle is thrown up a smooth plane inclined at an angle of  $30^\circ$  with the same speed, the distance covered by it along the inclined plane will be
- a) 250 m                      b) 500 m                      c) 750 m                      d) 100 m
18. An automobile enters a turn whose radius is  $R$ . The road is banked at angle  $\theta$ . Friction is negligible between the wheels of the automobile and road. Mass of the automobile is  $m$  and speed is  $v$ . Select the correct alternative
- a) net force on the automobile is zero
- b) normal reaction on the automobile is  $mg \cos\theta$
- c) normal reaction on the automobile is  $mg \sec \theta$
- d) net force on the automobile is  $\sqrt{(mg)^2 + (mv^2 / R)^2}$
19. Three identical stars, each of mass  $M$ , form an equilateral triangle (stars are positioned at the corners) that rotates around the centre of the triangle. The system is isolated and edge length of the triangle is  $L$ . The amount of work done, that is required to dismantle the system, is
- a)  $\frac{3GM^2}{L}$                       b)  $\frac{3}{2} \frac{GM^2}{L}$                       c)  $\frac{3}{4} \frac{GM^2}{L}$                       d)  $\frac{GM^2}{2L}$

20. A pendulum consists of a wooden bob of mass  $m$  and of length  $l$ . A bullet of mass  $m_1$  is fired towards the pendulum with a speed  $v_1$ . The bullet emerges out of the bob with a speed  $v_1/3$  and the bob just completes motion along a vertical circle. Then  $v_1$  is
- a)  $\left(\frac{m}{m_1}\right)\sqrt{5gl}$       b)  $\frac{3}{2}\left(\frac{m}{m_1}\right)\sqrt{5gl}$       c)  $\frac{2}{3}\left(\frac{m_1}{m}\right)\sqrt{5gl}$       d)  $\left(\frac{m_1}{m}\right)\sqrt{gl}$
21. From a given sample of uniform wire, two circular loops P and Q are made, P of radius  $r$  and Q of radius  $nr$ . If the M.I of Q about its axis is 8 times that of P about its axis (assuming wire diameter much smaller, than either radius) the value of  $n$  is
- a) 2      b)  $2^{1/3}$       c) 4      d) 8
22. The ends of given conductor are at fixed temperature  $\theta_1$  and  $\theta_2$  the graph of rate of heat flow at steady state through sections along the length is best represented by

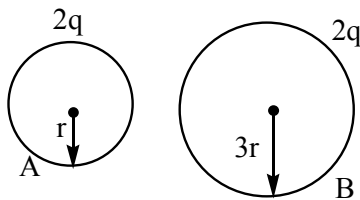


23.  $Q$  heat flows per second through the rod of length  $L$  and area of cross-section  $a$ . If it is stretched to double its length then what will be the heat flow per second keeping temperature difference same?
- a)  $2Q$       b)  $Q/2$       c)  $Q/4$       d)  $Q$
24. A string is wrapped around a cylinder of mass  $M$  and radius  $R$ . The string is pulled vertically upwards to prevent the centre of mass from falling as the cylinder unwinds the string. The work done on the cylinder for reaching an angular speed  $\omega$  is
- a)  $\frac{MR^2\omega^2}{4}$       b)  $\frac{MR^2\omega^2}{2}$       c)  $\frac{MR^2\omega^2}{3}$       d)  $\frac{2MR^2\omega^2}{3}$
25. When a substance is kept in a magnetic field, it gets repelled. Which of the following represents its susceptibility?
- a)  $-0.0004$       b)  $0.0004$       c)  $1.000$       d)  $-1.000$
26. The container is moving downwards with acceleration  $g/2$  and distance between A and B is  $h$ . If density of liquids is  $\rho$ , then pressure difference between A and B is

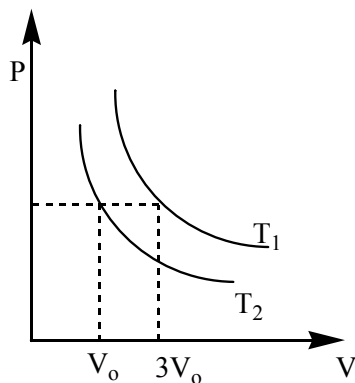


- a)  $\frac{h\rho g}{2}$       b)  $\frac{3hg\rho}{2}$       c)  $h\rho g$       d)  $2h\rho g$

27. The root mean square velocity of the a monoatomic gas molecules is 300 m/s. The velocity of sound through that gas is  
 a) 300 m/s                      b) 150 m/s                      c) 600 m/s                      d) 223 ms<sup>-1</sup>
28. During an adiabatic process, the pressure of a gas is proportional to  $T^{3.5}$  where "T" is its absolute temperature. The number of degrees of freedom of the gas (ignore vibrational degrees of freedom)  
 a) 3                                      b) 5                                      c) 6                                      d) 8
29. The two spherical conductors shown below are touched with each other and then separated to infinity. After the separation the potential on the shell A is

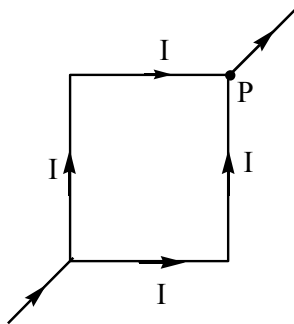


- a) Zero                      b)  $\frac{q}{4\pi\epsilon_0 r}$                       c)  $\frac{2q}{4\pi\epsilon_0 r}$                       d)  $\frac{3q}{4\pi\epsilon_0 r}$
30. Youngs double slit experiment is performed in a liquid. The 10<sup>th</sup> bright fringe in the liquid lies where the 8<sup>th</sup> dark fringe in the liquid lies where the 8<sup>th</sup> dark fringe lies in vacuum. Refractive index of the liquid is approximately  
 a) 1.81                      b) 1.67                      c) 1.51                      d) 1.33
31. If isotherms of a given sample at different temperatures are as shown then the ratio of temperatures  $T_1$  and  $T_2$  is

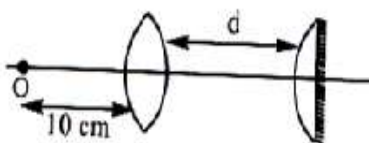


- a)  $\sqrt{3} : 1$                       b) 3:1                      c) 9:1                      d) 1:3
32. A heavy brass sphere is hung from a spring and it executes vertical vibrations with period T. The sphere is now immersed completely in a non-viscous liquid with a density (1/10)<sup>th</sup> that of brass. When set into vertical vibration with the sphere remaining inside liquid all the time, the time period will be  
 a)  $\sqrt{9/10} T$                       b)  $\sqrt{10/9} T$                       c)  $(9/10) T$                       d) T
33. The apparent frequency of a note is 200 Hz, when a listener is moving with a velocity of 40 ms<sup>-1</sup> towards a stationary source. When he moves away from the same source with same speed, the apparent frequency of the same note is 160 Hz. The velocity of sound in air in m/s is  
 a) 340                      b) 330                      c) 360                      d) 320

34. A square loop of side length  $a$  is shown in the diagram. Magnetic field at point P due to the configuration is (symbols have usual meanings)



