## NATIONAL TEST ABHYAS NEET MOCK TEST-53 PHYSICS

1. The ratio of the maximum wavelength of the lyman series in hydrogen spectrum to the maximum wavelength in the paschen series is

$$1)\frac{3}{105} \qquad 2)\frac{6}{15} \qquad 3)\frac{52}{7} \qquad 4)\frac{7}{108}$$

 When an electron jumps from a level n = 4 to n = 1, the momentum of the recoiled hydrogen atom will be

1)  $6.8 \times 10^{-27} kgms^{-1}$  2)  $12.75 \times 10^{-19} kgms^{-1}$  3)  $136 \times 10^{-19} kgms^{-1}$  4) Zero

3. Block A is hanging form a vertical spring and is at rest. Block B strikes the block A with velocity V and sticks to it. Then the value of v for which the spring just attains natural length is



4. A bar mass m length *l* is hanging from point A as shown in the figure. If the young's modulus of elasticity of the bar is Y and area of cross- section of the wire is A, then the increase in its length due to its own weight will be

 $1)\frac{mgL}{2AY} \qquad \qquad 2)\frac{mgA}{2LAY} \qquad \qquad 3)\frac{mg}{2LAY} \qquad \qquad 4)\frac{2LY}{mgA}$ 



The magnitude of resistance X in the circuit shown in the given figure, when no current flows through the  $5\Omega$  resistor is

1) 3Ω 2) 6Ω 3) 9Ω 4) 12Ω

If the extension in both the springs increases from x to x<sub>0</sub> on flowing current I in the rod from B to A then the value of magnetic field will be



7. In a region of uniform electric field of intensity E, an electron of mass  $m_e$  is released from rest. The distance travelled by the electron in time t is

$$1)\frac{2m_e t^2}{e} \qquad 2)\frac{eEt^2}{2m_e} \qquad 3)\frac{m_e g t^2}{eE} \qquad 4)\frac{2Et^2}{em_e}$$

8. A step –down transformer is used on a 1000V line to deliver 20A at 120V at the secondary coil. If the efficiency of the transformer is 80%, the current drawn from the line is

- 9. The ratio of temperature of sun and moon, if the wavelengths of their maximum emission radiations rates are  $140A^0$  and  $42000A^0$  will be
  - 1)1:30
     2)30:1
     3)42:14
     4)14:42

- 10. The phase difference between voltage and current in an Ac circuit containing a resistor and an inductor in series is  $\phi_1$ . When the inductor is replaced by a capacitor, the phase difference is changed to  $\phi_2$ . The phase difference when all the three elements are connected in series with the same AC source will be
  - 1)  $\tan^{-1}(\tan \phi_1 \tan \phi_2)$ 2)  $\tan^{-1}(\tan \phi_2 - \tan \phi_1)$ 3)  $\cos^{-1}(\cos \phi_1 - \cos \phi_2)$ 4)  $\cos^{-1}(\cos \phi_2 - \cos \phi_1)$
- 11. OABC is a current carrying square loop. An electron is projected from the centre of the loop along with its diagonal AC as shown. The unit vector in the direction of initial acceleration is



- 12. Two projectiles thrown from the same point at angles  $60^{\circ}$  and  $30^{\circ}$  with the horizontal attain the same height. The ratio of their initial velocities is
  - 1)1 2)2 3) $\sqrt{3}$  4) $\frac{1}{\sqrt{3}}$

13. The acceleration to gravity at a height  $1/20^{\text{th}}$  of the radius of the earth above the earth surface. is  $9ms^{-2}$ . It value at a point at an equal distance below the surface of the earth in  $ms^{-2}$  is about

1)8.5 2)9.5 3)9.8 4)11.5

- 14. A radioactive sample at any instant has its disintegration rate 5000 disintegrations per minute. After 5 minutes, the rate is 1250 disintegrations per minute. Then the decay constant per minute is 1)0.4 ln(2)
  2) 0.2 ln(2)
  3) 0.1 ln(2)
  4) 0.8 ln(2)
- 15. The wavelength  $\lambda_m = 5.5 \times 10^{-7} m$  when the temperature of the sun is 5500K. If the furnace has a wavelength  $\lambda_m$  equal to  $11 \times 10^{-7} m$ , then the temperature of the furnace is

1)5000K 2) 1750K 3) 3750K 4) 2750K

16. The variation of photocurrent with collector potential for different frequencies of incident radiation  $V_1, V_2, V_3$  is shown in the graph, then





17. An ideal gas is initially at temperature T and volume V. its volume is increased by  $\Delta V$  due to an increase in temperature  $\Delta T$ , pressure remaining constant. The quantity  $\delta = \Delta V / V \Delta T$  varies with temperature as



18. A gas can be taken from A to B via two different processes ACB and ADB

When path ACB is used 60J of heat flows into the system and 30J of work is done by the system and 30J of work is done by the system. If the path ADB is work done by the system is 10J, the heat flows into the system in the path ADB is



19. A truck of mass 10 metric ton runs at  $3ms^{-1}$  along a level track and collides with a loaded truck of mass 20 metrcton, standing at rest. If the trucks couple together, the common speed after the collision is

1) $1ms^{-1}$  2) $0.1 ms^{-1}$  3) $0.5 ms^{-1}$  4) $0.3 ms^{-1}$ 

20. A thin flexible wire of length L is connected to two adjacent fixed points and carries a current I in the clockwise direction, as shown in the figure. When the system is put in a uniform magnetic field of

strength B going into the plane of the paper, the wire takes the shape of a circle. The tension in the wire is



21. One mole of an ideal gas expands adiabatically such that its temperature  $T\alpha \frac{1}{\sqrt{v}}$  the value of  $\gamma = \left(\frac{C_p}{C_v}\right)$ 

1)1.30 2)1.50 3)1.67 4)2.00

22. A cylindrical conductor of diameter 0.1mm carries a current of 90mA. The current density (in A m<sup>-2</sup>) is  $(\pi \approx 3)$ 

1) $1.2 \times 10^7$  2) $3 \times 10^6$  3) $6 \times 10^6$  4) $2.4 \times 10^7$ 

23. In an AC circuit, the current is 3A and voltage 210V and power is 63W. The power factor is1)0.112) 0.093)0.084)0.10

24. The upper half of an inclined plane of inclination  $\theta$  is perfectly smooth while the lower half is rough. A body starting from the rest at the top comes back to rest at the bottom if the coefficient of friction for the lower half is given by

1)  $\mu = \sin \theta$  2)  $\mu = \cot \theta$  3)  $\mu = 2\cos \theta$  4)  $\mu = 2\tan \theta$ 

25. The potential energy for a conservative system is given by

 $U = ax^2 - bx$ 

of the gas is

Where a and b are positive constants the law of the force governing the system is

- 1)F= constant 2) F = bx 2a 3) F = b 2ax 4) F = 2ax
- 26. Starting with a sample of pure  ${}^{66}Cu$ , 7/8 of it decays into ZN in 15 min. The corresponding half –life
  - is

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1)10min 2)15 min 3) 5 min 4) 7\frac{1}{2} min
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27. The ends of a rod of length I and mass m are attached to two identical springs as shown in the figure. The rod is free to rotate about its centre O. The rod is depressed slightly at end A and released. The time period of the oscillation is



- 29. A photocell is illuminated by a small bright source placed 1m away. When the same source of light is placed (1/2)m away, the number of electrons emitted by photocathode would 1)decreased by a factor of 2
  2)increase by a factor of 2
  3)decrease by a factor of 4
  4) increase by a factor of 4
  - 30. The magnitude of x and y components of  $\vec{A}$  are 7 and 6 respectivley Also, the magnitudes of x and y components of  $\vec{A} + \vec{B}$  are 11 and 9 respectivley. Calculate the magnitude of vector  $\vec{B}$ 1)10 2) 5 3) 6 4) 3
  - 31. If the work done in blowing a bubble of volume V is W, then the work done in blowing the bubble of volume 2V from the same soap solution will be

1)W 2)
$$\sqrt{2}W$$
 3) $\sqrt[3]{4}W$ 

32. A ball is projected from a certain point on the surface of a planet at a certain angle with the horizontal surface. The horizontal and vertical displacement X and y vary with time t (in seconds)

as  $x = 10\sqrt{3}t$  and  $y = 10t - t^2$ . The maximum height attained by the ball is

- 1)100m 2)75m 3)50m 4)25m
- 33. A body of mass 8 kg is suspended through two light springs X and Y connected in series as shown in the figure. The reading in X and Y respectively are



1)8kg, zero

28.

3) 6kg, 2kg

4) 8kg, 8kg

34. The two surfaces of a biconvex lens has same radii of curvatures. This lens is made of glass of refractive index 1.5 and has a focal length of 10cm in air. The lens is cut into two equal halves along a plane perpendicular to its principal axis of yield two plano-convex lenses. The two pieces are glued such that the convex surfaces touch each other. If this combination lens is immersed in water (refractive index =

 $\frac{4}{3}$ ) its focal length (in cm) is

- 1)5cm2)10cm3)20cm4)40cm35. The displacement of an object attached to a spring and executing simple harmonic motion is given by $x = 2 \times 10^{-2} (\cos \pi t)$ . The time at which the maximum speed first occurs is
  - 1)
     0.25s
     2)
     0.75s
     3)
     0.125s
     4)
     0.5s
- 36. A sphere of mass M and radius R is released from the top of an inclined plane of inclination  $\theta$ . The minimum coefficient of friction between the plane and the sphere so that it rolls down the plane without sliding is given by

1) 
$$\mu = \tan \theta$$
 2)  $\mu = \frac{2}{3} \tan \theta$  3)  $\mu = \frac{2}{5} \tan \theta$  4)  $\mu = \frac{2}{7} \tan \theta$ 

37. In the circuit below, A and B represent two inputs and C represents the output. The circuit represents



1)Or gate 2)NOR gate 3)AND gate 4) NAND gate 38. If a ray travelling in the direction  $\frac{1}{2}(\hat{i}+\sqrt{3}\hat{j})$  is incident on a plane mirror, after reflection, the ray

traveles along direction  $\frac{1}{2} \left( \hat{i} - \sqrt{3} \hat{j} \right)$ . The angle of incidence is

1)  $45^{\circ}$  2)  $75^{\circ}$  3)  $30^{\circ}$  4)  $60^{\circ}$ 

39. A force  $\vec{F} = \alpha \hat{i} + 3 \hat{j} + 6 \hat{k}$  is acting at a point  $\vec{r} = 2\hat{i} - 6\hat{j} - 12\hat{k}$ . The value of  $\alpha$  for which angular momentum about origin is conserved is

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1)2 2) Zero 3)1 4) -1
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40. Which of the following the same dimensions ?

1)Force and strain2) Force and stress

3)Angular velocity and frequency 4) Energy and strain

41. Pressure of an ideal gas is increased by keeping temperature constant. What is the effect on kinetic energy of molecules ?

