

Full Length Mock Tests for NEET to Make You Ready to Face the Challenge

# MOCK TEST1

Duration: 3 Hours

Max. Marks : 720

# Instructions

- The test is of 3 hours duration and Test Booklet contains 180 questions. Each question carries 4 marks. For each correct response, the candidate will get 4 marks. For each incorrect response, one mark will be deducted from the total scores. The maximum marks are 720.
- The question paper contains three parts of Physics, Chemistry and Biology respectively.
- Part A contains 45 Questions from Physics section. Part B contains 45 Questions from Chemistry section. Part C contains 90 Questions from Biology.

# PART A PHYSICS

1. A capacitor of capacitance  $5\,\mu F$  is connected as shown in the figure. The internal resistance of the cell is  $0.5~\Omega$ . The amount of charge on the capacitor plates is



(a)  $80 \,\mu C$  (b)  $40 \,\mu C$  (c)  $20 \,\mu C$  (d)  $10 \,\mu C$ 

- For a material the Young's modulus is 3.2 times that of rigidity modulus. Its Poisson's ratio is
  (a) 0.6 (b) 0.3 (c) 0.2 (d) 0.5
- In an L C R circuit inductance is changed from L to L / 2. To keep the same resonance frequency, C should be changed to
  - (a) 2C (b)  $\frac{C}{2}$  (c) 4C (d)  $\frac{C}{4}$

**4.** Output *B* is given by



**5.** A particle moving with uniform acceleration has average velocities  $v_1$ ,  $v_2$  and  $v_3$  over the successive intervals of 5s, 10s and 15s respectively. Then, the value of  $\frac{v_1 - v_2}{v_2 - v_3}$  will be

(a) 
$$\frac{5}{3}$$
 (b) 1 (c)  $\frac{3}{5}$  (d)  $\frac{1}{2}$ 

**6.** The density of a solid ball is to be determined in an experiment. The diameter of the ball is measured with a screw gauge, whose pitch is 0.5 mm and there are 50 divisions on the circular scale.

The reading on the main scale is 2.5 mm and that on the circular scale is 20 divisions. If the measured mass of the ball has a relative error of 2%, the relative percentage error in the density is (a) 0.9% (b) 2.4% (c) 3.1% (d) 4.2%

- 7. An ideal solenoid having 5000 turns/m has an aluminium core and carries a current of 5 A. If  $\chi_{Al} = 2.3 \times 10^{-5}$ , then the magnetic field developed at centre will be
  - (a) 0.031 T (b) 0.048 T (c) 0.027 T (d) 0.050 T
- **8.** Find current *i* in circuit shown in figure.



- A many Min has into the second of many second
- **9.** A mass M is broken into two parts of masses  $m_1$  and  $m_2$ . For the force of attraction or gravitation to be maximum between them, the  $m_1$  and  $m_2$  have value

(a)  $m_1 = \frac{M}{3}, m_2 = \frac{2M}{3}$  (b)  $m_1 = \frac{2M}{3}, m_2 = \frac{M}{3}$ (c)  $m_1 = m_2 = \frac{M}{2}$  (d)  $m_1 = \frac{M}{4}, m_2 = \frac{3M}{4}$ 

**10.** Kepler space telescope generated a plot of intensity of radiation *versus* wavelength of three stars in Andromeda galaxy. What is the relation between their temperature?



**11.** The amplitude of a damped oscillator decreases to 0.9 times its original magnitude in 5 s. In another 10 s it will decrease to  $\alpha$  times its original magnitude, then  $\alpha$  is equal to (a) 0.7 (b) 0.81 (c) 0.729 (d) 0.6



13. In the given circuit, the current through the resistor  $2k\Omega$  is



**14.** The longitudinal waves starting from a ship return from the bottom of the sea to the ship after 2.60 s. If the bulk modulus of water be 220 kg mm<sup>-2</sup> and the density is  $1.1 \times 10^3$  kgm<sup>-3</sup>, the depth of sea is (take, g = 9.8 N kg<sup>-1</sup>)

(a) 1820 m	(b) 1850 m
(c) 1400 m	(d) 1420 m

- 15. The maximum vertical distance through which a full dressed astronaut can jump on the earth is 0.5 m. The maximum vertical distance through which he can jump on the moon, which has a mean density (2/3) rd that of earth and radius one quarter that of earth is
  (a) 1.5 m
  (b) 3 m
  (c) 6 m
  (d) 7.5 m
- **16.** Two slits are separated by a distance of 0.5 mm

and illuminated with light of  $\lambda = 6000$  Å. If the screen is placed 2.5m from the slits, the distance of the third bright fringe from the centre will be (a) 1.5 mm (b) 3 mm (c) 6 mm (d) 9 mm

- 17. If λ<sub>1</sub> and λ<sub>2</sub> are the wavelengths of the first members of the Lyman and Paschen series respectively, then λ<sub>1</sub>:λ<sub>2</sub> is
  (a) 1:3
  (b) 1:30
  (c) 7:50
  (d) 7:108
- **18.** The wavelength  $\lambda$  of a photon and the de-Broglie wavelength of an electron have the same value. Find the ratio of energy of photon to the kinetic energy of electron in terms of mass *m*, speed of light *c* and Planck constant *h*.

(a) 
$$\frac{\lambda mc}{h}$$
 (b)  $\frac{hmc}{\lambda}$   
(c)  $\frac{2hmc}{\lambda}$  (d)  $\frac{2\lambda mc}{h}$ 

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**19.** Potential energy of a particle in a force field is given by  $U = \frac{A}{x^2} - \frac{B}{x}$  where, A and B are positive constant and x is distance of particle from centre of the field. For stable equilibrium, the distance of

particle is (a)  $\frac{A}{B}$  (b)  $\frac{B}{A}$  (c)  $\frac{2A}{B}$  (d)  $\frac{B}{2A}$ 

**20.** What will be the time constant for the given circuit?



**21.** The output *Y* of given logic circuit is



- (a) AB + CD (b) ABCD(c) ABC + D (d)  $\overline{A \cdot B} + CD$
- **22.** Match the corresponding entries of Column I with Column II and choose the correct option from the codes given below

	Column I		Column II
А.	Astigmatism	1.	Convex lens
Β.	Hypermetropia	2.	Concave lens
C.	Myopia	З.	Cylindrical lens

	А	В	С		А	В	С
(a)	3	2	1	(b)	3	1	2
(C)	1	2	3	(d)	2	1	3

**23.** The effective resistance of *n* number of resistor when connected in parallel is  $P \Omega$ . If one of the resistor is removed, the effective resistance becomes  $Q \Omega$ . Then, the resistance of resistor which is removed is

(a) $\frac{PQ}{P+Q}$	(b) $\frac{PQ}{Q-P}$
(c) $\frac{P^2 Q^2}{(Q-P)^2}$	(d) $\frac{PQ}{P-Q}$

**24.** The mass of jupiter is  $1.9 \times 10^{27}$  kg and that of sun is  $1.99 \times 10^{30}$  kg. The mean distance of the jupiter from the sun is  $7.8 \times 10^{11}$  m. Assume that the jupiter moves in a circular orbit around the sun. Velocity of jupiter is (a)  $1.3 \times 10^4$  ms<sup>-1</sup> (b)  $1.5 \times 10^4$  ms<sup>-1</sup>

(a) 1.0 X 10 1110	
(c) $1.2 \times 10^4 \text{ ms}^{-1}$	(d) $1.6 \times 10^4 \text{ ms}^-$

**25.** In a match a sixer is hitted by a batsman and the ball touches the ground outside the boundary. Then, which of the following graph describes the variation of the cricket ball's vertical velocity v with time between the time t as it hits the bat and time t', when it touches the ground?



26. The excess pressure inside a spherical drop of water is five times that of another drop, then their respective mass ratio is(2) 5:3(b) 25:127

(a) 5 . 5	(D) 20 . 137
(c) 125 : 137	(d) 1:125

- 27. A thin symmetrical double convex lens of refractive index µ<sub>2</sub> = 1.5 is placed between a medium of refractive index µ<sub>1</sub> = 1.4 to the left and another medium of refractive index µ<sub>3</sub> = 1.6 to the right. Then, the system behaves as

  (a) a convex lens
  (b) a concave lens
  (c) a glass plate
  (d) a convex or concave lens
- 28. The half-life period of a radioactive element X is same as the mean life of another radioactive element Y. Initially, both of them have the same numbers of atoms, then
  - (a) X and Y have the same decay rate initially
  - (b) X and Y decay at the same rate always
  - (c) Y will decay at a faster rate than X
  - (d) X will decay at a faster rate than Y
- **29.** At room temperature  $(27^{\circ} \text{ C})$  a vehicle tyre has pressure of 3 atm. The temperature at which the tyre suddenly, burst will be (given,  $\gamma_{\text{air}} = \frac{7}{5}$ )

(a) 246K	(b) 274K
(c) 217K	(d) 204K

**30.** Which one of the following graph represents the variation of maximum kinetic energy  $E_{\rm K}$  of the emitted electrons with frequency v in photoelectric effect correctly ?