- a)  $\frac{\sqrt{2}\mu_0 I}{4\pi a}$       b)  $\frac{2\mu_0 I}{4\pi a}$       c)  $\frac{\mu_0 I}{\sqrt{2}\pi a}$       d) Zero
35. When plane of a dip circle is along magnetic meridian, period of oscillation of dip needle is  $T_1$ . When plane of dip circle is perpendicular to the magnetic meridian, the period of oscillation is  $T_2$  then  $\frac{T_1}{T_2}$  is (Angle of dip =  $30^\circ$ )
- a)  $\sqrt{2}$       b) 1      c) 2      d)  $\frac{1}{\sqrt{2}}$
36. Eddy currents are produced in a conducting material when it is
- a) heated  
b) placed in a time varying magnetic field  
c) placed in an time varying electric field  
d) placed in a uniform magnetic field
37. An electric bulb rated 100 W, 40 V has to be operated across 50V, 50 Hz a.c. supply. The capacitance of the capacitor which has to be connected in series with the bulb is
- a) 12 F      b)  $24\pi F$       c)  $\frac{6}{\pi} F$       d)  $\frac{1}{1200\pi} F$
38. Two radioactive substance X and Y initially contain equal number of nuclei. X has a half-life of 1 hour and Y has a half-life of 2 hours. After two hours, the ratio of the activity of X to the activity of Y is
- a) 1 : 4      b) 1 : 2      c) 1 : 1      d) 2 : 1
39. A photon of energy 10.2eV collides inelastically with hydrogen atom in ground state. After few microseconds another photon of energy 15eV collides inelastically with same hydrogen atom. Finally by a suitable detector, we find
- a) photon of energy 3.4eV and electron of energy 1.4eV  
b) photon of energy 10.2eV and electron of energy 1.4eV  
c) two photon of energy 3.4eV      d) two photons of energy 10.2eV
40. A convex lens of focal length 20cm and another plano-convex lens of focal length 40cm are placed co-axially (see figure). The plano-convex lens is silvered on plane surface. What should be the distance  $d$  (in cm) so that final image of the object 'O' is formed on O itself



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

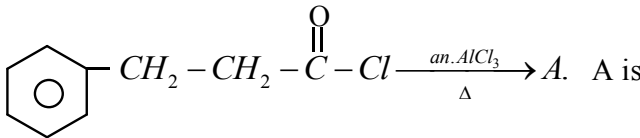
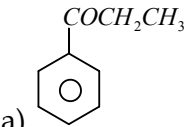
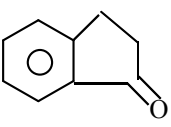
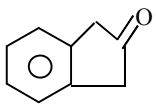
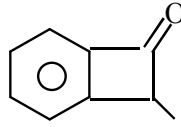
**In the following Q.Nos Instructions 41-60**

- a) Both assertion and reason are true and the reason is the correct explanation of the assertion  
b) Both assertion and reason are true but reason is not the correct explanation of the assertion  
c) Assertion is true but reason is false  
d) Both assertion and reason are false
41. (A) : All derived quantities may be represented dimensionally in terms of the base quantities  
(R) : The dimension of a base quantity in all other base quantities is always zero.
42. (A) : The stopping distance for a uniformly retarded vehicle is proportional to the square of initial velocity  
(R) : For a given brake force stopping distance of a vehicle is directly proportional to its initial kinetic energy
43. (A) : For two particles of equal mass the centre of mass lies exactly midway between them  
(R) : Centre of mass can be regarded as the mass weighted mean of  $x_1$  and  $x_2$ , where  $x_1$  and  $x_2$  are position of two particles of equal mass
44. (A) : The gravitational force between the particles is central  
(R) : Gravitational force is a non-conservative force.
45. (A) : At narrower portions where the streamlines are closely spaced, velocity of fluid is more than that broad particles and vice versa.  
(R) : According to equation of continuity, the volume flux or flow rate remains constant throughout the pipe of flow.
46. (A) : Plastic foams are good thermal insulators  
(R) : Plastic foams contains pocket of air.
47. (A) : A gas leaking from a cylinder in a kitchen takes considerable time to diffuse to other corners of the room.  
(R) : Molecules in a gas have a finite though small size, so they are bound to undergo collisions and cannot move straight unhindered
48. (A) : Workdone by frictional force is always negative  
(R) : Direction of frictional force is always opposite to motion of the body.
49. (A) : Steel bar can propagate longitudinal as well as transverse wave.  
(R) : Steel bar possess both bulk and shear elastic moduli.
50. (A) : There is no potential difference between any two points on the surface of conductor.  
(R) : Conductor has no tangential component of electric field on its surface.
51. (A) : The charge carriers of conductor under the action of electric field do not move with acceleration but with a steady drift velocity  
(R) : In a current carrying conductor during collision, free electrons share the energy gained by them with Lattice atoms
52. (A) : The algebraic sum of changes in potential around any closed loop involving resistors and cells in the loop is zero.  
(R) : Electric potential is a vector quantity
53. (A) : Magnetic dip at pole is  $0^\circ$ .  
(R) : Magnetic field at pole is directed horizontal.



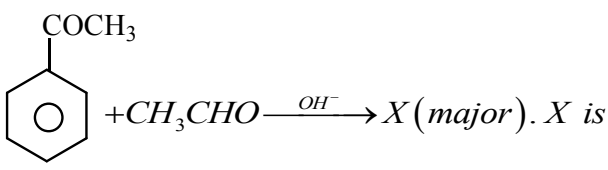
54. (A) : The diamagnetic substance develops a net magnetic moment in a direction opposite to that of the applied field  
 (R) : When magnetic field is applied to a diamagnetic substance, those electrons having orbital magnetic moment in the same direction slow down and those in the opposite direction speed up.
55. (A) : When an coil and a bulb connected in series with a battery the brightness of bulb increases on inserting an iron rod into the coil.  
 (R) : Selfinductance of a coil decreases when a ferro-magnetic core is used
56. (A) : Frequency modulated wave is not used for long distance communication  
 (R) : Over a long distance the FM wave becomes highly distorted.
57. (A) : At sunset or sunrise, the sun looks reddish  
 (R) : At sunset or sunrise, the sun's rays have to pass through a larger distance in the atmosphere and most of the blue and other shorter wavelengths are removed by scattering. The least scattered light reaches our eye.
58. (A) : If we use two sodium lamps illuminating two pinholes, we will not observe any interference fringes.  
 (R) : When the phase difference between the two vibrating sources changes rapidly with time, then the two sources are coherent.
59. (A) : For a given frequency of the incident radiation the stopping potential depends on its intensity  
 (R) : In photoelectric effect, number of electrons emitted per second, is inversely proportional to the intensity of incident radiation
60. (A) : If a nucleus  $A = 240$  breaks into two  $A = 120$  nuclei, nucleons get more tightly bound  
 (R) : A very heavy nucleus say  $A = 240$  has higher binding energy per nucleon compared to that of a nucleus with  $A = 120$ .