1)Increases2) Decreases3) No change4) Can't be determined

- 42. A resistor of  $10k\Omega$  having tolerance 10% is connected in series with another resistor of  $20k\Omega$  having tolerance 20% The tolerance of the combination will be approximately
  - 1)10% 2)13% 3)17% 4)20%

43. The fundamental frequency of a sonometer wire is n. if the length and diameter of the wire are doubled keeping the tension same, then the new fundamental frequency is

$$1)\frac{2n}{\sqrt{2}} \qquad \qquad 2)\frac{n}{2\sqrt{2}} \qquad \qquad 3)\sqrt{2}n \qquad \qquad 4)\frac{n}{4}$$

44. A tuning fork of frequency 200 Hz is in unison with a sonometer wire. Tension in the wire of sonometer is increased by 1% without any change in its length. Find the number of beats heard in 9s

45. Work done by static friction on an object

1)may be positive 2)must be negative	3)must be zero	4) none of these	
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- CHEMISTRY
- 46. The electronic configuration of an element is  $1s^2$ ,  $2s^2$ ,  $2p^6$ ,  $3s^2$ ,  $3p^3$ . What is the atomic number of the element which is just below the above element in the periodic table ? 1)34 2)49 3)33 4)31

47. In a mono – keto compound, generally which form of tautomeric structure is more stable than other ?

1)Keto form i	s more stable
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3)Equally stable

2)Enol form is more stable4)Stability cannot be predicted

4)Phenol and bromobenzene

48. In the chemical reactions

$$\underbrace{\overset{\mathrm{NH}_2}{\bigcirc}}_{\mathrm{HC1,278\ K}} A \xrightarrow{\mathrm{CuCN}}_{\bigtriangleup} B,$$

Compounds A and B respectively are 1)Fluorobenzene and phenol 3)Nitrobenzene and chlorobenzene Vanishing cream is an example of

- 49. Vanishing cream is an example of 1)Solution3)Lyophilic solution
- 2) Foam 4)Emulsion
- 50. Hydrolysis of sucrose gives
  - 1)Two molecules of glucose
  - 2)Two molecules of fructose
  - 3) one molecule each of glucose and fructose

4)one molecule each of glucose and mannose

**51.** The nature of 2, 4, 6 – trinitrophenol is 1)Neutral 2)Basic 3)Acidic

4)Weakly basic

2)Benzene diazonium chloride and benzonitrile

52.  $\begin{array}{c} CH_{3}CH_{2}COOH \xrightarrow{Cl_{2}} A \xrightarrow{alc.KOH} B\\ \hline 1) CH_{3}CH_{2}COCl 2) CH_{3}CH_{2}CHO\end{array}$ 

**1**)  $CH_3CH_2COCl$  **2**)  $CH_3CH_2CHO$  **3**)  $CICH_2CH_2COOH$  **4**)  $CH_2 = CHCOOH$ 

53.	A precipitate of the following would be obtained when HCl is added to a solution of stannous sulphide (SNS) in yellow ammonium sulphide						
	1)SnS	$2) SnS_2$	<b>3</b> ) $Sn_2S_2$	$4) (NH_4)_2 SnS_3$			
54.	Which one of the	following is not a biop	olymer ?				
	1)Cellulose	2)Nylon - 6	3)Insulin	4)DNA			
55.	For a reaction , te	emperature increase by	y $10^{0}C$ , the equilibriu	m will be attained faster by			
	1)2 times	2)same	3)1/2 times	4)4 times			
56.	The general formu	The general formula of a cycloalkane is					
	1) $C_{n}H_{n}$		$2) C_{n} H_{2n}$				
	3) $C_{n}H_{2n-2}$		4) $C_{n}H_{2n+2}$				
57.	If the ionic product of $Ni(OH)_2$ is $1.9 \times 10^{-15}$ , the molar solubility of $Ni(OH)_2$ in 1.0 M NaOH is						
	<b>1</b> )1.9×10 <sup>-18</sup> $M$	<b>2</b> )1.9×10 <sup>-13</sup> M	<b>3</b> )1.9×10 <sup>-15</sup> $M$	<b>4</b> )1.9×10 <sup>-14</sup> $M$			
58.	Which is a Lewis	base ?					
	<b>1</b> ) $B_2 H_6$	<b>2</b> ) $LiAlH_4$	<b>3</b> ) $AlH_3$	<b>4</b> ) $NH_{3}$			

59. In the following graph of Maxwell Boltzmann distribution of molecular velocities. Which of the following is the correct order of temperature ?



- 3)  $3^0$  amine 2)  $2^{\circ}$  amine  $1)1^0$  amine 4)Quaternary salt Which one of the following is the mineral for tin? 61. 1)Galena 2)Cerussite 3)Cossiterite 4)Anglesite A reaction  $A + B \rightarrow C+D+q$  is found to have a positive entropy change. The reaction will be 62. 1) Possible at high temperature 2)Possible only at low temperature 3)Not possible at any temperature 4)Possible at any temperature
- What is the IUPAC name of the following compounds? 63.

The molecular formula  $C_3H_9N$  can not represent

60.



1)Non – 3-en-1-al (cockroach repellent found in cucumber)

2)Non – 3- en -1- al (cockroach repellent found in cucumber)

3)Non – 4- en – 2-al (Cockroach repellent found in cucumber)

4)Non-4- en- 3-al (Cockroach repellent found in cucumber)

64. Non –stoichometric cuprous oxide,  $Cu_2O$  can be prepared in laboratory. In this oxide, copper to oxygen

ratio is slightly less than 2 : 1. This substance is a ?

- 1)p-type semiconductor2)n- type semiconductor
- 3)Intrinsic semiconductor 4)Insufficient information
- 65. Marble acts as a sink for1)Metallic pollutants 2)NH<sub>3</sub> pollutants

3)Acidic pollutants 4)None of these

66. In the reaction, the product P is

0

3)

67.

68.

69.





70.	Which one of the fol activity?	llowing characterstics of	the transition metals is	associated with their catalytic
	1)High enthalpy of atomization		2)Paramagnetic behavior	
	3)Colour of hydrated	dions	4)Variabl	le oxidation states
71.	Which of the follow	ls ?		
	1)Bromine	2)Iodine	3)Fluorine	4)Chlorine
72.	<ul> <li>O-nitrophenol is more volatile than paranitrop 1)intramolecular H – bonding in O-nitrophen</li> <li>2) interamolecular H – bonding in o-nitrophen</li> <li>3)more stronger intramolecular H – bonding i</li> <li>4)more stronger intermolecular H – bonding i</li> </ul>		phenol due to nol and intermolecular enol and intramolecular in o-nitrophenol as con in O-nitrophenol as con	H- bonding in P- nitrophenol H-bonding in p- introphenol npared to p – nitrophenol mpared to p-nitrophenol
73.	Pencilin was first dis 1)A fleming	scovered by 2) Tence and salke	3) S.A waksna	4) Lewis pasteur
74.	Propyne and propen	e can be distinguished by	ý	
	1)Concentrated $H_2S$	$SO_4$	2) $Br_2$ in $CCl_4$	
	3)Dilute $KMnO_4$		4)ammonical AgNO	3
75.	20.8g of BaCl <sub>2</sub> on reasonant of $BaSO_4$ for	eaction with 9.8g of $H_2S$ prmed is	$O_4$ produces 7.3g of H	Cl and some amount of $BaSO_4$ . The
	1) 23.3g	2)20.8g	3)9.8g	4)10.4g
76.	The volume of 0.1N aqueous solution is	dibasic acid sufficient to	o neutralize 1g of a bas	se that furnishes 0.04 mole of $OH^-$ in
	1)400mL	2)600mL	3) 200mL	4) 800mL
77.	The relationship bet	ween energy(E) of wave	elengths 2000A <sup>0</sup> and 80	000A <sup>0</sup> , respectively is
	1) $E_1 = 4E_2$	2) $E_1 = 2E_2$	3) $E_1 = \frac{E_2}{2}$	4) $E_1 = \frac{E_2}{4}$
78.	A silver cup is plate 1)107.89g	d with silver by passing 9 2)9.89g	965C of electricity. The 3)1.0002g	e amount of Ag deposited is 4)1.08g
79.	Mention whether the increasing pressure will cause the reaction to go into forward or backward direction, using (b) for backword (f) for forward (n) for no change by selecting any of the choices given for the following reactions respectively i) $COCl_2(g) \rightleftharpoons CO(g) + Cl_2(g)$ ii) $CH_4(g) \rightleftharpoons 2S_2(g) \rightleftharpoons CS_2(g) + 2H_2S(g)$			

iii)  $CO_2(g) + C(s) \rightleftharpoons 2CO(g)$ iv)  $2H_2(g) + CO(g) \rightleftharpoons CH_3OH(g)$ v)  $CaCO_3(s) \rightleftharpoons CaO(s) + CO_2(g)$ vi)  $4NH_3(g) + 5O_2(g) \rightleftharpoons 4NO(g) + 6H_2O(g)$ 1)(b) ,(n) ,(b) ,(f) ,(b) ,(b) 2)(b), (n), (b), (b), (b), (b) 3) (f), (f), (b), (f), (b), (b) 4) None of these

80.	. EAN of Cr in $\left[Cr(NH_3)_6\right]CI_3$ is			
	1) 32	2)33	3)34	4)35
81.	Phosphorus pentoxide	is widely used as		

- 1)Reducing agent 2)Oxidizing agent 3)Dehydrating agent 4)Bleaching agent 82. For which of the following molecule significant  $\mu \neq 0$ ?

1) only (a)
 2) (a) and (b)
 3) only (c)
 4)(c) and (d)
 83. A non –ideal solution was prepared by mixing 30mL chloroform and 50mL acetone. The volume of mixture will be

1) > 80 mL2) < 80 mL</th>3) = 80 mL4)  $\ge 80mL$ 84. Solid  $N_2O_5$  is

1)Ionic 2) Cavalent 3) Coordinate covalent 4) metallic 85. Consider an ion with the following structure  $[H_2C = C = NH_2]^+$ . For this ion, we can define two planes:

- one plane containing H- C H group, the other plane containing H N H group. What is the relationship between these planes ? 1) They are at  $120^0$  2) They are perpendicular to each other 3) They are in the same plane 4)More information is required
- 86. The unit of the rate of a second order reaction

1)  $time^{-1}$  2)  $mol \ L^{-1}time^{-1}$  3)  $Lmol^{-1}time^{-1}$  4)  $L^{2}mol^{-2}time^{-1}$ 

- 87. Gold number of a lyophilic sol is such a property that
  - 1) The larger its value, the greater is the peptizing power
  - 2) The lower is value, the greater is the peptizing power
  - 3) The lower its value, the greater is the protecting power
  - 4) The larger its value, the greater is the protecting power

88. For a given reaction,  $\Delta H = 35.5 k Jmol^{-1}$  and  $\Delta S = 83.6 J K^{-1} mol^{-1}$ . The reaction is spontaneous at (Assume that  $\Delta H$  and  $\Delta S$  do not vary with temperature) 1) T < 425K 2) T > 425K 3) All temperature 4) T > 298K

89. In which of the following reactions, hydrogen peroxide acts as an oxidizing agent ?
1) HOCl + H<sub>2</sub>O<sub>2</sub> → H<sub>3</sub>O<sup>+</sup> + Cl<sup>-</sup> + O<sub>2</sub>