**31.** In Meldi's experiment a string vibrates in 3 loops, when 8 g were placed in the pan. To make the string vibrates in 5 loops, the mass should be placed is of value

a) 2 g	(b) 2.88 g
c) 2.5 g	(d) 4 g

**32.** A uniform solid right circular cone and a hemisphere of same base radius 2m and same density are placed on each other, so as to have common face. The centre of mass of the compositive solid lies on the common face. The height of the cone is



- **33.** The resistance of the wire in platinum resistance thermometer at ice point is 3  $\Omega$  and at steam point is 9  $\Omega$ . When the thermometer is inserted in an unknown hot bath its resistance is found to be 12  $\Omega$ . The temperature of the hot bath is (a) 100° C (b) 50° C (c) 75° C (d) 150° C
- **34.** One mole of monoatomic gas and three moles of diatomic gas are put together in a container. The molar specific heat (in  $JK^{-1} \text{ mol}^{-1}$ ) at constant volume is ( $R = 8.3 JK^{-1} \text{ mol}^{-1}$ ) (a) 18.7 (b) 18.9 (c) 19.2 (d) 20.7
- **35.** A body weighs 72 kgf on the surface of earth. Then, its weight on surface of mars, whose mass is  $\frac{1}{9}$  and

radius is 
$$\frac{1}{2}$$
 of that of earth is  
(here, kgf = kilogram-force)  
(a) 72 kgf (b) 54 kgf (c) 62 kgf (d) 32 kgf

MODULE 2

**36.** Two thin long parallel wires separated by a distance *a* are carrying a current *I* A each. The magnitude of the force per unit length will be

(a) 
$$\frac{\mu_0 l}{4\pi a}$$
 (b)  $\frac{\mu_0 l}{4\pi a^2}$  (c)  $\frac{\mu_0 l^2}{2\pi a}$  (d)  $\frac{\mu_0 l}{2\pi a}$ 

**37.** A billiard ball of mass *m* and radius *r* hit by a cue stick at a height *h* above the centre and it acquire a linear velocity *v*. The angular velocity  $\omega$  acquired by the ball is

(a) 
$$\frac{5vr^2}{2h}$$
 (b)  $\frac{5vh}{2r^2}$  (c)  $\frac{2vr^2}{5h}$  (d)  $\frac{2vh}{5r^2}$ 

**38.** A current *I* flows in a conducting wire of length *L*. If we bent it in a circular form, its magnetic dipole moment would be

(a) 
$$\frac{lL^2}{4\pi}$$
 (b)  $\frac{lL}{4\pi}$  (c)  $\frac{l^2L}{4\pi}$  (d)  $\frac{l^2L^2}{4\pi}$ 

- **39.** Minimum excitation potential of Bohr's first orbit in hydrogen atom is
  (a) 3.6 V
  (b) 10.2 V
  (c) 13.6 V
  (d) 3.4 V
- 40. When a positive charge particle is moving on a equipotential surface, then work done in this process will be(a) positive(b) negative(c) zero(d) None of these
- **41.** Two plane mirror of length 24 m each are kept at a distance of 8 cm parallel to each other. A ray of light incident on one end of one mirror at angle of 53°. Then, total number of reflections before it

reaches the other end is (given,  $\tan 53^\circ = \frac{4}{3}$ )

- **42.** A particle executes SHM of amplitude 25 cm and time period 3s. The minimum time required for the particle to move between two points 12.5 cm on either side of the mean position is
  (a) 0.25 s (b) 0.5 s (c) 1 s (d) 1.25 s
- **43.** A voltmeter has a resistance of G Ohm and range of V volt. The value of resistance used in series to convert it into a voltmeter of range nV volt is

(a) 
$$nG$$
 (b)  $\frac{G}{(n-1)}$  (c)  $(n-1)G$  (d)  $\frac{G}{n}$ 

**44.** A source emits electromagnetic waves of wavelength 3m. One beam reaches the observer directly and other after reflection from a water surface, travelling 1.5 m extra distance with intensity reduced to 1/4 as compared to intensity due to the direct beam alone. The resultant intensity will be

(a) (1/4) fold (b) (3/4) fold (c) (5/4) fold (d) (9/4) fold

**45.** If 8 dipoles of charges of magnitude  $\pm e$  are placed inside the cube. The electric flux coming out of cube will be

(a)  $16e/E_0$  (b)  $8e/E_0$  (c)  $e/E_0$  (d) zero

# PART B CHEMISTRY

**46.** The sulphide ore is converted to oxide before reduction because

(a) oxides are easier to reduce

- (b) sulphide are easily decompose
- (c) oxide get easily decompose
- (d) sulphide get oxidised to sulphur
- **47.** The separation of primary, secondary and tertiary amines can be done through fractional distillation. Which of the following method will not used to distinguish primary, secondary and tertiary amine?
  - (a) Hinsberg method
  - (b) Hofmann method
  - (c) Liebermann's nitroso method
  - (d) Victor Meyer's method
- **48.** The amino acid which is optically inactive is (a) alanine (b) lactic acid (c) glycine (d) serine
- **49.** The substance which is added to soap to impart antiseptic properties is

  (a) indeform
  (b) terpineol

(0)	1000101111	$(\sim)$	torpinoo
(C)	chloroxylenol	(d)	bithional

**50.** Strength of acid increases with the attachment of group showing -I effect and decreases with the attachment of group showing +I effect. Which of the following is correct sequence of basic strength in aqueous solution?

(a) 
$$CH_3NH_2 < (CH_3)_2NH < (CH_3)_3N$$
  
(b)  $(CH_3)_2NH < CH_3NH_2 < (CH_3)_3N$   
(c)  $(CH_3)_3N < (CH_3)_2NH < CH_3NH_2$   
(d)  $(CH_2)_3N < CH_3NH_2 < (CH_3)_2NH$ 

**51.** Compound Ph—O—C—Ph can be prepared by the reaction of

(a) phenol and benzaldehyde in the presence of palladium(b) phenol and benzoic acid in the presence of NaOH

(c) phenol and benzoyl chloride in the presence of pyridine(d) phenol and benzoyl chloride in presence of ZnCl<sub>2</sub>

**52.** Arrange the following in correct sequence of basic strength.



**53.** Which of the following reagent is used to convert?



(a) Zn-Hg in HCl(c) Both (a) and (b)

(b)  $PH_3P = CH_2$ (d) None of these

**54.** Product obtained on reaction of 2-methylcyclohexene with *m*-CPBA followed by hydrolysis is



55. One mole of the complex CoCl<sub>3</sub> · 6H<sub>2</sub>O on reaction with excess of AgNO<sub>3</sub> gives two moles of white precipitate. Thus, complex is

(a) [Co(H<sub>2</sub>O)<sub>6</sub>]Cl<sub>3</sub>
(b) [Co(H<sub>2</sub>O)<sub>5</sub>Cl] Cl<sub>2</sub> · H<sub>2</sub>O

(c)  $[Co(H_2O)_4Cl_2]Cl\cdot 2H_2O$  (d)  $[Co(H_2O)_3Cl_3]\cdot 3H_2O$ 

- 56. The ligand N(CH<sub>2</sub>CH<sub>2</sub>NH<sub>2</sub>)<sub>3</sub> is
  (a) tridentate
  (b) didentate
  (c) tetradentate
  (d) pentadentate
- **57.** The transition elements vary widely in their chemical behaviour. Many of them are sufficiently electropositive to dissolve in mineral acids, although a few are noble. Among the first series transition metals, except copper, all the metals are relatively reactive. Transition elements show variable valency due to
  - (a) small size
  - (b) large charge