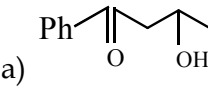
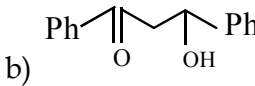
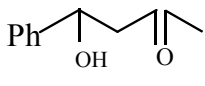
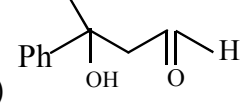
### CHEMISTRY

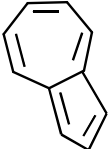
61. Which of the following is least basic  
 a)  $C_2H_5NH_2$       b)  $(CH_3)_2NH$       c)  $(C_2H_5)_2NH$       d)  $(C_2H_5)_3N$
62. Regarding photoelectric effect, false statement is  
 a) As the intensity of incident radiation increases number of photo electrons increases  
 b) As the frequency of incident radiation increases kinetic energy of photo electrons increases  
 c) Work function of rubidium is greater than that of potassium  
 d) If the frequency of incident radiation is doubled then kinetic energy of photoelectrons becomes more than doubled
63.  A is  
 a)       b)       c)       d) 
64. Correct increasing order of magnitude of electron gain enthalpy is  
 a)  $Si < S < P < Cl$       b)  $P < Si < Cl < S$       c)  $P < Si < S < Cl$       d)  $Si < P < S < Cl$

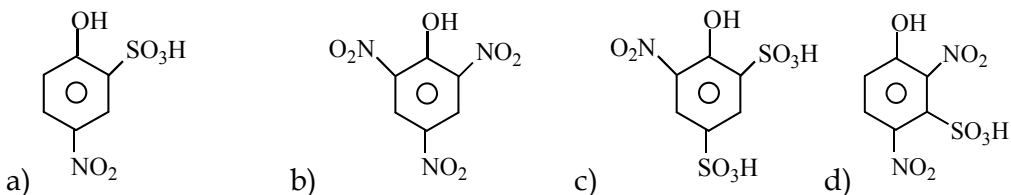
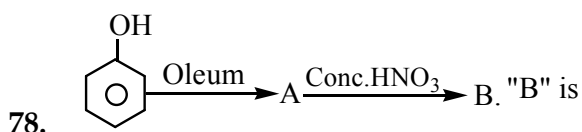
65. Polar molecule of the following is  
 a) SF<sub>6</sub>                      b) XeF<sub>2</sub>                      c) CCl<sub>4</sub>                      d) SF<sub>4</sub>
66. Equivalent weight of ferrous oxalate acting like reducing agent is  
 a)  $\frac{M}{3}$                       b)  $\frac{M}{8}$                       c)  $\frac{M}{6}$                       d)  $\frac{M}{4}$
67. Rate of diffusion is highest for  
 a) Nitrogen                      b) Oxygen                      c) Flourine                      d) Neon
68. In the reaction H<sub>2</sub>O<sub>2</sub> with "X", H<sub>2</sub>O and O<sub>2</sub> are by products "X" is  
 a) Fe<sup>+2</sup> / H<sup>+</sup>                      b) MnO<sub>4</sub><sup>-</sup> / H<sup>+</sup>                      c) I<sup>-</sup> / H<sup>+</sup>                      d) Mn<sup>+2</sup> / OH<sup>-</sup>

69.  $\text{Ph-CH}_3 \xrightarrow{\text{NBS}} \text{A} \xrightarrow{\text{C}_6\text{H}_5\text{ONa}} \text{B} \xrightarrow{\text{Conc.HI}} \text{C+D}$ . C,D are  
 a) C<sub>6</sub>H<sub>5</sub>OH, C<sub>6</sub>H<sub>5</sub>CH<sub>2</sub>I                      b) C<sub>6</sub>H<sub>5</sub>CH<sub>2</sub>OH, C<sub>6</sub>H<sub>5</sub>I  
 c) C<sub>6</sub>H<sub>5</sub>I, C<sub>6</sub>H<sub>5</sub>CH<sub>2</sub>I                      d) C<sub>6</sub>H<sub>5</sub>OCH<sub>2</sub>I, C<sub>6</sub>H<sub>5</sub>I

70. 

- a)       b)       c)       d) 
71. Nearest neighbouring distance between carbon atoms in the unit cell of diamond ('a' is edge length of unit cell)  
 a)  $\frac{\sqrt{3}a}{2}$                       b)  $\frac{a}{2\sqrt{2}}$                       c)  $\frac{\sqrt{3} a}{4}$                       d)  $\frac{a}{\sqrt{2}}$
72. 100 grams of ethylene glycol mixed with 250 grams of water showed a freezing point of -15°C. Weight of water separating as ice will be (kf of H<sub>2</sub>O = 1.86 K.kg mole<sup>-1</sup>)  
 a) 100 g                      b) 150 g                      c) 50 g                      d) 200 g
73. Which of the following is the best reducing agent in aqueous solution  
 a) Mg                      b) Zn                      c) Cu                      d) Ag
74. For a zero order reaction a graph is drawn between half life (y-axis) Vs initial concentration (x-axis). If the slope of the graph 0.05 then rate constat of the reaction is  
 a) 1M min<sup>-1</sup>                      b) 10M min<sup>-1</sup>                      c) 10M<sup>-1</sup> min<sup>-1</sup>                      d) 1M<sup>-1</sup> min<sup>-1</sup>
75. Which of the following is a positively charged sol  
 a) As<sub>2</sub>S<sub>3</sub> sol                      b) Latex                      c) gold sol                      d) heamoglobin
76. Which of the following is not aromatic

- a) B<sub>3</sub>N<sub>3</sub>H<sub>6</sub>                      b) Piperidine                      c) Fullerene                      d) 
77. Maximum number of -CO-NH- linkages are present in  
 a) Alitame                      b) Asparatame                      c) Sucralose                      d) Saccharin



79. Which of the following undergoes anionic hydrolysis

- a) Borax                      b) Washing soda                      c) Baking soda                      d) All of these

80. Incorrect statement is

- a) Work is a state function in an adiabatic process  
 b) Heat is a state function in an isochoric process  
 c) Enthalpy is a path function  
 d) All of these

81. Which of the following when present in water sample makes water toxic

- a) Zn=3PPM                      b) Mn=0.01PPM                      c) Cd=0.1PPM                      d) Al=0.05PPM

82. At constant pressure addition of inert gas has no effect on equilibrium in the reaction

- a)  $2NH_3(g) \rightleftharpoons N_2(g) + 3H_2(g)$                       b)  $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$   
 c)  $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$                       d)  $CaCO_3(s) \rightleftharpoons CaO(s) + CO_2(g)$

83. Which of the following cannot be prepared by direct combination of elements

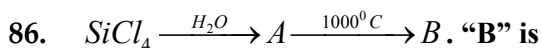
- a) BaH<sub>2</sub>                      b) CaH<sub>2</sub>                      c) MgH<sub>2</sub>                      d) BeH<sub>2</sub>

84. Wrong match is

- a) Boron ..... Bullet proof vest                      b) Silicagel ..... drying agent  
 c) Liquid Nitrogen .....refrigerant                      d) Borax ..... Weak antiseptic to eye infection

85. Back bonding is present in

- a)  $N(SiH_3)_3$                       b)  $Cl_2O$                       c)  $BF_3$                       d) all of these



- a) SiO<sub>2</sub>                      b) H<sub>2</sub>SiO<sub>3</sub>                      c) H<sub>4</sub>SiO<sub>4</sub>                      d) Si(OH)<sub>2</sub>