2) 
$$I_2 + H_2O_2 + 2OH^- \rightarrow 2I^- + 2H_2O + O_2$$

3)  $Pbs + 4H_2O_2 \rightarrow PbSO_4 + 4H_2O_2$ 

4)  $2MnO_{4}^{-} + 2H_{2}O_{2} \rightarrow 2MnO_{2} + 3O_{2} + 2H_{2}O + 2OH^{-}$ 

90. Among  $NO_2^+$ ,  $KO_2$  and  $Na_2O_2$  and  $NaAlO_2$  the paramagnetism exist in1)  $Na_2O_2$  only2)  $KO_2$  and  $NO_2^+$ 3)  $Na_2O_2$  and  $NaAlO_2$ 4)  $KO_2$  only

### BIOLOGY

91. The arteries differ from veins in having

1)Arteries consist of three distinct layers, which are thin and collapsible whereas veins consist of three distinct layers, which are rigid, thicker and highly muscular

2) Veins consist of three distinct layers, which are thin and collapsible whereas arteries consist of three distinct layers, which are rigid, thicker and highly muscular

3)Veins consist of two distinct layers, which are thick and collapsible whereas arteries consist of three distinct layers, which are rigid, thicker and highly muscular

4)Arteries consist of two distinct layers, which are thin and muscular whereas veins consist of three distinct layers, which are rigid, thicker and highly vascular

- 92. Find out the incorrect statements:
  - 1)Blue green alga is a prokaryotic cell
  - 2)WBC is ameboid in shape
  - 3) Mycoplasma is the largest cell
  - 4) Microbodies are cell organelles
  - 5) Prokaryotes do not exhibit a wide variety of shapes
  - 1) 2, 4 and 5 2) 2, 3 and 5 3) 3, 4 and 5 4) 3 and 5 ony
- 93. Read the following statements (A C) about the human heart

A) The SA node is a specialized mass of cardiac tissue present in the lower – left corner of the right atrium close to the AV septum

- B) The body has the ability to alter the heart rate, cardiac output but not stroke volume
- C) The end of the T- wave in ECG marks the end of the systole

How many statements is /are correct from the above ?

 1) Three
 2) Two
 3) One
 4) None

94. George palade observed granular structure under electron microscope which is composed of

- 1) RNA & DNA2) RNA & Carbohydrates
- 3) RNA & Proteins 4) RNA & Amino acids
- 95. Select incorrect statements
  - 1) Diplotene stage is not recognized by the dissolution of the synaptonemal complex
  - 2) Recombination nodules contain recombinase
  - 3) In Anaphase II separation of homologous chromosome occurs
  - 4)Inter kinesis is generally short lived
  - 1) 1 and 2
     2) 2 and 3
     3) 2 and 4
     4) 1 and 3
- 96. Which one of the following statement is not correct for most common type of nephrons of human kidney ?
  - 1)They are small size, less coiled with major part present at the junction of cortex and medulla
  - 2) They have short length of loop of Henle
  - 3) They do not have major role to form counter current mechanism
  - 4) They have no or highly reduced vasa recta
- 97. Every chromosome essentially has a primary constriction or the ...... On the sides of which disc shaped structures called \_\_\_\_\_ are present

1)centrosome, centromere

2)chromocenter, centromere

3) centromere, kinetochores

4) centromere, centromere

98. Trypsinogen is activated into trypsin by an enzyme \_\_\_\_\_ X\_\_\_ secreted by \_\_\_\_\_ Y \_\_\_\_ Choose the option which correctly describes 'X' and 'Y'

	Х	Y
(1)	Trypsinase	Small intestine
(2)	Intestinal Lipase	Small intestine
(3)	Enterokinse	Intestinal mucosa
(4)	Steapsin	Small intestine

99. A cell divides when its karyocytoplasmic index or karyoplasmic index

1)Decreases 2) Increased 3) Restored 4) Remain same

100. The  $5^{th}$  thoracic vertebra is

1) the region of the spinal column inferior to the sacral vertebrae

- 2) the region of the spinal column superior to the cervical vertebrae of the neck
- 3) at the same level as the sterna angle
- 4) inferior to the lumbar vertebrae of the lower back
- 101. Observe and identify the given structure



1) Brown – algae2) Blue – algae3)Red- algae

4)Green- algae

102. What is the number of carbon atoms which the palmitic acid and arachidonic acid contain ( including carboxyl carbon)

1) 16, 19 2) 15, 19 3) 16, 20 4) 18, 20

103. Identify the labelling i, ii, and iii in the haemoglobin -oxygen dissociation curve



- i. Binding of 1<sup>st</sup> oxygen molecule (difficult to bind)
   ii) Binding of 3<sup>rd</sup> oxygen molecule (easy to bind)
   iii)Binding of 2<sup>nd</sup> oxygen molecules (very difficult to bind)
  - 2) i. Binding of 1<sup>st</sup> oxygen molecule ( easy to bind)
    ii. Binding of 2nd oxygen molecule ( easy to bind)
    iii. Binding of 3<sup>rd</sup> oxygen molecule ( very difficult to bind)
  - 3) i. Binding of 1<sup>st</sup> oxygen molecule ( easy to bind)
    ii. Binding of 2nd oxygen molecule ( difficult to bind)
    iii. Binding of 3<sup>rd</sup> oxygen molecule ( very difficult to bind)
  - 4) i. Binding of 1<sup>st</sup> oxygen molecule (difficult to bind)
    ii. Binding of 2nd oxygen molecule (easy to bind)
    iii. Binding of 3<sup>rd</sup> oxygen molecule (very difficult to bind)
- 104. In the primary structure of protein
  - 1)Left end represents  $\rightarrow 1^{st}$  amino acid (C- terminal amino acid)
  - 2)Right end represents  $\rightarrow$  Last amino acid ( N terminal amino acid)
  - 3) Left and represents  $\rightarrow 1^{st}$  amino acid (N terminal amino acid)
  - 4) Right end represents  $\rightarrow 1^{st}$  amino acid (C-terminal amino acid)
- 105. Which of the following connotations are not true about the special creation theory of the origin of life ?
  - 1) All living organisms that we see to day were created as such
  - 2) The earth is about 4000 years old
  - 3)There has been gradual evolution of life form
  - 4)Diversity was always the same since creation and will remain same in future also
- 106. Three of the following statements about enzymes are correct and one is wrong The wrong option is
   1)Higher temperature destroys enzymatic activity because proteins are denatured by heat

2) Enzymes are denatured at high temperature but in certain exceptional organisms they are effective even at temperatures from  $80^{0}$ -  $90^{0}$ C

3)Enzymes lower the activation energy and hasten the enzyme catalyzed reaction

4)Most of the enzymes are active intracellular only and gets inactivated under extracellular conditions

107. Find the correct match in the following

Viruses are smaller in size ranging from 20- 400 nm and bacteria is larger in size, around 1000nm
 Origin of solar system: 20 billion years ago and origin of universe system 50 billion years ago

- 3) Founder effect operates in a large population and gene flow operates in a small population
- 4) Deep veins are located on the surface of the skin
- 108. Which of the following plant cells show totipotency ?
  - 1)Cork cells, meristem, spores2) Meristem, zygote, spores
  - 3) Spores, zygote, xylem vessels 4) Sieve tube, zygote, spores
- 109. Arrange the following places in increasing order of bird diversity

(i) New York	(ii) India	(iii) Green land	(iv) Columbia
1)iii, iv, ii, i	2) iv. iii. ii. i	3) i. ii. iii. iv	4) iii . i . ii. iv

110. Match the following column I with column II

	Column- 1		Column – II
A)	Hono habilis	I)	First human – like being hominid
B)	Homo erectus	II)	Buried their dead with flowers
C)	Neanderthal man	III)	Brain size around 900cc
D)	Cro-magnonman	IV)	Excellent cave painting /art
1) A- IV, B – III, C –II, D – I			2)A – III, B – I, C – II, D – IV
3)A – I, B – II, C – III, D- IV		V	4) A – I, B – III, C – II, D- IV

111. Which of the following set of animals are triploblastic, true coelomates with open type circulatory system?

1)Earthworm, Cockroach, Nereis	2) Cockroach, Octopus, Leech
3) Mosquito, Pheretima, Nereis	4) Cockroach, Leech, Pila

- 112. What cross leads to the production of the mule ?
  - 1) Male donkey X female horse 2) Female donkey X male horse
  - 3)Stallion X female donkey4) Stallion X mare
- 113. Which of the following statement is correct about cyclostomata ?
  - 1) All living members are endoparasites on some fishes
  - 2) They have an elongated body bearing 2 pair of gill slits
  - 3) They have a sucking and circular mouth without jaws
  - 4) All the above
- 114. Which of the following is a broadly utilitarian reason for the conservation of biodiversity ?1)Human derive direct economic benefit from nature
  - 2)Many drugs are derived from plants
  - 3) Medicinally useful plants are present in tropical forest
  - 4) Many insect pollinates the plants
- 115. Which of the following contraceptive method has high rate of failure ?
  - 1) Oral contraceptive pills2)Implants

3) Barrier method

4) Periodic abstinence

116. Which metal inactivates a catalytic converter ?

1)Gold2) Lead3) Silver4) Iron

117. The given diagram represents



- 1) The injection of ovum and sperms to the female uterus .
- 2) The blastomere is transferred to the uterus for further development of the baby

3)In vitro fertilization followed by zygote transfer into a fallopian tube or uterus of the female

4) both (a) and (c)

118. How many of the following statements are correct ?

1) Good ozone is found in the stratosphere

2) UV radiation having a lower wavelength than UV- B is almost completely absorbed by the Earth's atmosphere

3)UV- B causes snow blindness and cataract

- 4) dB is a unit to measure the thickness of ozone
- 1) one 2) two 3) three 4) four
- 119. Under favourable conditions, somatic cells store food materials, which become thick- walled structures and are called as
  - 1) Heterocysts 2) Akinetes 3) Gemmule 4) Endospores

120. Reducing sugars are

- 1) Glucose, fructose, maltose, galactose and lactose
- 2) Glucose, sucrose and cellulose
- 3) Lactose, starch, glycogen and trehalose
- 4) All of the above
- 121. The following graph shows the range of variation among population members for a trait determined by multiple genes



If this population is subject to stabilizing selection for several generations, which of the distribution is most likely to result ?