(c) presence of incompletely filled *d*-subshell

- (d) All of the above
- **58.** The oxidation state of Ni in tetracarbonyl nickel is (a) + 1 (b) + 2 (c) 0 (d) + 4
- 59. Chromatography is based on the principle of
  (a) vaporisation
  (b) concentration
  (c) absorption
  (d) adsorption
- 60. If the electron is visualised as a classical charged particle laterally rotating about an axis with angular momentum *L* and magnetic dipole moment *M* then find the magnetic moment of K<sub>3</sub> [FeF<sub>6</sub>]?
  (a) 3.87 BM
  (b) 4.89 BM
  (c) 5.91 BM
  (d) 6.92 BM

61. Which of the following inert gas element, shows the highest chemical reactivity?(a) Xe(b) He

(4) 10	(0)
(c) Ne	(d)

62. The reduction of >C=O to >CH<sub>2</sub> is done by Wolf-Kishner reduction. The reagent used in Wolf-Kishner reduction is

(a) NH<sub>2</sub>—NH<sub>2</sub> in presence of base
(b) Zn—Hg in dil. HCl
(c) PH<sub>3</sub>P = CH<sub>2</sub>
(d) None of the above

**63.** The mixture of concentrated HCl and HNO<sub>3</sub> made in 3 : 1 ratio contains

(a) $N_2O_4$	(b) NOCI
(c) NCI <sub>3</sub>	(d) CIO <sub>2</sub>

- **64.** Which of the following is/are use(s) of KMnO<sub>4</sub>?
  - (a) In analytical chemistry
  - (b) As a favourite oxidant in preparative organic chemistry(c) In bleaching of wool, cotton and silk
  - (d) All of the above
- **65.** Which of the following statement is correct about salt bridge?
  - (a) Forms insoluble precipitate with the electrolytes in the two half-cells
  - (b) Enhances the flow of electrons by overcoming liquid junction potential
  - (c) Maintains the electrical neutrality of the two half-cells
  - (d) Provides the extra ions
- **66.** Which of the following is not correct for the reaction?

$$2N_2O_5 \longrightarrow 4NO_2 + O_2$$

(a) Rate of reaction is 
$$-d[N_2O_5]$$

- (b) Rate of reaction is proportional to  $[N_2O_5]^2$
- (c) It is first order reaction
- (d) It is redox reaction
- **67.** The products formed on the photochemical decomposition of  $HNO_3$  is (a)  $N_2O_5$  and  $NO_2$  (b)  $N_2O_4$  and  $NO_2$ (c)  $NO_2$  and  $O_2$  (d) NO and  $O_2$
- 68. Which of the following expression is correct for average kinetic energy of one molecule of an ideal gas at 27°C and 1 atm pressure?
  (a) 900 cal K<sup>-1</sup> molecule<sup>-1</sup>

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(b) 6.21 \times 10^{-21} \text{ JK}^{-1} \text{ molecule}^{-1}
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(c) 336.7 JK<sup>-1</sup> molecule<sup>-1</sup>
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- (d) 3741.3 JK<sup>-1</sup> molecule<sup>-1</sup>

**70.** Match the block of elements given in Column I with their electronic configuration given in Column II and choose the correct code.

		Со	lumn	I		Colu	nn ll			-
	А.	<i>s</i> -b	lock		1.	[Xe] 4	f <sup>7</sup> 5d	<sup>1</sup> 6s <sup>2</sup>		
	Β.	p-b	lock		2.	[Kr] 4	d <sup>10</sup> 5s	s <sup>1</sup>		-
	C.	d-b	lock		3.	[Xe] 5	s <sup>1</sup>			-
	D.	<i>f</i> -b	lock		4.	[Xe] 4	f <sup>14</sup> 5 a	1 <sup>10</sup> 6s <sup>2</sup>	<sup>2</sup> 6p <sup>2</sup>	_
Со	des									-
	А	В	С	D			А	В	С	D
(a)	1	2	3	4		(b	) 3	4	2	1
(C)	2	3	1	4		(d	) 3	4	1	2

**71.** The shortest wavelength transition in the Paschen series in hydrogen atom occurs at 821 nm. At what wavelength does it occur in Li<sup>2+</sup> (isoelectronic to hydrogen)?

(a) 91.2 nm	(b) 273.6 nm
(c) 821.0 nm	(d) 7389.0 nm

72. Which of the following is the property of an isothermal expansion process?
(a) ΔU = 0
(b) W = -Q

II of these

- **73.** Which of following statement is correct?
  - (a) Glucose has furanose structure and fructose has pyranose structure
  - (b) Glucose has pyranose structure and fructose has furanose structure
  - (c) Both have furanose structure
  - (d) Both have pyranose structure
- **74.** A container has hydrogen and oxygen mixture in ratio of 1 : 1 by weight, then
  - (a) internal energy of the mixture decreases
  - (b) internal energy of the mixture increases
  - (c) entropy of the mixture increases
  - (d) entropy of the mixture decreases
- **75.** In the reaction,  $N_2O_4 \implies 2NO_2$ , *a* is that part of  $N_2O_4$  which dissociates, then the number of moles at equilibrium will be

(a) $(1 - \alpha)^2$	(b) 3α (d) 1 + α			
(c) α	(d) 1 + α			

**76.** The compound A on heating gives a colourless gas and a residue that is dissolved in water to obtain B. Excess of  $CO_2$  is bubbled through aqueous solution of B, C is formed which recovered in the solid form. Solid C on gentle heating gives back A. The compound is (a)  $CaSO_4 \cdot 2H_2O$  (b)  $CaCO_2$ 

a) CaSO <sub>4</sub> ·2H <sub>2</sub> O	(b) CaCO <sub>3</sub>
c) Na <sub>2</sub> CO <sub>3</sub>	(d) K <sub>2</sub> CO <sub>3</sub>

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77. In Carius method, 0.099 g of organic compound gave 0.287 g of AgCl. The percentage of chlorine in the compound will be
(a) 71 71%
(b) 29 39%

(a) 71.71%	(b) 29.39%
(c) 53.06%	(d) 76.23%

**78.** Choose the correct option which will fill the *A*, *B* and *C* correctly.

$$4B + 3CO_2 \longrightarrow A + C$$
  

$$4B + 3SiO_2 \longrightarrow B + Si$$
  

$$4B + 6NO \longrightarrow C + 3N_2$$

(a)  $B_2O_3$ ,  $BO_2$  and BO (b)  $B_2O_3$ ,  $B_2O_2$  and BO (c)  $B_2O_3$ ,  $B_2O_3$  and  $B_2O_3$ (d)  $BO, BO_2$  and  $B_2O_3$ 

**79.** Which of the following would react most readily with nucleophiles?



**80.** Match the following name of elements to stable end product.

		Name of elements					St	able	end (	produ	ucts
/	Δ.	Thorium				1.	208 82	Pb			
[	Β.	Neptu	nium			2.	209 83	Bi			
(	C.	Uranium				3.	206 82	Pb			
[	D.	Actinium				4.	207 82	Pb			
Со	de	s									
	А	В	С	D			А	В	С	D	
(a)	2	3	4	1		(b)	3	4	1	2	
(C)	1	2	3	4		(d)	4	1	3	2	

- **81.** Sewage containing organic waste should not be disposed in water bodies because it causes major water pollution. Fishes in such a polluted water die because of
  - (a) large number of mosquitoes
  - (b) increase in amount of dissolved oxygen
  - (c) decrease in amount of dissolved oxygen in water
  - (d) clogging of gills by mud

- 82. According to kinetic theory, the reactant molecules are assumed to be hard spheres and reaction is postulated to occur when molecules collide with each other. Pre-exponential factor in the expression obtained during collision theory is known as

  (a) collision diameter
  (b) collision frequency factor
  (c) collision energy
  (d) None of these
- **83.** The number of nearest neighbours and next nearest neighbours of  $Na^+$  ion in a crystal of NaCl are, respectively,

- 85. A certain current liberates 0.500 g of H<sub>2</sub> in 2.00 hr. How many gram of oxygen can be liberated by the same current in the same time?
  (a) 0.500 g
  (b) 8.00 g
  (c) 4.00 g
  (d) 16.00 g
- **86.** Addition of 0.643 g of a compound to 50 mL of benzene (density =  $0.879 \text{ g mL}^{-1}$ ), lowers the freezing point from 50.51°C to 50.03°C. If  $K_f$  for benzene is 5.12, the molecular mass (in g mol<sup>-1</sup>) of the compound is
  (a) 156.05 (b) 312.00
  (c) 78.00 (d) 468.00
- **87.** The oxygen atom in phenol (a) exhibits only inductive effect
  - (b) exhibits only resonance effect
  - (c) has more dominating resonance effect than inductive effect
  - (d) has more dominating inductive effect than the resonance effect
- 88. At 500 K, the half-life period of a gaseous reaction at an initial pressure of 100 kPa is 364 s. When the pressure is 50 kPa, the half-life period is 182 s. The order of the reaction is

  (a) zero
  (b) one
  (c) half
  (d) two
- **89.** The effective atomic number of cobalt in  $[Co(NH_3)_5H_2O]^{3+}$  is (a) 36 (b) 33 (c) 24 (d) 30
- **90.** Which of the following represents the correct order of solubility for the noble gases?
  - (a) Ne > Ar > Kr > He > Xe
  - (b) He > Ne > Ar > Kr > Xe
  - (c) Ar > Ne > He > Kr > Xe
  - (d) Xe > Kr > Ar > Ne > He

MODULE 2

# PART C BIOLOGY

- **91.** The virus of hepatitis-A contains (a) dsDNA (b) ssRNA (c) ssDNA (d) dsRNA
- **92.** Which of the following cranial nerves is incorrectly matched with its nature?