87. First noble gas compound is

- a) KrF<sub>2</sub>                      b) XeF<sub>2</sub>                      c) XePtF<sub>6</sub>                      d) XeO<sub>3</sub>

88. Disproportionation of potassium manganate in acidic medium yields

- a)  $MnO_4^-, MnO_2$                       b)  $MnO_4^-, Mn^{+2}$                       c)  $MnO_4^{2-}, Mn^{+2}$                       d)  $MnO_2, Mn^{+2}$

89. Percentage of Iron in misch metal is

- a) 20%                      b) 5%                      c) 45%                      d) 60%

90. Geometric isomerism cannot be exhibited by

- a)  $[Zn(NH_3)_2Cl_2]$                       b)  $[Pt(NH_3)_2Cl_2]$   
 c)  $[Cr(en)_2Cl_2]Cl$                       d)  $[Co(NH_3)_3(NO_2)_3]$

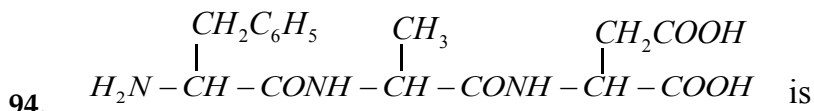
91. Which of the following is a tridentate ligand

- a) acac                      b) (EDTA)<sup>-3</sup>                      c) dien                      d) trien

92. Which of the following absorbs light of maximum wavelength

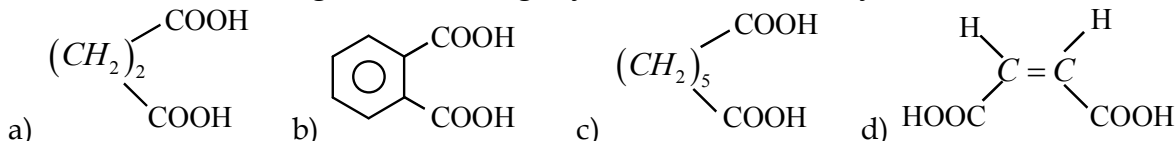
- a)  $[Co(NH_3)_6]^{+3}$                       b)  $[CoF_6]^{-3}$                       c)  $[Co(NO_2)_6]^{-3}$                       d)  $[Co(en)_3]^{+3}$

93. Which of the following is a wrong match (regarding purification)
- a) Copper ..... Poling  
 b) Zn ..... liquation  
 c) Ge..... Zone refining  
 d) Fe ..... Vanarkel process



- a) Phe-Val-Asp      b) Phe-Leu-Asp      c) Ala-Val-Asp      d) Phe-Ala-Asp
95. Malonic acid  $\xrightarrow{\Delta} A \xrightarrow[\Delta]{Ca(OH)_2} B$ . B is
- a) Acetone      b) Acetaldehyde      c) Acetic anhydride      d) Ethyl alcohol

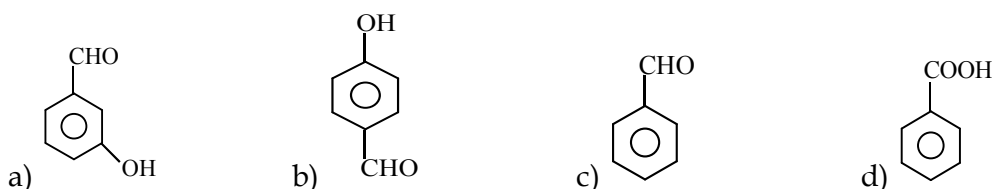
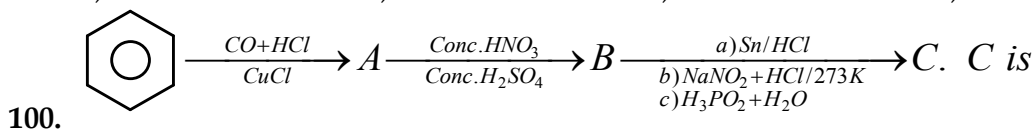
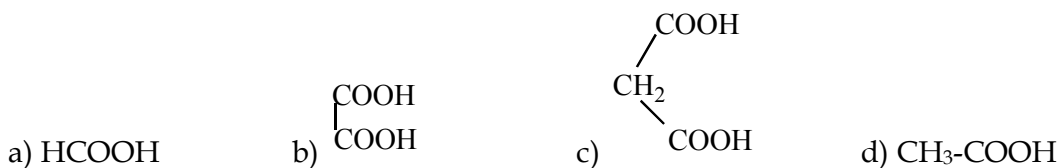
96. Which of the following cannot undergo cyclization due to dehydration



97. Number of moles of phenyl hydrazine required to form one mole of glucosazone

- a) 1      b) 2      c) 3      d) 4
98. Radius of first orbit is highest for
- a) H      b) He<sup>+</sup>      c) Be<sup>+3</sup>      d) Li<sup>+2</sup>

99. Which of the following has least P<sup>ka</sup> value



101-120 Assertion & Reason Type

- a) A and R are true, R explains A      b) A and R are true but R does not explain A  
 c) A is true but R is false      d) A and R are false
101. (A) : Glycerol (or) urea is added to H<sub>2</sub>O<sub>2</sub> while storing it  
 (R) : Glycerol (or) urea added act like catalytic poisoners
102. (A) : Carbonyl compounds do not undergo nucleophile substitution  
 (R) : H<sup>-</sup> ion and R<sup>-</sup> ions are very strong bases and are difficult to get replaced by other nucleophiles
103. (A) : Potential of mercury cell remains constant during life time  
 (R) : Concentration of ions remains constant during life time
104. (A) : Fructose gives positive Tollen's test  
 (R) : Fructose undergoes reversible isomerisation to give a mixture of fructose, glucose and mannose in alkaline medium