	3) Bulbourethral gland & Bartholin's gland					
	4) Prostate gland	4) Prostate gland & Skene's gland				
127.	In a pond ecosystem, the shape of a pyramid of number is					
	1) Linear	2) Irregular	3) Upright	4) Inverted		
128.	A man is suffering from a severe disease which includes symptoms like chills, fever and cough. On close inspection, it is found his fingernails have turned blue. An X- ray of his lungs showed an accumulation of fluid in them. Which of the following pathogens is the causative agent for this disease ?					
	1)Plasmodium v	ivax	2) Klebsiella pro	eumoniae		
	3)Haemophilus influenza		4)Plasmodium o	ovale		
129.	Consider the foll	lowing statements conc	erning food chains			
	I) Removal of 80	0% tigers from an area 1	resulted in greatly inc	reased growth of vegetation		
	II)In a grassland resulted in an ind	l ecosystem with deers creased population of de	s being primary cons eers	umers, removal of most of the carnivores		
	III)The length of	f food chains is generall	ly limited to 3 to 4 tro	phic levels due to energy loss		
	IV) The length c	of food chains may vary	y from 2 to 8 trophic 1	evels		
	Which two of the	e above statements are	correct?			
	1)II and III	2) III and IV	3) I and IV	4) I and II		
130.	Which of the following is the correct option for decreasing order of concentrations of different types of antibodies which are produced in our body ?					
	1)IgG, IgA, IgM, IgD, IgE		2)IgM,IgG,IgA,	IgD, IgE		
	3)IgM, IgG, IgA	, IgD, IgE	4) IgE, IgD, IgA	4) IgE, IgD, IgA,IgE, IgM		
131.	Swollen placenta	a with many ovules is p	present in			
	1) chilli	2) Aloe	3) Tulip	4) Mullathi		
132.	Find the number	of correct match in the	following :			
	I)Cancer : Don't	I)Cancer : Don't die of ignorance disease				
	II) Cocaine : Cal	II) Cocaine : Called coke or crack is usually snorted				
	III)Charas : Bind	III)Charas : Binds to cannabinoids				
	IV) smoking: Ca	IV) smoking: Causes cancer of urinary bladder				
	V) Hepatitis B: S	Sexually transmitted dis	sease			
	1) Five	2) Four	3) Three	4) Two		
133.	Which of the fol	lowing is not correct with	ith respect to a part of	the flower and its function ?		
	1) Sepals are gre	en leaf – like structures	which protect the flo	ower after opening		
	2) Petals are usu	ally brightly coloured to	o attracts insects for j	pollination		
	3) Staminodes p	roduce pollen grains				
	4) Stigma is the	4) Stigma is the tip of carpel and is the receptive surface for pollen grains				

134. The four sketches (A, B, C and D) given below, represent four different types of animal tissues. Which one these are correctly identified in the options given, along with its correct location and function ?









4)

Gland	Location	Function
1)Glandular epithelium	Intestine	Secretion
2)Collagen fibres	Cartilage	Attach skeletal muscles to bones
3)Smooth muscle tissue	Heart	Heart contraction
4)Columnar epithelium	Nephron	Secretion and absorption

#### 135. Select the incorrect pair

1)Indgofera – sepals five (Gamosepalous), Corolla(Vexillary aestivation)

2)Brinjal – Sepals five united (Persistent, valvate aestivation)

3)Asparagus – Sepals three often united into tube (valvate aestivation)

4) Colchicine – Perianth present tepals six (valvate aestivation)

136. Which of the following glands/ structures do not participate in excretion in Periplaneta Americana ?

1) Uricose gland

2) Malpighian tubules

3)Fat body

4) Phallic gland

137. Match the column

	Column – I		Column - II
A)	Marginal	1)	Pea
B)	Parietal	2)	Mustard and Argemone
C)	Axile	3)	Dianthus and primrose
D)	Free central	4)	China rose, tomato lemon
E)	Basal	5)	Sunflower and marigold
1)A – I, B – 2, C- 4, D- 3, E – 5 2) A – 2, B – 1, C – 3, D – 4, E- 5			

3)A-4, B-1, C-3, D-5, E-4 4) A-5, B-2, C-4, D-2, E-3

138.	Plasma membrane	of is known as sa	rcolemma									
	1)Myofibre	2) Myofibrill	3) Muscle	4)Fascicles								
139.	Haplodiplontic life	e cycle is observed in										
	1) Bryophyta	2) Pteridophyta	3)Most of the Algae	4) Both (1) and (2)								
140.	Read the statemen	ts (A- D)										
	A) Suture joint is a type of fibrous joint between cranial bones											
	B)Myasthenia gravis is an autoimmune disorder											
	C)Tetany results in rapid spasms or wild contractions in nerve											
	D)Accumulation of uric acid crystals in joints occurs in gout											
	How many of the	Iow many of the above statements are false ?										
	1) None	2) One	3) Two	4)Three								
141.	At the stage of ger	neration of action potenti	al, the axolemma is									
	1) Positive outside		2) Negative outside									
	3) Neither positive	e nor negative	4) Initially positive the	han negative								
142.	Select the incorrect statement from the following											
	1) The dominant phase in the life cycle of pteridophytes is sporophyte											
	2) The dominant phase in the life cycle of bryophytes is gametophyte											
	3) The dominant phase in the life cycle of gymnosperms is gametophyte											
	4) The dominant p	hase in the life cycle of a	angiosperms is sporoph	yte								
143.	Select the incorrect statement											
	1) Efferent neurons carry impulses from CNS to peripheral tissues											
	2) Granular bodies are found in cytons of neuron											
	3) Unipolar neuron	n has only one dendrite	4) Duramater is in co	ontact with cranium								
144.	Family solanaceae	and convolvulacee below	ngs to the order									
	1) Poales	2) Polymoniales	3)Diptera	4) Dicotichas								
145.	Which of the follo	wing hormones stimulate	es the reabsorption of e	lectrolytes in the kidney ?								
	1) Arginine	2) TSH	3) ADH	4) ACTH								
146.	Carbon skeleton p the cell thus respir	roduced during respiration ation is	on is used as precursor	for biosynthesis of other molecules in								
	1) Catabolic proce	ss 2) Anabolic process	3) Amphibolic proce	ss 4) Developmental process								
147.	Select the incorrect match											
	1) Adrenal cortex	– Glucocorticoids	2) Parathyroid glands – 4 in number									
	3) Hypothyroidisn	n – Cretinism	4) Thymosins – Stere	4) Thymosins – Steroid hormone								
148.	How many molect oxidized in aerobic	ules of carbon dioxide with the carbon dioxide with the carbon of the ca	ill be produced if two n	nolecules of Acetyl CoA is completely								
	1) one	2) Two	3) Three	4) Four								
149.	Which of the follo	wing group represents al	l beneficial elements ?									
	1) Na, Si, Se, Ag	2) Na, Se, Cu, Co	3)Na, Si, Co, Se	4) Na, Ne, Se, Co								
150.	Read the following	g statements										

	A) Insulin is a peptide hormone present in pancreatic juice								
	B) Parathormone and calcitonin are antagonistic hormones								
	C) Zona glomerulosa forms the inner layer of the adrenal cortex								
	How many statements are correct ?								
	1) None	2) One	3) Two	4)All					
151.	Stomata which open	s up in night and remai	ns close during day tin	ne shows					
	1) C <sub>3</sub> pathway	2) CAM pathway	3)C <sub>4</sub> pathway	4) Both (B) and (C)					
152.	'Chlorophyll 'a' is al	bsent in which of the fo	ollowing photosyntheti	c organism ?					
	1) Cyanobacteria	2) Red algae	3) Brown algae	4)Bacteria					
153.	During photorespirat	tion, the oxygen consur	ming reaction(s) occur	in					
	1) Stoma of chloropl	asts and peroxisomes	2) Grana of chloropla	asts and peroxisomes					
	3) Stroma of chlorop	blasts	4) Stroma of chlorop	lasts and mitochondria					
154.	Which one of the fol	lowing plant hormones	s is not correctly match	ed with its function ?					
	1) Abscisic acid – St	omatal closure	2) Gibberellic acid –	leaf fall					
	3) Cytokinin – Cell o	livision	4) IAA - Apical dominance						
155.	The term used for pe	ermanent cells that have	e reobtain meristematic	n meristematic property to perform cell division is					
	1)DIfferentation	2)Dedifferentiation	3)Redifferentiation	4)determination					
156.	The thalloid body of	slime mould is known	as						
	1) Fruiting body	2) Mycelium	3) Protenema	4) Plasmodium					
157.	Which one of the fol	lowing organisms is no	ot an example of a unic	ellular eukaryote ?					
	1) Euglena	2) Gonyaulax	3)Amoeba	4) E.coli					
158.	The fungi which are belongs to	e used to produce the	product which is also	the first stable product of TCA cycle					
	1) Phycomycetes	2) Ascomycetes	3 Basidiomycetes	4) Deuteromycetes					
159.	The bacterial genom	e consisits of							
	1) DNA and HIstone	•	2) DNA or Histone						
	3) DNA without His	tone	4) Neither DNA nor Histone						
160.	Select the incorrectly	y matched pair							
	1)Initiation codon –	AUG, GUG	2) Stop codon – UAA, UAG, UGA						
	3) Methionine – AU	G	4) Alanine – ACC, ACU, ACA, and ACG						
161.	UTR's are untranslat	ted region present on							
	1) rRNA	2) tRNA	3) mRNA	4) hnRNA					
162.	Hershey – Chase exp of steps followed in	periment successfully periment is	proved DNA to be the	genetic material. The correct sequence					
	1)Blending, infection	n, Centrifugation	2) Centrifugation, Int	fection, Blending					
	3) Infection, Centrifu	gation, Blending	4) Infection, Blendin	g, Centrifugation					
163.	Identify the incorrect	t match							
	1) Chlamydomanas -	- Zoospore	2)Penicillium – Conidia						
	3) Hydra – Gemmule	es	4) Amoeba – Binary fission						

- 164. To which of the following parts of a flower, the proximal end of the filament of stamen is attached ?
  1)Pedicel or tepals 2) Thalamus or petal 3) Sepals or petals 4) Tepals or sepals
- 165. Mass of cell enclosed within the integuments in ovule is called

1) Chalaza2) Endosperm3) Nucellus4) Sporogenous tissue

166. Which one of the following is correct about the post – fertilization events in flowering plants ?

- 1) Development of embryo before endosperm
- 2) Endosperm develops before embryo
- 3) Both the development of embryo and endosperm occurs simultaneously
- 4) All are correct
- 167. Which of the following statement is wrong ?
  - 1) Pollen grain in some plants remains viable for months
  - 2) Tapetum nourishes the developing pollen
  - 3) Vegetative cell is larger than generative cell
  - 4) PEN is produced by the fusion of two polar nuclei

168. Which of the following group of plants shows entomophily ?

- 1) Vallisneria, Grass, Amorphophallus 2) Amorphophallus, Yucca, Zea mays
- 3) Wheat, Zostera, Raffesia 4) Yucca, Ficus, salvia

169. choose the correct option with regard to statement A and B

A) Lactic acid bacteria (LAB) are responsible for converting milk into curd

B)LAB creates acidic medium necessary to coagulate and fully digest the milk proteins

- 1) Statements A and B are correct 2) Statements A and B are incorrect
- 3) Statement A is correct but B is incorrect 4) Statement B is correct and A is incorrect
- 170. Mendel selected \_\_\_\_\_ for this experiment
  - 1) 14 true breeding pea plant varieties 2) 7 true breeding pea plant varieties
  - 3) 14 hybrid pea plant varieties 4) 7 hybrid pea plant varieties
- 171. Reasons for mendel's success was
  - i) His experiments had a large sampling size, thus greater credibility to the data collected
  - ii)Use of statistical analysis and mathematical logic
  - iii) considered many characters at a time
  - iv) Results are confirmed on the successive generation of test plants

1) i, ii, iii2)i,ii, iv3)i,iii,iv4)All of the above

- 172. Drosophila melanogaster genome consists of
  - 1)3 pair of autosome + one pair of allosome 2)2 pair of autosome + 2 pair of allosome
  - 3) 1 pair of autosome + 3 pair of allosomes 4) 2 pair of autosome +1 pair of allosomes
- 173. Genotype of male plant is TT and genotype of female plant it tt. What would be the genotype of endosperm ?
  - 1) TTt 2) Ttt 3) Tt 4)tt

- 174. With respect to the ABO group, there are four major blood types because this blood group is determined by
  - 1)Three alleles, all of which are recessive
  - 2) Three alleles, of which, two are recessive and the third is dominant
  - 3) Three alleles, of which, two are recessive and the third is recessive
  - 4) Three alleles, all of which are co-dominant
- 175. Which one of the following symbols and its representation, used in human pedigree analysis is correct ?