(a) Olfactory	_	Sensory
(b) Trochlear	-	Motor
(c) Glossopharyngeal	-	Mixed
(d) Hypoglossal	_	Sensory

**93.** Match the Column I with Column II and choose the correct option from the codes given below.

Column I	Column II
A. Phycophages	1. Fungal viruses
B. Mycophages	2. Carry enzyme reverse transcriptase
C. Retroviruses	3. Benign and malignant
D. Tumour viruses	4. Viruses which are parasitic on algae
Codes	

	А	В	С	D		А	В	С	D
(a)	1	2	3	4	(b)	4	3	2	1
(C)	4	1	2	3	(d)	1	3	2	4

#### 94. K-T boundary refers to

- (a) mass extinction of 60 million years ago when dinosaurs disappeared
- (b) deposits of iridium which are rare on earth
- (c) Both (a) and (b)
- (d) None of these
- **95.** Refer to the diagram given below and choose the option that indicates incorrect labelling.



- (a) A-Represents the storage tissue rich in starch
- (b) *B*–Represents scutellum
- (c) C-Represents coleorhiza
- (d) *D*–Represents the protective covering of radicle

#### **96.** Which of the following statements is/are incorrect?

- I. The fast block polyspermy develops in response to the opening of sodium gates in the plasma membrane.
- II. The slow block polyspermy develops in response to the release of bindin.
- III. Capacitation is the process of entry of more than one sperm into the oocyte.

Choose the correct option.

(a) Only III	(b) I and II
(c) Only I	(d) I and III

- **97.** Consider the following statements about the structure of ovule and select the one which is incorrect.
  - (a) The point of attachment of funicle with the body is called hilum
  - (b) A collar-shaped outgrowth from the base of the ovule which forms the third integument is called aril
  - (c) In a polygonum type of embryo sac, the egg apparatus is situated towards the chalazal end
  - (d) Generally, both the polar nuclei fuse before fertilisation to form a single diploid nucleus
- **98.** Which of the following statements is true?
  - (a) Auxin translocation is non-polar
  - (b) Abscisic acid is transported through phloem only
  - (c) Phototropism is induced by blue light
  - (d) Auxin is not affected by TIBA
- **99.** Which among the following is/are adaptations of hydrophytes?
  - (a) No cuticle over the epidermis
  - (b) Aerenchyma is well-developed
  - (c) Secondary growth is absent
  - (d) All of the above
- 100. The enzyme that catalyses the conversion of plasminogen to plasmin and is used in acute coronary arterial thrombosis is

  (a) streptokinase
  (b) phosphotransferase
  (c) β-lactamase
  (d) penicillinase
- **101.** The production of fertile soil on bare rocks is<br/>(a) secondary succession<br/>(c) heterotrophic succession(b) primary succession<br/>(d) allogenic succession
- 102. The Tumour inducing (Ti) plasmid of which plant pathogen has been modified into a cloning vector to deliver genes of our interest?
  (a) Providencia stuartii
  (b) Agrobacterium tumefaciens
  (c) Haemophilus haemolyticus
  (d) Bacillus globigii

103.	Which of the following di deficiency in immune sys (a) Parkinson's disease	isorders occurs due to the stem? (b) Digeorges' syndrome	<b>114.</b> V in (a
	(c) Huntingtons's chorea	(d) Alzheimer's disease	(h
104.	In which of the following lipoprotein is maximum?	the percentage of	(L
	(a) Chylomicron (c) DHL	(b) VLDL (d) LDL	(C
105.	Which among the following incorrect regarding <i>Spire</i> (a) Fertilisation takes place in the (b) Conjugation tube is not for (c) Both (a) and (b) (d) None of the above	ng statements is/are ogyra? the female gametangium med	115. B (a (c 116. In
106.	Which of the following is compound linking glycoly (a) Oxaloacetate (c) Pyruvate	the intermediate ysis to Krebs cycle? (b) Acetyl Co-A (d) Citric acid	s( t] (a (c
107.	Catabolite Activator Prot (a) inducer (c) aporepressor	tein (CAP) is /an (b) corepressor (d) apoinducer	117. 1 re (a (b
108.	What will happen if corp the body of cockroach? (a) Digestion will not occur (c) It will become adult	ora allata is removed from (b) It will become sterile (d) It will become blind	(c (c <b>118.</b> Iı
109.	Identify the incorrectly n (a) Physical xerophytes – Soils (b) Physiological xerophytes – (c) Both (a) and (b) (d) None of the above	natched pair. s which are physically dry Soils having sufficient water	to (8 <b>119.</b> V (8 (1
110.	<i>trp</i> operon is regulated by acid tryptophan, this med (a) termination (c) suppression	y the availability of amino chanism is known as (b) attenuation (d) repression	(c (c <b>120.</b> A a
111.	In 'protoplast fusion', tiss are cultured. Their cells a subjected to the treatmen (a) IBA and NAA (b) ethylene and glycol (c) coconut milk and auxin (d) pectinase and cellulase	sues of two different plants are separated and nt with	(a (c <b>121.</b> In tr (a (c <b>122.</b> F
112.	Which are the first organ embryo? (a) Heart and blood vessels (c) Brain and spinal cord	ns to develop in a human (b) Eyes and ears (d) Mouth and tongue	fo (a (0
113.	What would be the numb aleurone cells of a plant chromosomes in leaf cell (a) 12	ber of chromosomes in when number of is 24? (b) 24	(a (a (b) (c

(d) 48

(c) 36

- Which among the following statements is/are ncorrect regarding significance of biopatents? ) Permit private, monopoly rights over cells, genes, animals and plants b) People would not research in such areas, which are dominated by patents c) Lead to research programmes dominated by potentiability and profitability d) Philosophy and social commentary that deal with the biological sciences and their potential impact on society
- ordered pits are found on the radial walls of (b) sieve tubes a) xylem tracheids c) xylem fibres (d) sieve plates
- n bacteria, glucose is utilised first, even if other ources of sugar are available. This happens hrough a mechanism known as a) catabolite repression (b) enzyme repression c) operon repression (d) positive feedback mechanisms
- 'he life history traits of organisms have evolved in elation to
  - a) Darwinian fitness
  - b) organisms evolve under selection pressure developed by environmental factors
  - ) organisms achieve most efficient reproductive strategy d) All of the above
- n mitotic prophase, the sister chromatids are held ogether by a multi-subunit protein complex called a) actin (b) cytokinin (c) cohesin (d) tubulin
- ïruses are known as wandering genes because a) nucleic acid is the only active part of a virus o) capsid is the outer protective coat c) nucleic acid is the central core d) capsid is made up of specific protein
- person performing 'Yoga' breathes in as much air s possible. The volume of air inspired is called a) tidal volume (b) inspiratory capacity c) vital capacity (d) inspiratory reserve volume
- n which of the following tissues the benign umour is enclosed? a) Connective tissue (b) Epithelial tissue c) Muscular tissue (d) Nervous tissue
- 'rom which amino acid, creatine is metabolically ormed?

) Histidine	(b) Phenylalanine
) Tryptophan	(d) Arginine

#### AMP regulates the *lac* operon by

- a) binding to the *lac* repressor
- b) binding to the operator
- c) combining with CAP to form a complex which starts transcription by binding near the promoter
- (d) All of the above

MODULE 2

- 102
- **124.** Match the Column I with Column II and choose the correct option from the codes given below.