105. (A) : Acetic acid liberates  $\text{CO}_2$  with  $\text{NaHCO}_3$   
 (R) : Acetic acid is weaker than carbonic acid.
106. (A) : Aniline cannot be prepared by Gabriel's phthalimide process  
 (R) : Chloro benzene is least reactive towards nucleophilic substitution
107. (A) : Pyrrole is more basic than pyridine  
 (R) : Nitrogen atom is  $\text{sp}^3$  hybridized in both pyrrole and pyridine
108. (A) : Solubility in water increases from  $\text{Mg}(\text{OH})_2$  to  $\text{Ba}(\text{OH})_2$   
 (R) : Down the group decrease in Lattice enthalpy is more than decrease in hydration enthalpy.
109. (A) : Conc.  $\text{HNO}_3$  can be transported in aluminium vessels  
 (R) : Conc.  $\text{HNO}_3$  renders passive with Aluminium
110. (A) : Extent of physical adsorption of  $\text{H}_2$  is greater than  $\text{CH}_4$  using charcoal as adsorbent  
 (R) : Critical temperature of  $\text{H}_2$  is greater than that of  $\text{CH}_4$
111. (A) : Acetanilide is more reactive than aniline towards electrophilic substitution  
 (R) :  $-\text{NHCOCH}_3$  group deactivates benzene towards electrophilic substitution
112. (A) : Standard enthalpy of a compound is equal to its standard enthalpy of formation  
 (R) : Standard enthalpy of elements is assumed to be zero
113. (A) : Hydrolysis constant of  $\text{CH}_3\text{COOK} > \text{HCOOK}$   
 (R) :  $\text{pK}_a$  of  $\text{HCOOH} > \text{CH}_3\text{COOH}$
114. (A) : Gallium is used as a thermometric liquid  
 (R) : Gallium has wide liquid range
115. (A) : Rate constant of a reaction is unaffected by the presence of catalyst  
 (R) : Rate of a reaction is unaffected by catalyst
116. (A) :  $\text{CH}_2 = \overset{+}{\text{C}}\text{H} - \overset{-}{\text{N}}\text{H}_3$  cannot show resonance  
 (R) :  $\overset{+}{\text{C}}\text{H}_2 - \overset{-}{\text{C}}\text{H} = \overset{+}{\text{N}}\text{H}_3$  cannot exist because nitrogen atom cannot have more than octet
117. (A) : Tetrahedral complexes formed by monodentate ligands cannot show Geometrical isomerism  
 (R) : Tetrahedral complexes are non-planar
118. (A) : Edge centre in a CCP arrangement is an octahedral void  
 (R) : Edge centre in a CCP arrangement is in contact with four spheres at corners and two spheres at face centres
119. (A) :  $\overset{1}{\text{C}}\text{H}_3 - \overset{2}{\text{C}}\text{O} - \overset{3}{\text{C}}\text{H}_2 - \overset{4}{\text{C}}\text{H}_2\text{OH}$  undergoes acidic dehydration most readily  
 (R) : Keto group makes hydrogens attached to 3<sup>rd</sup> carbon strongly acidic
120. (A) : At room temperature during Joule Thomson expansion, hydrogen gas shows heating effect  
 (R) : Inversion temperature of hydrogen is greater than room temperature.

### BOTANY

121. Calvin cycle is the major pathway by which sugars are synthesised in  
 (a)  $\text{C}_3$  plants      (b)  $\text{C}_4$  plants      (c) CAM plants      (d)  $\text{C}_3$ ,  $\text{C}_4$  and CAM plants

122. A prokaryote with chlorophyll a and oxygenic photosynthesis is  
 (a) Chlorella (b) Anabaena (c) Azospirellum (d) Euglena
123. Pollen kit is present in the pollen grains of  
 (a) Entamophilous flowers (b) Anemophilous flowers  
 (c) Ornithophilous flowers (d) Chiropterophilous flowers
124. Which of the following are a pair of recessive traits in pea  
 (a) Axial and white flowers (b) Inflated and yellow pods  
 (c) Yellow and wrinkled seeds (d) Yellow and constricted pods
125. Bacteria involved in Gobar gas production belong to  
 (a) Eubacteria (b) Actinomycetes (c) Archeobacteria (d) Mycoplasma
126. DNA molecule is  
 (a) hydrophobic and negatively charged (b) hydrophilic and positively charged  
 (c) hydrophilic and negatively charged (d) hydrophobic and positively charged
127. A man with blood group A marries a woman with blood group B. What are all the possible blood groups of their off springs?  
 (a) O only (b) A and B only (c) A, B and O only (d) A, B, AB and O
128. Infectious agent of potato spindle tuber disease is  
 (a) Protein with abnormal folding (b) DNA without protein coat  
 (c) RNA molecule without protein coat (d) RNA molecule with protein coat
129. Light may be the limiting factor for the rate of photosynthesis in  
 (a) Sciophytes (b) Heliophytes (c) Halophytes (d) Psammophytes
130. Splicing is  
 (a) transcriptional process (b) post transcriptional process  
 (c) post translational process (d) transational process
131. Who identified DNA as the genetic material by their transformation experiments  
 (a) Griffith (b) Hershey and Chase  
 (c) Avery, MacLeod, McCarty (d) Meselson and Stahl
132. In which of the following suspended organic matter in the effluent is considerably reduced  
 (a) Secondary treatment plant (b) Anaerobic sludge digester  
 (c) Primary treatment plant (d) Tertiary treatment
133. Tendrils in Gourds are modified  
 (a) leaf lets (b) adventitious buds  
 (c) axillary buds (d) stipules
134. A cloning vector that can be used either in yeast or in E.Coli as host cells is  
 (a) Expression vector (b) Cosmid (c) Phagmid (d) Shuttle vector
135. Spindle assembly check point (SAC) control the transition of which phases of mitosis  
 (a) S phase to M phase (b) Prophase to metaphase  
 (c) Metaphase to anaphase (d) Anaphase to telophase
136. Height in humans is controlled by  
 (a) Pleiotropic genes (b) Multiple alleles  
 (c) Codominance (d) Polygenic inheritance

**137. Match the following**

List-I	Lisr-II
M. UUU	I. Proline
N. AAA	II. Glycine
O. CCC	III. Phenyl alanine
P. GGG	IV. Lysine

	M	N	O	P
a.	III	IV	I	II
b.	III	II	I	IV
c.	IV	III	I	II
d.	III	IV	II	I

**138. Which of the following is not a polynucleotide**

- (a) Viroid (b) pBR322 (c) Hind II (d) Operon

**139. Correct statement about Kreb's cycle is**

- (a) During conversion of citric acid to  $\alpha$ -ketoglutaric acid two decarboxylation reactions occur  
(b) Fumerase carries on both hydration and dehydration  
(c) There are three points in the cycle where NADP<sup>+</sup> is reduced as NADPH + H<sup>+</sup> and one point where FAD is reduced as FADH<sub>2</sub>  
(d) GTP is produced during conversion of succinyl CoA to succinic acid

**140. A phytohormone used to remove effect of inhibitory substances of seed germination is**

- (a) Para - ascorbic acid (b) Abscissic acid  
(c) Gibberellic acid (d) Indole butyric acid

**141-150 The following questions are Assertion and Reason type. Mark the answers as**

- a- if both A and R are true, R is the correct explanation of A**  
**b- if both A and R are true, R is not the correct explanation of A**  
**c. if A is true but R is false**  
**d. if both A and R are false**

141. (A) : An organism which acts as herbicide is called bio herbicide  
(R) : Phytophthorapalmivora is a mycoherbicide
142. (A) : Grafted photoinduced leaves on antoher plant cannot induce flowering in antoher plant  
(R) : A defoliated plant can respond to suitable photo period and floral induction takes place
143. (A) : Normal respiration of plants is also called dark respiration  
(R) : Only photorespiration occurs in light
144. (A) : Carotenoids occur both in chloroplasts and chromoplasts  
(R) : Carotenoids are called accessory pigments
145. (A) : Both in co-dominance and incomplete dominance phenotypic and genotypic ratios coincide  
(R) : Heterozygotes can be differentiated from both the homozygotes in these plants



146. (A) : Vascular cambium in dicot stem is partly primary and partly secondary  
 (R) : A part of vascular cambium arises from the cells of medullary rays by differentiation
147. (A) : Gametophyte development in homosporous pteridophytes is exosporic  
 (R) : In heterosporous pteridophytes gametophyte development is endosporic
148. (A) : Terminal oxidation is the last step of aerobic respiration  
 (R) : Electron transport is an oxidative phosphorylation process
149. (A) : The genetic code is ambiguous  
 (R) : A particular codon may code for more than one amino acid
150. (A) : All the genes are not located in the chromosomes  
 (R) : Extra nuclear genes do not show Mendelian inheritance