= mating between relatives 1) unaffected male 2) unaffected female 3) male affected 4) 176. Bioreactors have 1)Foam control system, temperature control system 2)Oxygen delivery system 3)pH control system 4) All the above 177. Which of the following is not the application of PCR? a)Detection of very low concentration of bacteria or virus b)Detection of mutations in genes in suspected cancer patients c)Amplification of the desired DNA segment d) detection of antibodies synthesized against pathogens 2)b 3)c 4)d a)a 178. Humulin is a 1) Nutural insulin 2) Human insulin synthesized by genetically engineered E.Coli 3)Human insulin synthesized by pancreas 4) Chemically synthesized insulin 179. How many recombinant therapeutics have been approved for human use all over the world ? 1)10 2)20 3)30 4)90 180. Select the mismatch 1)AIDS – ELISA test (Diagnosis) 2)Filariasis – Wuchereria (Causative organism) 3) Malaria – Anopheles mosquito (Causative agent) 4)Ringworm – Dry, scaly lesions on skin (Symptoms)

# NATIONAL TEST ABHYAS NEET MOCK TEST-53 Answers and Explanations

1)	4	2)	1	3)	2	4)	1	5)	2	6)	4	7)	2	8)	1	9)	2	10) <b>1</b>
11)	2	12)	4	13)	2	14)	1	15)	4	16)	3	17)	3	18)	3	19)	1	20) <b>3</b>
21)	2	22)	1	23)	4	24)	4	25)	3	26)	3	27)	3	28)	1	29)	4	30) <b>2</b>
31)	4	32)	4	33)	4	34)	4	35)	4	36)	4	37)	1	38)	4	39)	4	40) <b>3</b>
41)	3	42)	3	43)	4	44)	1	45)	1									

CHEMISTRY	'

(		(19	),	( 9	$\varphi$ )			60	
46) <b>3</b>	47) <b>1</b>	48) <b>2</b>	49) <b>4</b>	50) <b>3</b>	51) <b>3</b>	52) <b>4</b>	53) <b>2</b>	54) <b>2</b>	55) <b>1</b>
56) <b>2</b>	57) <b>3</b>	58) <b>4</b>	59) <b>1</b>	60) <b>4</b>	61) <b>3</b>	62) <b>4</b>	63) <b>1</b>	64) <b>1</b>	65) <b>3</b>
66) <b>2</b>	67) <b>2</b>	68) <b>2</b>	69) <b>3</b>	70) <b>4</b>	71) <b>3</b>	72) <b>1</b>	73) <b>1</b>	74) <b>4</b>	75) <b>1</b>
76) <b>3</b>	77) 1	78) <b>4</b>	79) <b>1</b>	80) <b>2</b>	81) <b>3</b>	82) 4	83) <b>2</b>	84) <b>1</b>	85) <b>2</b>
86) <b>3</b>	87) <b>3</b>	88) <b>2</b>	89) <b>3</b>	90) <b>4</b>					

## **BIOLOGY**

91) <b>2</b>	92) <b>4</b>	93) <b>2</b>	94) <b>3</b>	95) <b>4</b>	96) <b>1</b>	97) <b>3</b>	98) <b>3</b>	99) <b>1</b>	100) <b>3</b>
101) <b>2</b>	102) <b>3</b>	103) <b>4</b>	104) <b>3</b>	105) <b>3</b>	106) <b>4</b>	107) <b>1</b>	108) <b>2</b>	109) <b>4</b>	110) <b>4</b>
111) <b>4</b>	112) <b>1</b>	113) <b>3</b>	114) <b>4</b>	115) <b>4</b>	116) <b>2</b>	117) <b>2</b>	118) <b>3</b>	119) <b>2</b>	120) <b>1</b>
121) <b>1</b>	122) <b>4</b>	123) <b>3</b>	124) <b>4</b>	125) <b>1</b>	126) <b>2</b>	127) <b>3</b>	128) <b>3</b>	129) <b>1</b>	130) <b>1</b>
131) <b>1</b>	132) <b>3</b>	133) <b>3</b>	134) <b>1</b>	135) <b>3</b>	136) <b>4</b>	137) <b>1</b>	138) <b>1</b>	139) <b>4</b>	140) <b>2</b>
141) <b>1</b>	142) <b>3</b>	143) <b>3</b>	144) <b>2</b>	145) <b>3</b>	146) <b>3</b>	147) <b>4</b>	148) <b>4</b>	149) <b>3</b>	150) <b>2</b>
151) <b>2</b>	152) <b>4</b>	153) <b>1</b>	154) <b>2</b>	155) <b>2</b>	156) <b>4</b>	157) <b>4</b>	158) <b>2</b>	159) <b>3</b>	160) <b>4</b>
161) <b>3</b>	162) <b>4</b>	163) <b>3</b>	164) <b>2</b>	165) <b>3</b>	166) <b>2</b>	167) <b>4</b>	168) <b>4</b>	169) <b>3</b>	170) <b>1</b>
171) <b>2</b>	172) <b>1</b>	173) <b>2</b>	174) <b>3</b>	175) <b>1</b>	176) <b>4</b>	177) <b>4</b>	178) <b>2</b>	179) <b>3</b>	180) <b>3</b>

## SOLUTIONS

## PHYSICS

$$\frac{\lambda_1}{\lambda_2} = \frac{\left(\frac{1}{9} - \frac{1}{16}\right)}{\left(\frac{1}{1} - \frac{1}{4}\right)} = \frac{7}{108}$$
1...

2. 
$$E = E_4 - E_1 = -\frac{13.6}{4^2} - \left(-\frac{13.6}{1^2}\right)$$

= -0.85 + 13.6 = 12.75 eV

 $=12.75 \times 1.6 \times 10^{-19} J$ 

$$P = \frac{E}{c} = \frac{12.75 \times 1.6 \times 10^{-19}}{3 \times 10^8}$$
$$= 6.8 \times 10^{-27} \, kgms^{-1}$$

This must be the momentum of recoiled hydrogen atom (in opposite direction)

3. The initial extention in spring is  $X_0 = \frac{mg}{k}$  Just after collision of B with A the speed of combined mass is  $\frac{v}{2}$ 

For the spring to just attain natural length the combined mass must rise up by  $x_0 = \frac{mg}{k}$  and comes to rest



Applying conservation of energy between initial and final states

$$\frac{1}{2}2m\left[\frac{v}{2}\right]^2 + \frac{1}{2}k\left[\frac{mg}{k}\right]^2 = 2mg\left[\frac{mg}{k}\right]$$
  
Solving we get  $V = \sqrt{\frac{6mg^2}{k}}$ 



Consider a small section dx of the bar at a distance x from B. The weight of the bar for a length x is  $W = \left(\frac{mg}{L}\right)x$ . Elongation in x will be

$$de = \left(\frac{W}{AY}\right) dx = \left(\frac{mg}{LAY}\right) dx.x$$

Total elongation of the bar can be obtained by integrating this expression for x = 0 to x = L

$$\therefore \Delta l = \int_{x=0}^{x=L} de = \left(\frac{mg}{LAY}\right) \int_{0}^{L} x dx$$
$$\Rightarrow \Delta l = \frac{mgL}{2AY}$$

5. Since no current flows through the  $5\Omega$  resistor, the circuit represents a balanced wheatstone bridge.

Therefore, 
$$\frac{x}{18} = \frac{2}{6}$$
  
$$X = \frac{2}{6} \times 18 = 6\Omega$$

6.



mg + IBI = 2kx0....(2)

$$\frac{mg + IBI}{mg} = \frac{x_0}{x} \text{ or}$$
$$IBI = mg\left(\frac{x_0}{x} - 1\right) \text{ or } B = \frac{mg}{Il}\left(\frac{x_0 - x}{x}\right)$$

7.Acceleration  $a = \frac{eE}{m}$  here acceleration is constant so we can use the equation of motion

$$S = \frac{1}{2}at^{2}$$
$$= \frac{1}{2}\frac{eE}{m}t^{2}$$
$$n\% = \frac{80}{100} = \frac{V_{s}I_{s}}{V_{p}I_{p}} = \frac{120 \times 20}{1000 \times I_{p}}$$
$$I_{p} = \frac{120 \times 20}{1000 \times 0.8} = 3A$$

9. From Wien's law

 $\lambda_m T = \text{constant}$ 

Where  $\lambda_m$  is maximum wavelength and T is the absolute temperature

Given, 
$$\lambda_1 = 140A^0$$
,  $\lambda_2 = 4200A^0$   
 $\therefore \frac{\lambda_1}{\lambda_2} = \frac{T_2}{T_1} = \frac{140}{4200}$   
 $\Rightarrow \frac{T_2}{T_1} = \frac{1}{30}$   
 $\Rightarrow \frac{T_1}{T_2} = \frac{30}{1}$   
10.  $\tan \phi_1 = \frac{x_L}{R}$ ,  $\tan \phi_2 = \frac{x_c}{R}$   
 $\tan \phi = \frac{x_L - x_C}{R} = \tan \phi_1 - \tan \phi_2$   
 $\phi = \tan^{-1}(\tan \phi_1 - \tan \phi_2)$   
11.  $\vec{F} = -e(\vec{V} \times \vec{B})$   
Force will be along BO, or unit vector

$$= -\frac{\begin{pmatrix} \hat{i} + \hat{j} \end{pmatrix}}{\sqrt{2}}$$

$$= \frac{v^2 \sin^2 \theta}{\sqrt{2}}$$

$$12. h_{\max} = \frac{v^2 \sin^2 \theta}{2g}$$

As  $h_{\rm max}$  is same in both the cases

$$v_1^2 \frac{\sin^2 \theta_1}{2g} = v_2^2 \frac{\sin^2 \theta_2}{2g}$$
  
But  $\theta_1 = 60^\circ, \theta_2 = 30^\circ$   
$$V_1^2 \frac{\left(\frac{3}{4}\right)}{g} = V_2^2 \frac{\left(\frac{1}{4}\right)}{g}$$
  
$$\frac{V_1}{V_2} = \frac{1}{\sqrt{3}}$$

13. At a height h,

$$g_{h} = g\left(1 - \frac{2h}{R}\right)$$
  
For  $h = \frac{R}{20}$  we get  
 $9 = g\left(1 - \frac{1}{10}\right) = \frac{9}{10}g$   
At a depth d,  
 $g_{d} = g\left(1 - \frac{d}{R}\right)$   
For  $d = \frac{R}{20}$   
 $gd = g\left(1 - \frac{1}{20}\right) = \frac{19}{20}g$   
 $\Rightarrow \frac{gd}{9} = \frac{19}{18}$   
 $\Rightarrow gd = 9.5ms^{-2}$ 