	С	olumi	۱I			Column II
А.	C	D <sub>2</sub>			1.	Freshwater wetlands
В.	CI	$H_4$			2.	Non-toxic gas
C.	CI	=C			З.	Burning of fossil fuel
D.	$N_2$	0			4.	Industrial processes
Co	des					
	А	В	С	D		A B C D
(a)	1	2	3	4		(b) 3 1 2 4
(C)	4	2	3	1		(d) 1 3 2 1

125. Match the Column I with Column II and choose the correct option from the codes given below.

Column I					Column II					
А.	A. Intrafascicular 1. cambium				Cambium between xylem and phloem					
В.	B. Interfascicular 2 cambium			2.	Parenchymatous cells of medullary rays					
C.	C. Tyloses			3.	Ballon-like structures					
D.	Hea	irtwoo	bd	4.	Physiologically inactive					
Со	des									
	А	В	С	D	A B C D					
(a)	1	3	2	4	(b) 3 1 2 4					
(C)	1	2	3	4	(d) 4 1 2 3					

**126.** Which of the following is not a secondary sex organ in human males?

(a) Seminal vesicle	(b) Penis
(c) Epididymis	(d) Testis

- **127.** With respect to eukaryotic gene regulation, which of the following statements is not true for enhancers?
  - (a) They function in tissue specific manner
  - (b) They function in any orientation
  - (c) They function as promoters
  - (d) They function even when are at a distance from the gene
- **128.** Thyroxine is produced from which of the following amino acids?

(a) Tryptophan (b) Alanine (c) Glycine (d) Tyrosine

- **129.** Identify the incorrect statement(s).
  - I. Ability of an organism to maintain a state of dynamic constancy is called thermoregulation.
  - II. The maintenance of constant internal temperature by an organism is called homeostasis.
  - III. The oldest living plant on earth is the great Indian banyan tree.

Choose the correct option.

(c) Only III (a) Only I (b) I and II (d) All of these

## MODULE 2)

- **130.** Castle's intrinsic factor is a glycoprotein secreted by parietal cells is required for the absorption of (a) cobalamine (b) biotin (c) pyridoxine (d) niacin
- 131. Match the Column I with Column II and choose the correct option from the codes given below.

	<b>Column I</b> (Type of bryophytes)		<b>Column II</b> (Features)
Α.	Hepaticopsida	1.	Capsule without any columella
В.	Anthocerotopsida	2.	Sterile columella present
C.	Bryopsida	3.	Sporophyte well-differentiated into foot, seta and capsule
D.	Marchantiales	4.	Riccia
Cod	les		

В	С	D	А	В	С	D	
2	4	3	(b) 1	2	3	4	
1	3	4	(d) 4	1	3	2	
	B 2 1	B C 2 4 1 3	BCD243134	B         C         D         A           2         4         3         (b) 1           1         3         4         (d) 4	B         C         D         A         B           2         4         3         (b) 1         2           1         3         4         (d) 4         1	B         C         D         A         B         C           2         4         3         (b) 1         2         3           1         3         4         (d) 4         1         3	B         C         D         A         B         C         D           2         4         3         (b) 1         2         3         4           1         3         4         (d) 4         1         3         2

**132.** In golden rice *crtl* (carotene desaturase) gene has been inserted from the (a) Narcissus pseudonarcissus (b) Erwinia uredovora

(c) Pseudomonas putida (d) E. coli

**133.** Match the following columns and choose the correct option from the codes given below.

Co (Ho	<b>lumn</b> prmone	l e)			<b>Column II</b> (Function)				
A. Hun gon	nan ch adotrc	norioni opin	С	1.	Promotes growth of myometrium				
B. Prog	gester	one		2.	Maintains corpus luteum				
C. Oes	troger	١		3.	Suppresses uterine contractions				
D. Rela	axin			4.	Softens cervix to prepare for dilation				
Codes									
A (a) 2 (c) 4	B 3 1	C 1 3	D 4 2		A B C D (b) 3 2 4 1 (d) 1 4 2 3				

- **134.** The individuals produced as a consequence of the undersecretion of pituitary gland are called (a) midgets (b) fidgets (c) gadgets (d) maggots
- **135.** In which of the following, males have half the number of chromosomes that females possess? (a) Moth (b) Chicken (c) Honeybee (d) Pigeon
- **136.** Which of the following statements is/are correct? (a) Bilirubin is transported in blood by being attached to plasma albumin
  - (b) Bilirubin is insoluble in water
  - (c) Both (a) and (b) are correct
  - (d) None of the above

**137.** In which of the following is XX-XO sex chromosome complement found? (a) Chimpanzee (b) Birds (c) Honeybee (d) Cockroach **138.** The effect(s) of ozone depletion include(s) (a) inhibition of photosynthesis in phytoplanktons (b) damage in nucleic acids of living organisms (c) increase in UV-radiations reaching the earth surface (d) All of the above **139.** In which of the following structures insulin does not increase the glucose uptake? (a) Cardiac muscles and skeletal muscles (b) Renal tubules and intestinal mucosa (c) Adipose tissues and cardiac muscles (d) Smooth muscles and skeletal muscles **140.** Which of the following is/are required for full expression of the *lac* operon? (a) Lactose (b) Allolactose (c) Lactose and cAMP (d) Allolactose and cAMP **141.** The human biochemical disorder Tay-Sachs disease is an example of (a) incomplete dominance (b) codominance (c) epistasis (d) multiple alleles **142.** Which among the following statements is/are correct regarding water potential? (a) It refers to the chemical potential of water in a system (b) Water potential of pure water is zero (c) Water potential increases when pure water is heated (d) All of the above **143.** In the figure given below, a diagrammatic view of human skull is given. Two of the bones are wrongly labelled. They are Frontal bone



(a) sphenoid and hyoid bone(b) frontal and parietal bone(c) occipital and temporal bone(d) parietal and occipital bone

- **144.** Which of the following is a 'double-headed snake'? (a) *Python* (b) Viper (c) Sand boa (d) Kraits
- 145. Which of the following is a pair of zoogeographical regions separated by high mountains?(a) Oriental and Australian(b) Nearctic and Neotropical(c) Ethiopian and Nearctic(d) Palaearctic and Oriental
- **146.** A little boy was inquisitive about why a cow was licking its calf. What is the most probable explanation given by his grandfather?

- (a) It is an action of time passing with calf
- (b) Lysozymes present in the saliva of the mother protects the calf from bacterial infection
- (c) To remove insects sitting on the calf
- (d) Both (a) and (b)

#### **147.** Craidukov's phenomenon is

- (a) the capacity of changing colour
  - (b) the change in colour according to the wavelength of incident light
  - (c) also known as chromatic adaptation
  - (d) All of the above
- **148.** Which of the following statements are not disadvantages of hydroponics?
  - I. The cost of these experiments is high.
  - II. It requires skilled people.
  - III. It facilitates production of seasonal vegetables.
  - IV. It avoids soil borne pathogens.

Choose the correct option.

(a) II and III (b) III and IV (c) I and IV (d) I, II and III

- 149. Which of the following classes of Echinodermata does not include free-moving echinoderms?
  (a) Asteroidea
  (b) Holothuroidea
  (c) Echinoidea
  (d) Crinoidea
- **150.** Identify the incorrect statement(s).
  - I. Amniotic fluid test is used for diagnosing chromosomal abnormalities.
  - II. In ultrasound imaging, visible images are produced by the pattern of echos made by organs.
  - III. Chronic villi sampling is an invasive technique used in prenatal diagnosis.
  - IV. Maternal blood sampling is an invasive technique where mother's blood is tested.

Choose the correct option.