### ZOOLOGY

151. Which of the following statements are true?  
 (i) Comb jellies have eight combs of cilia that propel the animals through water  
 (ii) Rotifers are pseudocoelomates with green glands as excretory organs  
 (iii) Flatworms have no body cavity but have specialized organs of circulation  
 (iv) Earthworms are most familiar annelids provided with eumetamerism  
 (v) Hagfishes and lampreys are sister groups and both show anadromous migration  
 a) (i), (ii) and (iv)    b) (i) and (iv)    c) (i), (iii) and (v)    d) (iv) and (v)
152. The following of cardiac muscle relay signals from one cardiomyocyte to the other and help synchronize the contraction  
 a) Abundant myoglobin    b) Thin sarcolemma  
 c) Diad systems    d) Intercalated discs
153. Total number of bones in cranium and face respectively is  
 a) 8 and 14    b) 8 and 12    c) 10 and 12    d) 10 and 14
154. Which of the following statements is not true?  
 a) Pepsin is resistant to denaturing effect of low pH of stomach  
 b) Gastric inhibitory peptide is secreted by gastric mucosa  
 c) Castle's intrinsic factor is the secretion of stomach cells  
 d) *Helicobacter pylori* is an acid tolerant bacterium
155. Tunica albuginea is found in  
 a) Kidney    b) Lung    c) Heart    d) Gonad
156. The following are the animal examples as like thorns of *Cuscuta* and tendrils of *Bougainvillea*  
 a) Webbed feet of penguin and flippers of dolphin  
 b) Wings of butterfly and pigeon  
 c) Forelimbs of whales and cheetah  
 d) Nephrons of earthworms and kidneys of man
157. The "foetal ejection reflexes" in carrying mother and "milk ejection reflexes" in a lactating mother are promoted by  
 a) Relaxin    b) Oxytocin    c) FSH    d) Progesterone



158. Read the following

(A) Aortic valve

(B) Pulmonary valve

(C) Bicuspid valve

(D) Tricuspid valve

Identify the valves that prevent backflow of deoxygenated blood

a) A and B

b) B and D

c) A and C

d) C and D

159. Which of the following is true for the function of ear?

a) Eustachian tube - "Filled endolymph" reduces the friction

b) Semicircular canals - Help in the reception of sound vibrations

c) Otolith organ - Participate in static equilibrium

d) Organ of Corti - Support the body during angular acceleration

160. Byssinosis is

a) An occupational disorder

b) A nutritional disorder

c) A Medelian disorder

d) A carcinogenic state of brain

161. Choose the correct pair

a) Corpus luteum - Testis

b) Corpora quadrigemina - Four parathyroid glands

c) Corpora allata - Endocrine glands of insect

d) Corpus spongiosum - Envelope of ovary

162. Lippes loop is a contraceptive prevents

a) Ovulation

b) Menstruation

c) Fertilization

d) Insemination

163. If Klinefelter syndrome is formed by  $n+1$  gamete of male it will be with the sex chromosomes

a) XX

b) XY

c) YY

d) XO

164. Identify the given diagram and its effect



a) Cocaine - Stimulant

b) LSD - Hallucinogen

c) Morphine - Pain killer

d) Cannabinoid - Depressant

165. When a child in village bitten by an unknown venomous snake, antivenin is given by primary health centre. This administration comes under

a) Artificial active immunity

b) Natural active immunity

c) Artificial passive immunity

d) Natural passive immunity

166. A fall in glomerular blood flow

a) Activates JG cells to release renin

b) Activates the JG cells to release erythropoietin

c) Inhibits the production of ANP

d) Stops the activities of JG cells

**167. Read the following and choose the correct statement**

- a) By leaching, the detritivores mix the inorganic nutrients into soil to use by plants
- b) NPP is the source of energy for herbivores, omnivores and decomposers
- c) Pyramid of energy is inverted in seawater where phytoplankton start the food chain
- d) Rapid deforestation decreases the rate of release of CO<sub>2</sub> into atmosphere

**168. Match the following**

List-I	List-II
A) Fig tree	1) Granivore
B) <i>Ophrys</i> flower	2) Partner wasp
C) Seed predators	3) Sexual deceit
D) Parts of plant eating	4) Phytophagous

Code:

- |    | A | B | C | D |
|----|---|---|---|---|
| a) | 2 | 3 | 1 | 4 |
| b) | 3 | 2 | 1 | 4 |
| c) | 1 | 2 | 3 | 4 |
| d) | 4 | 2 | 3 | 1 |

**169. Read the following animals**

**A. Bali                      B. Javan                      C. Caspian                      D. Quagga**

**Identify the recent extinctions pertaining to subspecies of tiger**

- a) A and B only      b) A, C and D only      c) A, B and C only      d) A, B, C and D

**170. The theme of the 2018 Biodiversity Conference is**

- a) Think globally and act locally
- b) Investing in biodiversity for people and planet
- c) Increasing in Zoological Parks rather than National Parks
- d) Avoiding the construction of new projects

**171-180. In the following questions, a statement of assertion (A) is followed by a statement of reason (R).**

**If both the assertion and reason are true and the reason is the correct explanation of the assertion, then mark (a)**

**If both the assertion and reason are true but the reason is not correct explanation of the assertion, then mark (b)**

**If the assertion is true statement and reason is false, then mark (c)**

**If both the assertion and reason are false statements, then mark (d)**

- 171. (A) : Loss of self tolerance may lead to autoimmune disease.  
(R) : In autoimmune disorders, the self antigens are eliminated by modified fibroblasts.
- 172. (A) : Presence of TMAO in a marine shark is a protective measure against urea retained in the body fluids.  
(R) : TMAO is an organic molecule.
- 173. (A) : Epinephrine elicits multiple effects if its target cells differ in their receptor type.  
(R) : Epinephrine is a water soluble hormone and uses secondary messenger to function in the cells.

174. (A) : The pO<sub>2</sub> in alveoli is always considerably less than in the atmosphere.  
(R) : In every inhalation the fresh air of atmosphere mixes with the oxygen depleted residual air.
175. (A) : Blood flow continues to the skin which acts as sole site of gaseous exchange while the frog is submerged.  
(R) : Submerged frogs can use their rudimentary gills also for their respiratory demands.
176. (A) : Excess intake of alcohol may cause more dehydration by frequent urination.  
(R) : Alcohol inhibits the pituitary secretion of anti-diuretic hormone (ADH).
177. (A) : Global warming is global warning for the existence of living beings on the earth.  
(R) : Rise in temperature is leading to deleterious changes in the environment and resulting odd climatic changes like El Nino effect etc,.
178. (A) : Pyramid of biomass on land is upright but seawater is inverted.  
(R) : Number of phytoplankton on land has more biomass than to seawater.
179. (A) : When adult human depends on milk diet only he fails to survive.  
(R) : Milk digestion is not possible in adult humans.
180. (A) : In Magnetic Resonance Imaging, there is a difference in imaging in "normal healthy cells" and "pathological cells" of same tissue.  
(R) : The "normal healthy cells" and "pathological cells" of same tissue have equal water content with difference in their proton densities and absorbed ionized radiation.