14. As rate of disintegration is proportional to the number of atoms actually present, therefore

$$N_0 = 5000, N = 1250, t = 5 \min$$
  
As  $N = N_0 e^{-\lambda t}$ 

$$\therefore \ln \frac{N}{N_0} = -\lambda t; \ln \left(\frac{1250}{5000}\right) = -\lambda t$$
  
In  
$$\left(\frac{1}{4}\right) = -\lambda \times 5; -2\ln 2 = -\lambda \times 5; \lambda = 0.4\ln 2$$

15. According to wien's displacement law,  $\lambda_m T = b \text{ or } \lambda_m \alpha \frac{1}{T}$ 

Where b is Wien's constant whose value is  $29 \times 10^{-3} mK$ 

$$\frac{(\lambda_m)_S}{(\lambda_m)F} = \frac{T_F}{T_S} \text{ or } T_F = T_S \times \frac{(\lambda_m)_S}{(\lambda_m)_F} = 5500K$$
$$\times \frac{(5.5 \times 10^{-7} \, m)}{(11 \times 10^{-7} \, m)} = 2750K$$

16. The smaller the incident frequency, the smaller the stopping voltage required



$$V_3 > V_2 > V_1$$

17. For an ideal gas ; pV = nRT

For, p = constant

$$p\Delta v = nR\Delta T$$

$$\delta = \frac{\Delta V}{\Delta T} = \frac{nR}{p} = \frac{nR}{n\frac{RT}{V}} = \frac{V}{T}$$
$$\therefore \frac{\Delta V}{\Delta T} = \frac{1}{T} \text{ or } \delta = \frac{1}{T}$$

18. For path ACB,

 $\Delta Q = \Delta U + \Delta W$ 

 $60 = \Delta U + 30$   $\Rightarrow \Delta U = 30J$ For path ADB  $\Delta Q = \Delta U + \Delta W$ As initial and find points are the same, change in internal energy is same in both the cases  $\Delta Q = 30 + 10 = 40J$ 

#### 19. By the conservation of linear momentum

$$V = \frac{m_1 u_1 + m_2 u_2}{m_1 + m_2}$$
$$V = \frac{10 \times 3 + 20 \times 0}{10 + 20} = 1 m s^{-1}$$

20. 
$$L = 2\pi R$$

$$\therefore R = \frac{L}{2\pi}$$

$$2T \sin(d\theta) = F_m$$

$$I = \int_{T}^{T} \int_{T}^{T} \int_{T}^{T} \int_{T}^{T} \int_{T}^{T} \int_{T}^{T} \int_{T}^{T} F_m$$
For small angles,  $\sin(d\theta) \approx d\theta$ 

$$\therefore 2T (d\theta) = I (dL) B \sin 90^{0}$$

$$= 1(2R.d\theta).B$$

$$\therefore T = IRB = \frac{ILB}{2\pi}$$
21. In an adiabatic expansion  $PV^{\gamma} = cons \tan t$ 
Put  $P = \frac{RT}{V} \therefore \left(\frac{RT}{V}\right) V^{\gamma} = cons \tan t$ 
 $TV^{\gamma-1} = constant \text{ or } T\alpha V^{1-\gamma}$ 
As  $T\alpha \frac{1}{\sqrt{v}} \therefore 1 - \gamma = -\frac{1}{2}$ 
 $\gamma = 1 + \frac{1}{2} = \frac{3}{2} = 1.5$ 

22. Given, The diameter of the cylindrical conductor (D)= 0.01mm

Radius 
$$(r) = \frac{D}{2} = \frac{0.1}{2}mm$$
  
Current  $(I) = 90mA = 90 \times 10^{-3}A$   
We know that

Current density (J) = 
$$\frac{I}{A}$$
  

$$= \frac{1}{\pi r^{2}}$$

$$= \frac{90 \times 10^{-3}}{\frac{22}{27} \times \left(\frac{0.1 \times 10^{-3}}{2}\right)^{2}}$$

$$= \frac{90 \times 10^{-3}}{3.14 \times \left(\frac{0.1 \times 10^{-3}}{2}\right)^{2}}$$

$$= 12000 \times 10^{3}$$

$$= 1.2 \times 10^{7} Am^{-2}$$
23. Power P = 1.V.  $\cos \theta$   
 $\therefore \cos \theta = \frac{P}{IV} = \frac{63}{3 \times 210} = 0.1$ 
24. For the upper half  
 $v^{2} = u^{2} + 2al/2 = 2(g \sin \theta)1/2 \text{ for } = gl \sin \theta$   
Lower half  $\Rightarrow$   
 $0 = u^{2} + 2g (\sin \theta - \mu \cos \theta) \frac{1}{2}$   
 $\Rightarrow -gl \sin \theta = gl (\sin \theta - \mu \cos \theta)$   
 $\Rightarrow \mu \cos \theta = 2 \sin \theta \Rightarrow \mu = 2 \tan \theta$   
25. In a conservative field  $F = -\frac{dU}{dr}$   
 $\therefore F = -\frac{d}{dx} (ax^{2} - bx) = b - 2ax$   
26:  
 $N = N_{0} (1 - e^{-\lambda t}, )N - \text{The amount of}$   
substance decayed  
 $\Rightarrow \frac{N_{0} - N}{N_{0}} = e^{-\lambda t}$   
 $\therefore \frac{1}{8} = e^{-\lambda t}$   
 $\Rightarrow 8 = e^{\lambda t}$   
 $\Rightarrow 3 \ln 2 = \lambda t$   
 $\Rightarrow \lambda = \frac{3 \times 0.693}{15}$ 

Half -life period

 $\lambda = 5 \min$ 

27. Let the rod be depressed by a small amount x ( in the figure). Both the springs are compressed by x. when the rod is released, the restoring torque is given by

$$\tau = (kx) \times \frac{1}{2} + (kx) \times \frac{1}{2} = (kx)1$$
  
Now  
$$\tan \theta = \frac{x}{1} = \frac{2x}{1}$$

the 
$$1/2$$
 1  
ce  $\theta$  is small,  $\tan \theta \simeq \theta$ , w

Sinc where  $\theta$  is expressed in randian

Thus 
$$\theta = \frac{2x}{1}$$
 or  $x = \frac{\theta 1}{2}$ 

$$\tau = k \left(\frac{\theta 1}{2}\right) \times 1 = \frac{k\theta 1^2}{2}$$

If I is the moment of inertia of the rod about O, then

$$I\frac{d^2\theta}{dt^2} = -\left(\frac{Kl^2}{2}\right)\theta$$

Or

$$\frac{d^2\theta}{dt^2} = -\left(\frac{kl^2}{2I}\right)\theta$$

Since  $\frac{d^2\theta}{dt^2}\alpha(-\theta)$ 

, the motion is simple

harmonic whose angular frequency is given by

$$\theta = \sqrt{\frac{kl^2}{2l}}$$

Now, and . Therefore,  $\omega = \frac{2\pi}{T}$   $I = \frac{ml^2}{12}$ 

we have

, which is choice Or

$$T = \pi \sqrt{\frac{2m}{3k}}, \quad \pi \sqrt{\frac{2m}{3k}}$$

28: Maximum kinetic energy

$$=\frac{1}{2}m\omega^2 A^2$$

$$\theta = \sqrt{\frac{g}{L}}$$
$$A = L\theta$$

$$KE = \frac{1}{2}m\frac{g}{L} \times L^2\theta^2$$
$$KE = \frac{1}{2}mgL\theta^2$$

If length is doubled { Here we are

$$K_2 = \frac{1}{2} mg \left( 2L \right) \theta^2$$

assuming angular amplitude is same]

$$\frac{K_1}{K_2} = \frac{\frac{1}{2}mg1\theta^2}{\frac{1}{2}mg(2L)\theta^2} = \frac{1}{2}$$
$$K_2 = 2K_1$$

$$I = \frac{P \, of \, source}{4\pi \left(dis \tan ce\right)^2} = \frac{P}{4\pi d^2}$$

Here, we assume light to spread uniformly in all directions, The number of photo-electrons emitted form a surface of Thus the number of electrons emitted n depends directly on LP remains constant as the source is the same

$$\therefore \frac{I_2}{I_1} = \frac{n_2}{n_1} \Longrightarrow \frac{P_2}{P_1} \left(\frac{d_1}{d_2}\right)^2 = \frac{n_2}{n_1}$$

$$\frac{n_2}{n_1} = \left(\frac{P}{P}\right) \left(\frac{1}{1/2}\right)^2 = \frac{4}{1}$$
  

$$(\therefore P_1 = P_2 = P)$$
  
30. Given,  $\vec{A} = 7\hat{i} + 6\hat{j}$   
Let  $\vec{B} = b_1\hat{i} + b_2\hat{j}$ ..... (i)  
Given that,  $\vec{A} + \vec{B} = 11\hat{i} + 9\hat{j}$   
Or  $(7 + b_1)\hat{i} + (6 + b_2)\hat{j} = 11\hat{i} + 9\hat{j}$   
Comparing the scalar component of  $\hat{i}$  and  $\hat{J}$   
 $7 + b_1 = 11$  and  $6 + b_2 = 9$   
 $\Rightarrow b_1 = 4$  and  $b_2 = 3$   
 $\therefore$  from Equation (i),  
 $\vec{B} = 4\hat{i} + 3\hat{j}$   
 $\left|\vec{B}\right| = \sqrt{4^2 + 3^2} = \sqrt{25} = 5$ 

31.As volume of the bubble

$$V = \frac{4}{3}\pi R^3 \Longrightarrow R = \left(\frac{3}{4\pi}\right)^{1/3} V^{1/3} \Longrightarrow R^2$$

$$=\left(\frac{3}{4\pi}\right)^{2/4}V^{2/3}$$

$$\Rightarrow R^2 \alpha V^{2/3}$$

Work done in blowing a soap bubble

$$W = 8\pi R^2 T \Longrightarrow W \infty R^2 \infty V^{2/3}$$
$$\therefore \frac{w_2}{w_1} = \left(\frac{v_2}{v_1}\right)^{2/3} = \left(\frac{2v}{v}\right)^{2/3} = (2)^{2/3}$$
$$= (4)^{1/3} \Longrightarrow w_2 = \sqrt[3]{4w}$$

32. 
$$\frac{dy}{dt} = v_y = 10 - 2t$$
 at maximum height  $v_y = 0$ 

t = 5 sec

So maximum height attained

$$\Rightarrow y_{at=5} = 10t - t^2$$
$$= 50 - 25 = 25m$$

33.As the springs are light in weight, therefore the tension in both springs will be the same. So, both

springs will show the same reading 8kg

34. If a lens of focal length f is divided into two equal parts and each has a focal length f then

$$\frac{1}{f} = \frac{1}{f^1} + \frac{1}{f^1}, i.e, f^1 = 2f$$

Now if these parts are put in contact then resultant focal length of the combination will be

$$\frac{1}{f} = \frac{1}{2f} + \frac{1}{2f}$$
, i.e., F = f (initial

value)

For this combination

$$\frac{1}{F} = \left( {}_{a} \mu_{g} - 1 \right) \left( \frac{1}{R_{1}} - \frac{1}{R_{2}} \right) \dots \dots (i)$$