(a) Only I

(c) IV and V

(b) Only IV (c) Only II (d) III and IV

- **151.** Pick out the mismatched pair(s).
  - I. Wind Anemophily Maize
    - II. Water Hydrophily Vallisneria
    - III. Insects Entomophily Poppy
    - IV. Snails Myrmecophily Lemna
    - V. Ants Malacophily Chrysanthemum

  - Choose the correct option. (a) Only IV (b)
    - (b) Only V (d) None of the
    - (d) None of these
- **152.** Which among the following statements is incorrect regarding viruses?
  - (a) Viruses possess no membranes of their own
  - (b) Viruses do not possess ribosomes to make proteins
  - (c) Viruses do not have any source of energy (ATP)  $% \left( ATP\right) =\left( ATP\right) \left( ATP\right) \left$
  - (d) Viruses can reproduce by themselves

# **NEET** Test Drive

- **153.** The primary treatment of effluents involves (a) removal of large particles (b) removal of small particles (c) removal of dissolved particles (d) Both (a) and (b)
- **154.** On the basis of functions, the meristematic tissue is divided into
  - (a) protoderm, procambium, ground meristem
  - (b) apical, lateral, intercalary
  - (c) mass, plate, rib meristem
  - (d) primary, secondary
- **155.** Identify the incorrectly matched pair.
  - (a) Chlorophyceae-Chlorophyll-a and b, carotenoids
  - (b) Phaeophyceae-Chlorophyll-a and c, fucoxanthin
  - (c) Rhodophyceae-Chlorophyll-a, phycocyanin, phycoerythrin, xanthophyll
  - (d) None of the above
- **156.** The MN blood group in humans is an example of (a) partial dominance (b) codominance (c) incomplete dominance (d) epistasis
- **157.** Which of the following category of genes found in normal cells have an antiproliferative function?
  - (a) Oncogenes (b) Proto-oncogenes
  - (c) Retro genes (d) Tumour-suppressor genes
- **158.** In the glomerulus of nephron, the afferent arteriole is
  - (a) longer than efferent arteriole
  - (b) of same diameter as efferent arteriole
  - (c) wider than efferent arteriole
  - (d) narrower than efferent arteriole
- **159.** Which among the following is/are method(s) of safe disposal of radioactive wastes?
  - (a) Radioactive waste is buried deep under ground surface
  - (b) Radioactive waste is reprocessed
  - (c) Radioactive waste is buried in specially constructed buildings
  - (d) All of the above
- **160.** The oldest known fossil cells were about the size of modern prokaryotes. Which of the following resembles them?
  - (a) Red algae (b) Green algae (c) Amoeba (d) Bacteria
- **161.** Which one among the following is not the characteristic of virusoids? (a) They are small circular RNA
  - (b) They are always associated with larger viral RNA
  - (c) They may form part of the viral genome
  - (d) They are proteinaceous infectious particles
- 162. 'Saheli' is a new oral contraceptive pill for females with
  - (a) low side effects and low contraceptive value
  - (b) high side effects and high contraceptive value
  - (c) low side effects and high contraceptive value
  - (d) high side effects and low contraceptive value
- MODULE 2

- **163.** MAB (Man And Biosphere) programme is associated with (a) studying impact of human interference on environment (b) pollution in biotic and abiotic environments (c) conservation strategies for present and future (d) All of the above
- **164.** It is important to make a newborn baby burp immediately after feeding or else they may regurgitate. This is because of lesser developed (a) cardiac sphincter (b) gastric cells (c) pyloric sphincter (d) None of these
- **165.** Identify the incorrectly matched pair. (a) Sclerophyllous-Stiff leaves (b) Trichophyllous-Leaves covered with hairs (c) Malacophyllous–Soft and fleshy leaves (d) None of the above
- **166.** Clones can be obtained by which of the following techniques? (a) Vegetative propagation (b) Cultivation (c) Hybridisation
  - (d) Sexual reproduction
- **167.** A health conscious lady takes a lot of germinated lentils in breakfast. Which of the following enzymatic reaction will be the first to occur after its intake in mouth?

	Substrate	Enzyme	Products formed
(a)	Protein	Pepsin	Polypeptide
(b)	Fats	Lipase	Diglycerides
(C)	Maltose	Maltase	Glucose + Glucose
(d)	Starch	Amylase	Glucose + Fructose

- **168.** Which of the following organs of the cockroach absorbs nitrogenous waste from haemolymph? (a) Mycetocytes (b) Urate cells (c) Utriculi majores (d) Anal cerci
- **169.** Which among the following statements is/are true for carbon cycle?
  - (a) Atmospheric inputs of carbon through rainfall are higher
  - (b) There is respiratory release of carbon into the atmosphere
  - (c) The gaseous exchange of carbon between organisms and environment is negligible
  - (d) Both (a) and (b)
- **170.** Real time PCR utilises ..... for detection and estimation of DNA products. (a) methyl orange (b) SYBR green (c) phenolphthalein (d) ethidium bromide

#### **171.** 'Brown sugar' is composed of

- (a) lysergic acid diethylamide
- (b) tetra-hydro cannibinols
- (c) diacetyl morphine hydrochloride
- (d) acetaldehyde

**172.** Match Column I with Column II and choose the correct option from the codes given below.

	Col	umn	I				Colur	nn II		
А.	Trop	oical	rainfo	rests			1.	Sal		
В.	Trop	oical	decid	uous	forests		2.	Acaci	a sp.	
C.	Des	ert					3.	Dipter	rocar	pus
D.	Coa	istal k	biome				4.	Mang	rove	S
Co	des									
	А	В	С	D			А	В	С	D
(a)	3	1	2	4		(b)	1	2	3	4
(C)	2	1	3	4		(d)	4	1	3	2

**173.** Match the contents of Column I to the contents of Column II and choose the correct option from the codes given below.

Column I					Column II				
Α.	[	Barley		1.	Atomita-2				
В.	l	Pepper	mint	2.	2. Aruna				
C.	(	Castor		З.	Todd's Mitch	am			
D.	l	Rice		4.	Erectiferum				
				5.	Pusa Lerma				
Co	des	6							
	А	В	С	D	А	В	С	D	
(a)	1	2	3	4	(b) 4	3	2	1	
(C)	3	4	1	2	(d) 2	1	3	4	

- **174.** Why the bronchioles and lungs in human beings do not collapse even though they lack the cartilaginous rings?
  - (a) Surfactants secreted by the clara cells prevent the collapse
  - (b) The intercostal muscles keep the pleura expanded
  - (c) The elastic cartilage present on their surface prevents them from collapsing
  - (d) None of the above

**175.** Refer to the following flowchart and select the option which correctly indicates '*a*' and '*b*'.



- 176. In *Drosophila*, gynandromorphs occur due to the(a) loss of autosomal chromosome(b) loss of X-chromosome(c) gain of Y-chromosome(d) chemical induction
- **177.** Along with scales, scutes and bony plates are found in which of the following?(a) *Torpedo*(b) Salmon
  - (c) Gambusia (d) Hippocampus
- **178.** According to the 'Blackman's law of limiting factor', at a particular time, photosynthesis can be limited by (a) CO<sub>2</sub> concentration (b) light
  (c) Both (a) and (b) (d) Either (a) or (b)
- 179. Identify the incorrectly matched pair.
  (a) Ebola → Filoviruses
  (b) Mumps → Paramyxovirus
  (c) Rabies → Rhabdovirus
  (d) Yellow fever → Variola virus
- **180.** The arrangement of outer and central microtubules in a cilium is called