#### GENERAL KNOWLEDGE

181. **Battle of plassey took place in the year**  
a) 1764                      b) 1757                      c) 1773                      d) 1789
182. **Land of midnight sun is**  
a) Japan                      b) Norway                      c) Finland                      d) Sweden
183. **In the year 2019 the winner of Men's Australian open tennis is**  
a) Nadal                      b) Federer                      c) Djokowich                      d) Nishkori
184. **India won cricket world cup (Men) in the years**  
a) 1983,2011                      b) 1996,2015                      c) 1986,2011                      d) 1992,2007
185. **Who was the founder of Aryasamaaj**  
a) Raja Ram Mohan Roy                      b) Dada Bhai naoroji  
c) Dayananda Saraswati                      d) Agnivesh
186. **Who is the Defence Minister of Republic of India**  
a) Arun Jaitly                      b) Rajnath Singh                      c) Sumitra Mahajan                      d) Nirmala Sitaraman
187. **Number of Assembly constituencies in Telangana State**  
a) 111                      b) 119                      c) 122                      d) 107

188. **President of Governor Bank of India**  
 a) Urjit Patel    b) Shakti Kanta Das  
 c) Raghuram Rajan    d) Subba Rao
189. **Who among the following has been appointed as New Chief Election Commissioner of India?**  
 a) Anshul Mishra    b) O.P. Rawat              c) Sunil Arora              d) B. Chandrakala
190. **Which of the following is the India's heaviest communication satellite i.e. Recently launched successfully from French Guiana?**  
 a) GAST-17              b) GSAT-11              c) GSAT-9              d) GSAT-10
191. **A train running at the speed of 60 km/hr crosses a pole in 9 seconds. What is the length of the train?**  
 a) 120 metres              b) 180 metres              c) 324 metres              d) 150 metre
192. **The angle of elevation of a ladder leaning against a wall is  $60^\circ$  and the foot of the ladder is 4.6 m away from the wall. The length of the ladder is:**  
 a) 2.3 m              b) 4.6 m              c) 7.8 m              d) 9.2 m
193. **In the first 10 overs of a cricket game, the run rate was only 3.2. What should be the run rate in the remaining 40 overs to reach the target of 282 runs?**  
 a) 6.25              b) 6.5              c) 6.75              d) 7
194. **What least number must be added to 1056, so that the sum is completely divisible by 23 ?**  
 a) 2              b) 3              c) 18              d) 21
195. **An accurate clock shows 8 o'clock in the morning. Through how many degrees will the hour hand rotate when the clock shows 2 o'clock in the afternoon?**  
 a)  $144^\circ$               b)  $150^\circ$               c)  $168^\circ$               d)  $180^\circ$
196. **If one-third of one-fourth of a number is 15, then three-tenth of that number is:**  
 a) 35              b) 36              c) 45              d) 54
197. **3, 5, 11, 14, 17, 21**  
 a) 21              b) 17              c) 14              d) 3
198. **A man purchased a cow for Rs. 3000 and sold it the same day for Rs. 3600, allowing the buyer a credit of 2 years. If the rate of interest be 10% per annum, then the man has a gain of:**  
 a) 0%              b) 5%              c) 7.5%              d) 10%
199. **A and B together have Rs. 1210. If  $\frac{4}{15}$  of A's amount is equal to  $\frac{2}{5}$  of B's amount, how much amount does B have?**  
 a) Rs. 460              b) Rs. 484              c) Rs. 550              d) Rs. 664
200. **Father is aged three times more than his son Ronit. After 8 years, he would be two and a half times of Ronit's age. After further 8 years, how many times would he be of Ronit's age?**  
 a) 2 times              b)  $2\frac{1}{2}$  times              c)  $2\frac{3}{4}$  times              d) 3 times



# SRI CHAITANYA EDUCATIONAL INSTITUTIONS,INDIA.

A.P, TELANGANA, KARNATAKA, TAMILNADU, MAHARASHTRA, DELHI, RANCHI

SEC : SR ELITE, AIIMS S60, NEET MPL & MEDICON

DATE : 04-02-19

## AIIMS GRAND TEST-8 KEY

### PHYSICS

1) d	2) c	3) a	4) a	5) a	6) c	7) b	8) c	9) d	10) a
11) b	12) d	13) c	14) b	15) a	16) d	17) b	18) b	19) b	20) b
21) a	22) d	23) c	24) a	25) a	26) a	27) d	28) b	29) b	30) d
31) b	32) d	33) c	34) d	35) d	36) b	37) d	38) c	39) b	40) c
41) b	42) a	43) a	44) c	45) a	46) a	47) a	48) d	49) a	50) a
51) a	52) c	53) d	54) a	55) d	56) a	57) a	58) c	59) d	60) c

### CHEMISTRY

61) a	62) c	63) b	64) c	65) d	66) a	67) d	68) b	69) a	70) a
71) c	72) c	73) a	74) a	75) d	76) b	77) a	78) a	79) d	80) c
81) c	82) b	83) d	84) d	85) d	86) a	87) c	88) a	89) b	90) a
91) c	92) b	93) d	94) d	95) a	96) c	97) c	98) a	99) b	100) c
101) c	102) a	103) a	104) a	105) c	106) a	107) d	108) a	109) a	110) d
111) c	112) a	113) c	114) a	115) d	116) a	117) b	118) c	119) a	120) c

### BOTANY

121) d	122) b	123) a	124) d	125) c	126) c	127) d	128) c	129) a	130) b
131) c	132) a	133) c	134) d	135) c	136) d	137) a	138) c	139) d	140) c
141) b	142) d	143) c	144) b	145) a	146) c	147) b	148) b	149) d	150) b

### ZOOLOGY

151) b	152) d	153) a	154) b	155) d	156) c	157) b	158) b	159) c	160) a
161) c	162) c	163) b	164) c	165) c	166) a	167) b	168) a	169) c	170) b
171) c	172) b	173) b	174) a	175) c	176) a	177) a	178) c	179) d	180) c

### GENERAL KNOWLEDGE

181) b	182) b	183) c	184) a	185) c	186) d	187) b	188) b	189) c	190) b
191) d	192) d	193) a	194) a	195) d	196) d	197) c	198) a	199) b	200) a

**SOLUTIONS  
PHYSICS**

01.  $v = PE \sin \theta \Rightarrow v = (2aq)E \sin \theta \quad v = PE \sin \theta$

02. At  $C_2 : \vec{E} = \vec{E}_1 - \vec{E}_2 = \frac{\rho r_1}{3\epsilon_0} - \frac{\rho r_2}{3\epsilon_0}$   
 $\Rightarrow \vec{r}_1 = r(-\hat{i})$  and  $\vec{r}_2 = \vec{O} \text{ so } \vec{E} = -\frac{\rho r \hat{i}}{3\epsilon_0}$

03.  $C_1 = C_{total} = \frac{\epsilon_0 A}{\frac{d}{1} + \frac{d}{\infty} + \frac{d}{k}} = \frac{K \epsilon_0 A}{(K+1)d}$

$C_2 = C_{of \text{ region III}} = \frac{K \epsilon_0 A}{d}$

$\frac{U_{in \text{ region III}}}{U_{total}} = \frac{\frac{Q^2}{2C_2}}{\frac{Q^2}{2C_1}} = \frac{C_1}{C_2} = \left( \frac{1}{K+1} \right)$