Now, if this combination is immersed in liquid, then

$$\frac{1}{F^{1}} = \left( {}_{1}\mu_{g} - 1 \right) \left( \frac{1}{R_{1}} - \frac{1}{R_{2}} \right) \cdots \text{(ii)}$$

$$\frac{F^{1}}{f} = \frac{\left(a \mu_{g} - 1\right)}{\left(1 \mu_{g} - 1\right)} = \frac{\left((1.5) - 1\right)}{\left(\frac{3}{2} - 1\right)}$$

$$Or \quad \frac{F^{1}}{f} = \frac{0.5}{\left(\frac{9}{8} - 1\right)} = 0.5 \times 8$$

$$\therefore F = 0.5 \times 8 \times 10 = 40 cm$$

$$\therefore F = 0.5 \times 8 \times 10 = 40 cm$$
35: Given : displacement
$$x = 2 \times 10^{-2} \cos \pi t$$

$$Velocity \quad v = \frac{dx}{dt} = -2kt10^{-2}\pi \sin \pi t$$
For the first time when  $v = v_{\max}$ ,  $\sin \pi t = 1$ 

$$Or \quad \sin \pi t = \sin \frac{\pi}{2} \text{ or } \pi t = \frac{\pi}{2}$$

$$or \quad t = \frac{1}{2}s = 0.5s$$

$$36. \quad \mu \ge \frac{\tan \theta}{1 + \frac{R^{2}}{K^{2}}}$$

$$\Rightarrow \mu_{\min} = \frac{\tan \theta}{1 + \frac{R^{2}}{K^{2}}}$$

37. It is OR gate When either of them conducts, the gate conducts

38. Angle between incident ray and reflected ray

36. *µ* ≥

$$\cos \delta = \frac{\left(\hat{i} + \sqrt{3} \, \hat{j}\right) \cdot \left(\hat{i} - \sqrt{3} \, \hat{j}\right)}{2.2}$$
$$\cos \delta = -\frac{1}{2} \Longrightarrow \delta = 120^{0}$$
$$180 - \langle i = 120 \Longrightarrow \langle i = 60^{0}$$
If  $\vec{L} = \text{ constant then } \vec{\tau} = 0$  So  $\vec{r} \times \vec{F} = \vec{r}$ 

 $0 \Rightarrow \vec{F}$ 39. should be parallel to  $\vec{r}$  so coefficient should be in same ratio. So  $\frac{\alpha}{2} = \frac{3}{-6} = \frac{6}{-12}$ 

So  $\alpha = -1$ 

40. 
$$\omega = \frac{d\theta}{dt} = (T^{-1})$$
 and frequency  $[n] = [T^{-1}]$ 

41. Kinetic energy of ideal gas depends only on its temperature. Hence it remains constant whether its pressure is increased or decreased

42. 
$$\Delta R_s = \Delta R_1 + \Delta R_2$$
  
=  $\left[\frac{10}{100} \times 10 + \frac{20}{100} \times 20\right] k\Omega = 5k\Omega$   
 $\frac{\Delta R_s}{R_s} \times 100 = \frac{5}{30} \times 100 = \frac{50}{3} = 17\%$ 

43: The fundamental frequency of a sonometer wire is

$$f = \frac{1}{2l} \sqrt{\frac{4T}{\pi \rho d^2}}$$
$$\Rightarrow f \propto \frac{1}{ld}$$

So if the length and dimeter of the wire are doubled, then its frequency becomes on-fourth

44. 
$$f = \frac{1}{2\pi} \sqrt{\frac{T}{\mu}}$$
$$\frac{\Delta f}{f} = \frac{1}{2} \frac{\Delta T}{T}$$
$$\Delta f = \frac{1}{2} \times \frac{1}{100} \times 200$$

 $\Delta f = 1$ 

Bear frequency = 1

Number of beats in 9 second  $= 9 \times 1 = 9$ 



consider the blocks shown in the figure to be moving together due to static friction between them

The free body diagrams of both the blocks are shown below



Work done by static friction on A is positive and on B is negative

## CHEMISTRY

46 Given electronic configuration of element is

$$1s^2, 2s^2, 2p^6, 3s^2, 3p^3$$

$$Z = 15; N_7, P_{15}, As_{33}$$

47. Enol formation leads to decrease in stability for a mono keto structure. Hence keto form is more stable

48.



Formation of A is by diazotization and formation of B from A is by  $S_{\rm N}$  reaction.

49. Vanishing cream is an oil in water (O in w) type emulsion

50.Sucrose is a disaccharide consisting of one molecule of glucose and one molecule of fructose

51. 2, 4, 6- trinitrophenol is picric acid. It is acidic in nature due to 3(-M) group attached with phenol

52.1<sup>st</sup> step is HeII – volhard zelinsky reaction, halogenations of carboxylic acid at  $\alpha - c$ 

 $CH_{3}CH_{2}COOH \xrightarrow[-HCl]{Cl_{2}} CH_{3}CHClCOOH \xrightarrow[-HCl]{alc.KOH}$ 

 $CH_2 = CHCOOH$ 

Acrylic acid

53. 
$$SnS + (NH_4)_2 S_2 \xrightarrow{HCl} (NH_4)_2 S + SnS_2$$

54: Polymers which control various life processes in plants and animals are called biopolymers. Cellulose insulin, DNA, starch, protein, etc. are examples of biopolymer

Nylon – 6 is a synthetic polymer. It is not a biopolymer

55. Rate of reaction becomes almost twice with an

increase of 10°C in temperature

(from 298 K to 308 K)

56. General formula of acycloalkane is  $C_n H_{2n}$ 

$$NaOH \rightleftharpoons Na^{+} + OH^{-}$$
  
57.  $CM \quad CM$ 

$$Na(OH)_{2} \rightleftharpoons Ni^{2} + 2OH^{-}$$

$$X \qquad X \qquad 2X$$

$$\therefore K_{sp} = \left[Ni^{2+}\right] \left[OH^{-}\right]^{2}$$

$$= X \left(X + C\right)^{2}$$

$$K_{so} = xc^{2} \text{ (neglecting higher power of x)}$$

$$x = \frac{k_{sp}}{c^{2}} = \frac{1.9 \times 10^{-15}}{\left(1\right)^{2}}$$

58. According to Lewis, " A base is a species which can donate an electron pair" In NH<sub>3</sub>, N has one lone pair. Thus  $NH_3$  is a Lew is base

59.The peak represents  $U_{MPS}$  as  $U_{MPS} \propto \sqrt{T}$  the graph a T<sub>3</sub> has maximum  $U_{MPS}$ , hence  $T_3$  is the highest temperature

60.  $C_3H_9N$  represent following structures  $CH_3CH_2CH_2NH_2$ 

Propanamtestne  
(1<sup>o</sup> amtextene)  
H  
$$CH_3CH_2 - N - CH_3$$
  
N- methyl ethanamtextene (2<sup>o</sup> amtextne)

$$CH_{3}$$

$$|$$

$$CH_{3}CH_{2}-N-CH_{3}$$

N, N – dimethyl methanamtextne (  $3^{\circ}$  amtextne)

61:

Mtextneral	Formula
Galena	Pbs
Cerussite	PbCO <sub>3</sub>
Cassiterite	SnO <sub>2</sub>
Anglesite	PbSO <sub>4</sub>

Thus, cassiterite (tin stone) is a mtextneral for tin.

### 62. $\Delta G = \Delta H - T \Delta S$

For the given reaction,  $\Delta H = -ve$  it is exothermic,  $\Delta S = +ve$  then  $\Delta G = -ve$  So, the reaction is done will be spontaneous at all temperatures

63.



64. The ratio of copper to oxygen is slightly less than 2: 1. This show that some cuprous ( $Cu^+$ ) ions have been replaced by cupric ( $Cu^{2+}$ )ions. In order to maintain the electrical neutrality of the molecule, every two  $Cu^+$  ions will be replaced by one  $Cu^{2+}$  ion which results in creating cation vacancies leading to positive holes. Since the conduction is due to positive holes, it is a p- type semiconductor

65. 
$$\frac{CaCO_3 + H_2SO_4 \rightarrow CaSO_4 + H_2O + CO_2}{(Marble) (Acid)}$$

66:





67  $K_2[NiCl_4]$ 

In 
$$[NiCl_4]^{2-}$$
, Ni is present as  $Ni^{2+}$ 

Which has 3d electronic configuration, Thus, there are 8 electrons in 3d orbitals of  $Ni^{2+}$ 

$$Ni^{2+} \rightarrow 1s^2 2s^2 2p^6 3s^2 3p^6 3d^8$$

68.



70. The transition elements, on account of their variable valency, are able to form unstable intermediate compounds very readily



(I) acid. The other halogen forms several oxacids

72



Intramolecular H- bond intermolecular H- bond and steam Volatile and boiling pt. is higher

- 73. A Fleming discovered pencillin in 1929
- 74. The terminal hydrogen is acidic in  $H_3C - C \equiv Ch(Pr \ opyne)$  and it reacts with ammonical  $AgNO_3$ . In propene,  $CH_3CH = CH_2$  There is no acidic hydrogen. So propyne form precipitate with  $AgNO_3$ whereas propene does not form
- 75. According to law of conservation of mass

Mass of reactants = mass of products

 $20.8 + 9.8 = 7.3 + Mass of BaSO_4$ 

 $\therefore$  Mass of  $BaSO_4 = 23.3g$ 

76.  $N_1V_1 = N_2V_2$ 

$$0.1 \times V_1 = \frac{0.04}{2}$$

 $V_1 = 0.2L$ 

- $= 0.2 \times 1000 = 200 ml$
- 77. According to Planck's theory  $E = \frac{hc}{\lambda}$ ,

*i.e.*, 
$$\frac{E_1}{E_2} = \frac{\lambda_2}{\lambda_1} \left( \therefore E \propto \frac{1}{\lambda} \right)$$
  
Thus,  $\frac{E_1}{E_2} = \frac{8000}{2000} = 4$   
 $\therefore E_1 = 4E_2$   
 $Ag^+ + e^- \rightarrow Ag$ 

78.