(a) 9+2 pattern	(b) 9+0 pattern
(c) 8+2 pattern	(d) 9+1 pattern

# **Answer Sheet**

1. (0	d)	<b>2.</b> (a)	<b>3.</b> (a)	<b>4.</b> (a)	5. (c)	6. (c)	<b>7.</b> (a)	<b>8.</b> (a)	<b>9</b> . (c)	10. <i>(c)</i>
11. (0	<u>;</u> )	12. (b)	13. (c)	14. (a)	15. (b)	16. (d)	17. (d)	18. (d)	19. (c)	<b>20.</b> (c)
<b>21.</b> (b	b)	<b>22.</b> (b)	23. (b)	<b>24.</b> (a)	<b>25.</b> (a)	<b>26.</b> (d)	27. (c)	<b>28.</b> (c)	<b>29.</b> (c)	<b>30.</b> (d)
<b>31</b> . (b	5)	<b>32.</b> (c)	33. (d)	<b>34.</b> (a)	35. (d)	<b>36.</b> (c)	37. (b)	<b>38.</b> (a)	<b>39.</b> (b)	<b>40.</b> (c)
41. (0	a)	<b>42.</b> (b)	43. (c)	<b>44.</b> (d)	<b>45</b> . (d)	<b>46.</b> (a)	<b>47.</b> (d)	<b>48.</b> (c)	<b>49</b> . (d)	<b>50.</b> (d)
<b>51.</b> (d	<u>;</u> )	<b>52.</b> (d)	53. (c)	54. (b)	55. (b)	56. (c)	57. (c)	58. (c)	<b>59.</b> (d)	<b>60.</b> (c)
61. (0	z)	<b>62.</b> (a)	63. (b)	<b>64.</b> (d)	65. (c)	66. (c)	67. (c)	<b>68.</b> (b)	<b>69.</b> (d)	<b>70.</b> (b)
<b>71.</b> (d	a)	<b>72.</b> (d)	73. (b)	74. (c)	<b>75.</b> (d)	76. (b)	<b>77.</b> (a)	<b>78.</b> (c)	<b>79.</b> (c)	<b>80.</b> (c)
81. (0	<u>;</u> )	82. (b)	83. (b)	<b>84.</b> (d)	85. (c)	<b>86.</b> (a)	87. (c)	<b>88.</b> (a)	<b>89.</b> (a)	<b>90.</b> (d)
<b>91.</b> (b	b)	<b>92.</b> (d)	<b>93.</b> (c)	<b>94.</b> (c)	<b>95.</b> (c)	<b>96.</b> (d)	<b>97.</b> (c)	<b>98.</b> (c)	<b>99.</b> (d)	100. <i>(a)</i>
101. (b	b)	102. (b)	103. <i>(b)</i>	104. <i>(a)</i>	105. <i>(b)</i>	106. <i>(b)</i>	107. (d)	108. <i>(c)</i>	109. (d)	110. <i>(b)</i>
111. (0	d)	112. (c)	113. (c)	114. (d)	115. <i>(a)</i>	116. <i>(a)</i>	117. (d)	118. (c)	119. (a)	120. (b)
<b>121.</b> (d	a)	122. (d)	123. (c)	124. (b)	125. (c)	126. (d)	127. (c)	128. (d)	129. (c)	<b>130.</b> (a)
131. (b	5)	132. <i>(b)</i>	133. <i>(a)</i>	134. <i>(a)</i>	135. (c)	136. (c)	137. (d)	138. <i>(d)</i>	139. <i>(b)</i>	140. (d)
141. (0	z)	142. (d)	143. (c)	144. (c)	145. (d)	146. (b)	147. (d)	148. <i>(b)</i>	149. (d)	150. (b)
<b>151.</b> (d	<u>;</u> )	152. (d)	153. (d)	154. <i>(a)</i>	155. (d)	156. (b)	157. (d)	158. (c)	159. (d)	<b>160.</b> (d)
<b>161.</b> (d	d)	162. (c)	163. (d)	164. (a)	165. (d)	166. (a)	167. (c)	168. <i>(b)</i>	169. (d)	170. (b)
<b>171.</b> (d	-)	172. (a)	173. (b)	174. (a)	175. <i>(b)</i>	176. (b)	177. (d)	178. (d)	179. (d)	180. (a)



PHYSICS

1. In steady state, there will be no current in the capacitor branch. Net resistance of the first parallel branch and cell,  $R = 1 + 1 + 0.5 = 2.5 \Omega$ Current drawn from the cell,  $i = \frac{V}{R} = \frac{2.5}{2.5} = 1$  A Potential drop across two parallel branches,  $V = E - ir = 2.5 - 1 \times 0.5$ = 2.5 - 0.5 = 2.0 VSo, charge on the capacitor plates  $q = CV = 5 \times 2 = 10 \mu C$ **2.** As,  $Y = 2\eta (1 + \sigma)$ 

 $3.2 \eta = 2\eta (1 + \sigma) \Longrightarrow 1.6 = 1 + \sigma$  $\sigma = 0.6$ 

3. 
$$v = \frac{1}{\sqrt{LC}}$$
  
When *L* is changed to *L* / 2, *C* must be changed to 2*C* to keep v same.

**4.** As,  $A = \overline{X} \cdot \overline{Y} = \overline{X + Y}$  $(:\overline{A} \cdot \overline{B} = \overline{A + B})$ 

- $B = \overline{X + Y} \cdot \overline{Z}$  (NAND gate)  $=\overline{X+Y}+\overline{Z}=X+Y+Z$
- 5. Let u be initial velocity and a be uniform acceleration 0 С Α u+5a u+15a $\mu + 30 a$ и Then average velocities are,  $v_1 = \frac{u+u+5a}{2} = u + \frac{5}{2}a$  $v_2 = \frac{u + 5a + u + 15a}{2} = u + 10a$  $v_3 = \frac{u + 15a + u + 30a}{2} = u + \frac{45}{2}a$  $\therefore \quad \frac{v_1 - v_2}{v_2 - v_3} = \frac{\frac{5}{2}a - 10a}{10a - \frac{45}{2}a} = \frac{-15a}{-25a}$  $=\frac{15}{25}=\frac{3}{5}$ Pitch 6. Least count = Number of division  $=\frac{0.5 \text{ mm}}{0.01 \text{ mm}} = 0.01 \text{ mm}$ . 50 Diameter of ball,  $D = MSR + CSR \times LC$  $= 2.5 + 20 \times 0.01 = 2.7$  mm

Mass Density,  $\rho =$ Volume  $-\frac{4}{3}\pi\left(\frac{D}{2}\right)$ percentage error in density  $=\frac{\Delta\rho}{\rho}\times 100$  $=\frac{\Delta M}{M}\times 100+\frac{3\Delta D}{D}\times 100$  $= 2\% + 3 \times \frac{0.01}{2.7} \times 100$ = 2% + 1.11% = 3.1% **7.** Given, *n* = 5000 turns/m, *i* = 5A  $\chi_{Al} = 2.3 \times 10^{-5}, B = ?$ As,  $B = \mu_0 (H + I)$ where,  $H = \frac{B_0}{m} = \frac{\mu_0 ni}{m} = ni$  $\mu_0 \quad \mu_0$  $= 5000 \times 5$  $= 2.5 \times 10^4$  A/m and  $I = \chi H = 2.3 \times 10^{-5} \times 2.5 \times 10^{4}$ = 0.575 A/m  $B=\mu_0(H+I)$  $= 4\pi \times 10^{-7} (2.5 \times 10^4 + 0.575) T$ = 0.031 T

8. The circuit given in the question, is a balanced Wheatstone bridge, so no current is flow in the branch BC and it behaves like an open circuit. So, circuit becomes as shown below



Now, in the above circuit,  $R_{ABD} = 5 + 10 = 15 \Omega$  $R_{ACD} = 10 + 20 = 30\Omega$ Resistance.  $R_{ABD}$  and  $R_{ACD}$  in parallel,  $R_{\rm net} = \frac{15 \times 30}{30 + 15} = \frac{450}{45} = 10\,\Omega$  $i = \frac{E}{R_{\text{net}}} = \frac{5}{10} = 0.5 \text{ A}$ 

**9.** Let  $m_1 = m$  and  $m_2 = M - m$ , then  $F = \frac{Gm(M-m)}{r^2} = \frac{G}{r^2} (Mm - m^2)$ For maximum force,  $\frac{dF}{dm} = 0$   $\Rightarrow \qquad \frac{G}{r^2} (M - 2m) = 0$  $M = 2m \text{ or } m = \frac{M}{2}$  $\Rightarrow$  $m_1 = m_2 = \frac{M}{2}$ ÷ **10.** Wien's law,  $\lambda_m \propto \frac{1}{\tau}$  and from the figure  $\begin{aligned} &(\lambda_m)_A < (\lambda_m)_C < (\lambda_m)_B. \text{ Therefore,} \\ &T_A > T_C > T_B. \end{aligned}$ 11. The amplitude of damped oscillator is  $A = A_0 e^{-kt}$ , where  $k = \frac{b}{2m}$ At t = 5 s, 0.9  $A_0 = A_0 e^{-5k}$  $\Rightarrow e^{-5k} = 0.9$ At  $t = 15 \text{ s}, \alpha A_0 = A_0 e^{-15k}$  $e^{-15k} = \alpha$  $\Rightarrow$  $(e^{-5k})^3 = \alpha$  $\rightarrow$  $\alpha = (0.9)^3 = 0.729$  $\Rightarrow$ **12.** We known,  $\eta_1 = 1 - \frac{T_2}{T_1} \Rightarrow \frac{1}{5} = 1 - \frac{T_2}{T_1}$  $\frac{T_2}{T_1} = \frac{4}{5}$ ...(i)  $\Rightarrow$  $\eta_2 = 1 - \frac{T_2 - 60}{T_1}$  $\frac{1}{2} = 1 - \frac{T_2 - 60}{T_1}$  $\Rightarrow$  $\frac{1}{2} = \frac{T_2 - 60}{T_1}$ ...(ii) From Eqs. (i) and (ii), we get  $T_1 = 200 \,\mathrm{K}$ ,  $T_2 = 160 \,\mathrm{K}$ **13.** Voltage across  $2 \text{ k}\Omega$  resistor = 12 VTherefore current passing through 2 kΩ resistor =  $\frac{12}{2 \times 10^3}$  = 6 × 10<sup>-3</sup> A = 6 mA **14.** Given,  $K = 220 \text{ kg mm}^{-2}$  $= 220 \times 10^{6} \text{ kgm}^{-2}$ =  $220 \times 9.8 \times 10^{6}$  Nm<sup>-2</sup>  $\rho = 1.1 \times 10^{3}$  kgm<sup>-3</sup>.