04.  $I = \frac{V}{R} = \frac{V}{\left( \rho \frac{l}{A} \right)} = \frac{EA}{\rho}$

05.  $V = I_g (R + G) = 30 = 0.006(R + G)$

$R + G = 5000 \Rightarrow G = 10\Omega$

$I_g G = (I - I_g)S \Rightarrow S = \frac{10}{249}$

06. Convex lens forms real inverted image without lateral inversion

07.  $K.E = 2E_0 - E_0$  (for  $0 \leq x \leq 1$ )  $\Rightarrow \lambda_1 = \frac{h}{\sqrt{2mE_0}}$ ;

$K.E = 2E_0$  (for  $x > 1$ )  $\Rightarrow \lambda_2 = \frac{h}{\sqrt{4mE_0}} : \frac{\lambda_1}{\lambda_2} = \sqrt{2}$

08.  $\lambda = \frac{h}{p} = \frac{h}{\sqrt{2mK}} \Rightarrow K = \frac{h^2}{2m\lambda^2} = \frac{hc}{\lambda_0}$

09. Conceptual

10.  $W_2 = W_{water} + \text{reaction force by finger on water.}$

11.  $a = \frac{dv}{dt} = \frac{dv}{dx} \frac{dx}{dt} = (\text{slope}) \text{ velocity} = \left( \frac{-1}{\sqrt{3}} \right) 8 \Rightarrow -\frac{8}{\sqrt{3}} \text{ ms}^{-2}$

12. Where  $\rho$  resistance per unit length  $\Rightarrow \Pi = \text{constant}$  where I current in main circuit

13. Conceptual

14.  $f_1 = \mu_1 m_1 g = 6N$

$f_2 = \mu_2 m_2 g = 6N$  system is ready to move (or) moves with constant velocity

$\Rightarrow a = 0 \therefore T = f_1 = 6N$

15.  $W_A = Tx \cos 0^\circ$  and  $W_B = (2T) \frac{x}{2} \cos 180^\circ$

16. a) L.C of vernier calipers  $= \frac{1}{n} \text{ msD} = \frac{1}{20} \text{ mm} = 0.05 \text{ mm}$

b) L.C of Screw gauge =  $\frac{1}{50} \text{ mm} = 0.02 \text{ mm}$

17.  $\frac{u^2}{g} = 500 \dots (1)$

$$\frac{1}{2} mu^2 = mgl \sin \theta \Rightarrow l = 500m$$

18.  $N = mg \cos \theta$

19.  $\sqrt{3} \frac{GM^2}{L^2} = \frac{Mv^2}{(L/\sqrt{3})} \Rightarrow v = \sqrt{\frac{GM}{L}}$

To dismantle the system, energy equal to total energy of the system must be provided.

$$TE = 3 \times \frac{1}{2} MV^2 + \left( -3 \times \frac{GM^2}{L} \right) = -\frac{3}{2} \frac{GM^2}{L}$$

20.  $m_1 v_1 = m_1 \frac{v_1}{3} + mV \Rightarrow v = \frac{2m_1 v_1}{\sqrt{m}}$

$$\Rightarrow \sqrt{5gl} = \frac{2m_1 v_1}{3m}$$

21.  $I = mr^2 = (2\pi r A \rho) r^2 \Rightarrow I \propto r^3$

22.  $\left( \frac{dQ}{dt} \right)$  is same through any cross – section of the conductor

23.  $\frac{dQ}{dt} \propto \frac{A}{l} \Rightarrow \frac{dQ}{dt} \propto \frac{V}{l^2} \Rightarrow \frac{dQ}{dt} \propto \frac{1}{l^2}$

24. W.D by all forces =  $\Delta KE = \frac{1}{2} I \omega^2 = \frac{mr^2 \Delta^2}{4}$

25. Suspect ability of diametric substance is small and negative

26.  $P_A = h_A \rho \left( g - \frac{g}{2} \right)$

$$P_B = h_B \rho \left( g - \frac{g}{2} \right)$$

$$(P_B - P_A) = (h_B - h_A) \rho \frac{g}{2}$$

27.  $\frac{v}{c} = \sqrt{\frac{r}{3}} \Rightarrow v = \frac{\sqrt{5}}{3} c$

28.  $P \propto T^{\frac{\gamma}{\gamma-1}}$

29. After touching,  $V_1 = V_2$

$$\frac{q_1}{r} = \frac{q_2}{3r} \Rightarrow \frac{q_1}{q_2} = \frac{1}{3}$$

$$\Rightarrow q_1 = \frac{1}{4} (2q + 2q) = q$$

$$q_2 = \frac{3}{4} (2q + 2q) = 3q$$

$$\therefore v_1 = \frac{1}{4\pi\epsilon_0} \frac{q}{r}$$

$$30. \quad y = \frac{D}{d} \Delta x$$

$$\Rightarrow 10\lambda_m = (2n-1) \frac{\lambda_0}{2}$$

$$10\lambda_m = 15 \frac{\lambda}{2} \Rightarrow \frac{\lambda_0}{\lambda_m} = \frac{4}{3}$$

$$31. \quad PV = nRT \Rightarrow \frac{3v_0}{v_0} = \frac{T_1}{T_2}$$

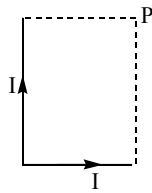
32. Time period remains same

$$33. \quad \frac{h_{app}}{h_{rec}} = \frac{v+v_0}{v-v_0} \Rightarrow \frac{40+v_0}{v-40} = \frac{200}{160}$$

$$160 + 4v = 5v - 200$$

$$v = 360 \text{ms}^{-1}$$

34.



$\vec{B}$  Due to these conductors will cancel each other

$$35. \quad T_1 = 2\pi \sqrt{\frac{I}{MB_e}} \text{ and } T_2 = 2\pi \sqrt{\frac{I}{MB_v}}$$

$$\frac{T_1}{T_2} = \sqrt{\frac{B_v}{B_e}} = \sqrt{\sin \delta}$$

36. Conceptual

$$37. \quad V_c = \sqrt{e^2 - v_R^2} = \sqrt{50^2 - 40^2} = 30V$$

$$x_c = \frac{V_c}{I} = \frac{30}{(100/40)} = 12$$

$$\frac{1}{C\omega} = 12 \Rightarrow C = \frac{1}{12\omega}$$

$$38. \quad A = \lambda N = \frac{0.693}{t_{1/2}} \left( \frac{N_0}{2^n} \right)$$

$$A \propto \frac{1}{t_{1/2} \times 2^n} \Rightarrow \frac{A_x}{A_y} = \frac{2 \times 2^1}{2^2} = 1$$

39. Conceptual

$$40. \quad \text{Silvered lens act as a concave mirror of power } P. \quad P = 2(\mu-1) \frac{1}{R} = \frac{2}{f} = \frac{1}{20}$$

$\Rightarrow f = -20 \text{cm}$  for unsilvered lens,

$$U = -10, f = 20 \Rightarrow \frac{1}{20} = \frac{1}{v} + \frac{1}{10} \Rightarrow v = -20 \text{cm}$$

This image should be at the center of curvature of concave mirror

$$\text{So, } d + 20 = 2f \Rightarrow d = 20 \text{cm}$$