 $\therefore$  96500*C* are required to deposite Ag = 108g

 $\therefore$  965*C* are required to deposite

$$Ag = \frac{108}{96500} \times 965 = 1.08g$$

79. i)  $n_p > n_r$ , the reaction will go in backword direction

ii)  $n_p = n_r$ , the reaction will not be affected by increasing pressure

iii)  $n_p < n_r$  , the reaction will go in backword direction

iv)  $n_p < n_r$  , the reaction will go in forward direction

v)  $n_p > n_r$  the reaction will go in backward direction

vi)  $n_p > n_r$  , the reaction will go in backword dirction

While computing  $n_p$  and  $n_r$  only gaseous moles have been considered

80:  $EAN = 24 - 3 + 2 \times (6) = 33$ 

81. Phosphorous pentoxide is widely used as a dehydrating agent .Phosphorus pentoxide is a potent dehydrating agent as its hydrolysis

$$P_4O_{10} + 6H_2O \rightarrow 4H_3PO_4(-177kJ)$$

- 82. In (C) and (D) the oxygen and sulphur are SP<sup>3</sup> hybridized, with 2 lone pairs . Thus the molecule is 3D, and has a dipole moment
- 83 Chloroform and acetone form a non ideal solution, in which A.. B type interaction are more than A....A and B... B type interactions due to H<sup>-</sup> bonding . Hence, the solution shows negative deviation form Raoult's law i.e.,

$$\Delta V_{mix} = -ve$$

 $\Delta H_{mix} = -ve$ 

 $\therefore$  Total volume of solution = less than (30 + 50) mL or 80mL

84. Solid  $N_2O_5$  is ionic.X – ray diffraction shows that solid  $N_2O_5$  exists as  $NO_2^+NO_3^-$  (nitronium nitrate) 85. Like allene, the two pi- bonds are perpendicular to one another

86. 
$$\frac{dA}{dt} = k \left[ A \right]^2$$

K= Reaction rate constant

Then unit of second order reaction rate constant

$$k = -\frac{d\left[A\right]}{dt} \times \frac{1}{\left[A\right]^2}$$

Therefore unit of second order reaction is  $Lmol^{-1}time^{-1}$ 

- 87. The reciprocal of gold number is directly proportional to the protecting power
- 88. :  $\Delta G = \Delta H T \Delta S$

For a reaction to be spontaneous,

$$\Delta G = -Ve$$

 $i.e., \Delta H < T \Delta S$ 

$$\therefore T > \frac{\Delta H}{\Delta S} = \frac{35.5 \times 10^3 J}{83.6 J K^{-1}}$$

i.e, T > 425K

89.  $2e^- + 2H^+ + H_2O_2 \rightarrow 2H_2O(reduction)$ 

 $S^{-2} + 4H_2O \rightarrow SO_4^{-2} + 8H^+ + 8e^-(oxidation)$ 

(Equation  $1 \times 4$ )+(Equation .2)

Final reaction Pbs +  $4H_2O_2 \rightarrow PbSO_4 + 4H_2O$ 

90. The electron distribution in  $O_2^-$  is :

 $\sigma_{15}^2 \sigma_{2s}^{*2} \sigma_{2s}^2 \sigma_{2s}^{*2} \sigma_{2px}^2 \sigma_{2py}^2 \sigma_{2pz}^2 \sigma_{2py}^{*2} \sigma_{2pz}^{*1}$ 

 $\therefore O_2^{2^-}$  is diamagnetic and  $O_2^-$  is paramagnetic . In  $AlO_2^-$ , oxide ions  $(O^{2^-})$  are present and oxide ion is diamagnetic

 $NO_2$  has one unpair electron hence paramagnetic but  $NO_2^+$  has no unpair electron therefore diamagnetic

#### **BIOLOGY**

- 91. Veins consist of three district layers, which are thin and collapsible whereas arteries consist of three distinct layers, which are rigid, thicker and highly muscular
- 92. Mycoplasma is smallest living cell. prokaryotes like bacteria exhibit wide variety of shapes like –spherical shape, Rod shape, comma shape and spiral shape
- 93. The SA node is specialized mass of cardiac tissue present in the upper right corner of the right atrium
- 94. Ribosomes are called palade granules Ribosomes are composed with RNA and protein(Ribonucleoproteins)
- 95. Diploteme stage is recognised by dissolution of synaptonemal complex

Recombination between non sister chromatids takes place in presence of recombinase. enzyme speration of homogous chromosomes occurs during anaphase – I

Interkinesis is short lived

- 96. Nephron of human kidney are long coiled with major part present cortex and medulla
- 97. Primary constriction of a chromosome is also called as centromere. Protein discs present on either sides of it are called as kinetochores
- 98. The secretion of the brush border cells of the mucosa, along with the secretions of the goblet cells constitute the intestinal juice or succus entericus intestinal mucosa also secretes enterokinase enzyme which convert inactive trypsinogen into active trypsin
- 99. A cell divides when karyocytoplasmic index decreases. Cell division restores nucleocytoplasmic ratio
- 100. The 5<sup>th</sup> thoracic vertebra is at the same level as the sterna angle
- 101. Blue green algae are prokaryotes in which photosynthetic lamellae as contains

Phycobilisomes (or) cyanosomes

- 102. Palmitic acid contains 16 carbons including carboxylic carbon and arachidonic acid 20 carbons including carboxylic carbon
- i) Binding of 1<sup>st</sup> oxygen molecule(difficult to bind) due to low PO<sub>2</sub>

ii) Binding of  $2^{nd}$  oxygen molecule(easy to bind) due to optimum  $PO_2$ 

iii)Binding of  $3^{rd}$  oxygen molecule(very difficult to bind) due to very low  $PO_2$ 

- 104. In a primary protein left end is called 'N' terminal (amino group of first amino acid is free with out peptide bonds) Right end is called 'C' terminal, which contains last amino acid of a protein with free carboxylic group
- 105. There has been gradual evolution of life form not true about the special creation theory of the origin of life
- 106. Extracellular enzymes are also active when proper conditions are provided
- 107. Correct statement is viruses are smaller in size ranging from 20-400nm and bacteria is larger in size, around 1000nm
- 108. All living nucleated plant cells are totipotent cork cells are dead, xylem vessels are dead and matured sieve tube cells are enucleated
- 109. iii- Green land, i New York , ii- India, iv-Columbia
- 110. Hono habilis First human like being hominid

Homo erectus - Brain size around 900cc

Neanderthal man - Buried their dead with flowers

Cro-magnonman - Excellent cave painting /art

111. Cockroach , leech, pila are triploblastic, true coelemates with open type circulatory system

112. Male donkey and female horse cross leads to the production of the mule

113. Cyclostomata have a sucking and circular mouth without jaws

114. Many insect pollinates the plants is a broadly utilitarian reason for the conservation of biodiversity

115. Periodic abstinence contraceptive method has high rate of failure

- 116. Lead metal inactivates a catalytic
- 117. The given diagram represents the blastomere is transferred to the uterus for further development of the baby
- 118. dB is a unit to measure sand vibrations
- 119. thick walled resting spores formed during unfavourable condition by cyanobacteria are called akinetes
- 120. Sugars that act as reducing agents which contain a free aldehyde (or) ketogroup common dietary monosaccharides are reducing sugars

- 121. Option 1 diagram (Peak gets higher and narrower) this population is subject to stabilizing selection for several generations
- 122. All the events of menstrual cycle stop and there is no menstruation during pregnancy is due to negative feed back of progesterone
- 123. under unfavourable conditions, many zooplankton species in lakes and ponds are known to enter diapauses
- 124. only (i)statement correct the first movement of the foetus and appearance of hair on the head are usually observed during 5<sup>th</sup> months of pregnancy
- 125. Xerach succession occurs on bare rock(8) barren land . Sequence of organisms coloniling on bare rock cue Lichens → Moss → herbs → Shrubs → Trees → Forest (climax)
- 126. serotum and labia minora of reproductive organs does not show homology between males and females
- 127. In a pond ecosystem the shape of pyramid of number is upright
- 128. Haemophilus influenza, symptoms like chills fever and cough fingernails have turned blue
- 129. The length of food chains is generally limited to 3 to 4 trophic levels due to energy loss .(True statement)
- 130. IgG, IgA, IgM, IgD, IgE decreasing order of concentrations of different types of antibodies produced in our body
- 131. Swollen axle placentation is found in solanaceae. Chilli belongs to family solanaceae
- 132. i)Cancer ; Don't die of ignorance disease ( False)

iv) smoking ; causes cancer of urinary bladder(false)

- 133. Sterile stameus are called staminodes, they do not produce pollen
- 134. Glandular epithelium Intestine, secretion correct matching
- 135. Asparagus belongs to the family Liliaceae. Flowers of liliaceae contains tepals

- 136. Phallic gland do not participate in excretion in periplaneta Americana
- 137. Dianthus and primerose contains free central placentation, china rose, tamato and lemon shows axile placentation
- 138. Plasma membrane of myofibre is known as sarco lemma
- 139. Algae shows haplontic life cycle , but bryophytes and pteridophytes shows haplodiplontic life cycle.

In bryophytes gametophyte is dominant and it is haploid . But in pteridophytes sporophyte is dominant and it is diploid

- 140. Tetany results in rapid spasms ( or) wild contractions in nerve(False) (Spasm in muscles)
- 141. At the stage of generation of action potential, the axolema is positive out side
- 142. Sporophyte is the dominant phase in gymnosperms life cycle
- 143. Unipolar neuron has only one dendrite(False) (Unipolar neuron- no –dendrite)
- 144. Based on similar floral characters solanaceae and convolvulaceae are included in order polymoniales
- 145. ADH hormones stimulates the reabsorption of electrolytes in the kidney
- 146. Brekage of C-C bonds during respiration is a catabolic process.Carbon skeleton produced during respiration acts as processor for biorynthesis of other biomolecules, it is anabolic process. Hence respiratory process is a amphibolic pathway
- 147. Thymosins steroid hormone (False match) Thymosin – peptide hormone
- 148. In Kreb's cycle one acetyl Co.A produces two CO<sub>2</sub> molecules.

One during convession of oxalosuccinic acid  $\rightarrow \alpha$  -ketoglutaric acid

one during convession of  $\alpha\;$  -ketoglutaric acid  $\rightarrow$  Succiuyl Co.A

149. Sodium (Na), Silica (Si),Cobalt(CO) and selinium(Se)are beneficial but not essential elements

- 150. Parathromone and calcitonin are antagonistic harmones (True statements)
- 151. Scotoactive stomata are present in CAM plants. They opens during night and closes during daytime
- 152. All photosynthetic organisms contain chlorophyll 'a' except photosynthetic bacteria
- 153. In Photorespiration oxygen is cosumed in chloroplast and peroxisomes. In chloroplast during oxygenation of RuBp and in pesoxisomes during synthesis of glyoxolate
- 154. Ethylene promotes leaf fall
- 155. Regaining meristematic activity by permanent cells is called dedifferentiation
- 156. Aggregation formed by slime mould under suitable condition is called plasmodium
- 157. E.coli is a unicellular prokaryote
- 158. First stable product in TCA cycle is citric acid, Aspergillus niger is a ascomycetes fungi produces citric acid
- 159. Bacteria is a prokaryote .In prokaryotes DNA is not associated with histone proteins
- 160. Alanine is coded by –GCU, GCC, GCA, GCG
- 161. m-RNA contains UTR's which are useful for efficient translation
- 162. Infection, Blending, centrifugation
- 163. Hydra reproduces b budding
- 164. proximal end of the filament is connected to the thalamus (or) petal. Distal end is connected to the anther
- 165. Integuments are present around the nucellus
- 166. Endospem development occurs before embryo formation, to ensure nourishment to the developing embryo
- 167. PEN is formed by the fusion of male gamets with two polar nuclei
- 168. Wheat, grasses, zea ways are generally wind pollinated plants.

vallisneria and zostera are pollinated by water

- 169. LAB's converts milk into curd, they partially digests milk proteins
- 170. 14 types of true breeding lines (or) purelines of pea plants are selected by Mendal for his hybridization experiments
- 171. considered only one (or) two characters every time



180. Malaria – Anopheles mosquito (Causative agent)(fase – matching)(Plasmodium – causative agent)