 $= 1400 \, \text{ms}^{-1}$ 

Velocity,  $v = \sqrt{\frac{K}{\rho}} = \sqrt{\frac{220 \times 9.8 \times 10^6}{1.1 \times 10^3}}$ 

and

Depth of sea = 
$$\frac{vt}{2}$$
  
=  $\frac{1400 \times 2.60}{2}$  = 1820 m

**15.** The acceleration due to gravity on earth is  $g_{\theta} = \frac{4}{3}\pi GR\rho$ 

That on moon,  $g_m = \frac{4}{3}\pi G\left(\frac{R}{4}\right)\left(\frac{2}{3}\rho\right) = \frac{1}{6}g_e$ 

As the potential energy remain same, i.e.,  $mg_eh_e = mg_mh_m$ 

$$h_m = \frac{g_e}{g_m} h_e = \frac{g_e}{1/6g_e} h_e$$
$$= 6 \times 0.5 \text{ m} = 3 \text{ m}$$

**16.** Distance of *n*th bright fringe from the centre,

$$y_n = \frac{nD\lambda}{d}$$
  
$$y_3 = \frac{3 \times 6000 \times 10^{-10} \times 2.5}{0.5 \times 10^{-3}}$$

- $= 9 \times 10^{-3} \text{ m} = 9 \text{ mm}$
- **17.** For first line of Lyman series,  $n_1 = 1$ and  $n_2 = 2$

$$\therefore \ \frac{1}{\lambda_1} = R\left(\frac{1}{1^2} - \frac{1}{2^2}\right) = R\left(1 - \frac{1}{4}\right) = \frac{3R}{4}$$

For first line of Paschen series,

$$n_{1} = 3 \text{ and } n_{2} = 4$$
  

$$\therefore \frac{1}{\lambda_{2}} = R\left(\frac{1}{3^{2}} - \frac{1}{4^{2}}\right)$$
  

$$= R\left(\frac{1}{9} - \frac{1}{16}\right) = \frac{7R}{144}$$
  

$$\frac{\lambda_{1}}{\lambda_{2}} = \frac{7R}{144} \times \frac{4}{3R} = \frac{7}{108}$$

**18.** The de-Broglie wavelength,

$$\lambda = \frac{h}{mv} \Rightarrow v = \frac{h}{m\lambda} \qquad \dots(i)$$
  
Energy of photon,  $E_p = \frac{hc}{\lambda}$   
(since  $\lambda$  is same)

so. required ratio is.

$$\frac{E_p}{E_e} = \frac{hc/\lambda}{\frac{1}{2}mv^2} = \frac{2hc}{\lambda mv^2}$$

Substituting value of *v* from Eq. (i), we get

$$\frac{E_p}{E_e} = \frac{2hc}{\lambda_m \left(\frac{h}{m\lambda}\right)^2} = \frac{2\lambda mc}{h}$$

**19.** As, 
$$U = \frac{A}{x^2} - \frac{B}{x}$$
  
For equilibrium,  $\frac{dU}{dx} = 0$ 

$$\Rightarrow \frac{d}{dx} \left(\frac{A}{x^2} - \frac{B}{x}\right) = -\frac{2A}{x^3} + \frac{B}{x^2} = 0$$
  

$$\Rightarrow \quad x = \frac{2A}{B}$$
  
For stable equilibrium,  $\frac{d^2U}{dx^2} > 0$   

$$\Rightarrow \quad \frac{d^2U}{dx^2} = \frac{6A}{x^4} - \frac{2B}{x^3}$$
  
 $\left(\frac{d^2U}{dx^2}\right)_{x=\frac{2A}{B}} = \frac{B^4}{8A^3} > 0$   
20. Time constant in  $R - C$  circuit is given  
by  $t = R_{eq}C$   
Equivalent resistance,  $t$   
 $= \frac{2R \times 3R}{2R + 3R} = \frac{6R}{5}$   
 $\therefore \quad t = \frac{6R}{5} \times C = \frac{6RC}{5} = 1.2 RC$   
21.  $Y = \overline{AB} + \overline{CD} = \overline{AB} \cdot \overline{CD}$   
(By de-Morgan's theorem)  
 $= ABCD$   
22. (A) Astigmatism-It can be corrected  
with the use of cylindrical lens.  
(B) Hypermetropia-To overcome  
from this problem a convex lens is  
used.  
(C) Myopia-It is also know by short  
sightedness and can be  
corrected with the use of

corrected with the use of concave lens.23. When *n* resistors are connected in

parallel, then  

$$\frac{1}{P} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \dots + \frac{1}{R_n} \dots (i)$$
When last register is removed then

$$\frac{1}{2} = \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \dots + \frac{1}{2} \dots (ii)$$

 $Q = R_1 + R_2 + R_3 + \dots + R_{n-1}$ Subtracting Eq. (ii) from Eq. (i), then

$$\frac{1}{P} - \frac{1}{Q} = \frac{1}{R_n}$$
$$\frac{Q - P}{PQ} = \frac{1}{R_n} \implies R_n = \frac{PQ}{Q - P}$$

**24.** As the gravitational force of attraction between sun and jupiter provide the necessary centripetal force to jupiter to move in a circular orbit.

So, 
$$\frac{mv^2}{r} = \frac{GMm}{r^2} \Rightarrow v = \sqrt{\frac{GM}{r}}$$
  
=  $\sqrt{\frac{6.67 \times 10^{-11} \times 1.99 \times 10^{30}}{7.8 \times 10^{11}}}$   
=  $1.3 \times 10^4 \text{ ms}^{-1}$ 

goes on decreasing with height unitil it become zero. After that the situation is reversed and the velocity goes on increasing untill the ball hits the ground. This explanation can be interpreted by graph (a), as the motion is in 2-D.

**26.** Pressure in spherical drop,  $p = \frac{2T}{R}$ .  $\frac{2T}{R_1} = 5 \times \frac{2T}{R_2}$  (:: Given,  $p_1 = 5p_2$ )

$$\Rightarrow R_2 = 5R_1$$
  
and  $\frac{m_1}{m_2} = \frac{4\pi R_1^3 d_1}{4\pi R_2^3 d_2} = \frac{1}{125}$ 

**27.** For first refracting surface, For parallel beam of light,

$$-\frac{\mu_1}{u} + \frac{\mu_2}{v} = \frac{\mu_2 - 1}{R}$$
$$= -\frac{1.4}{-\infty} + \frac{15}{v} = \frac{15 - 1.4}{R}$$
$$v = 15R$$

For second refracting surface,

$$\begin{aligned} &-\frac{\mu}{15R}+\frac{\mu_3}{v'}=\frac{\mu_3-\mu_2}{R}\\ \Rightarrow &-\frac{15}{15R}+\frac{1.6}{v'}=\frac{1.6-15}{R} \Rightarrow v'=\infty \end{aligned}$$

Hence, the combination behaves as a glass plate.

**28.** Half life of X = mean life of Y

Let  $\lambda_{\it X}$  and  $\lambda_{\it Y}$  be decay constants of  $\it X$  and  $\it Y,$  then condition (1) implies

$$\frac{0.693}{\lambda_{\chi}} = \frac{1}{\lambda_{\gamma}} \implies \lambda_{\gamma} = \frac{\lambda_{\chi}}{0.693} \Longrightarrow \lambda_{\gamma} > \lambda_{\chi}$$

As rate of decay is proportional to decay constant, hence decay of Y will be faster than that of X.

**29.** It is a adiabatic process so,  $p^{(1-\gamma)}T^{\gamma} = \text{constant}$ 

$$\left(\frac{p_2}{p_1}\right)^{\gamma-1} = \left(\frac{T_2}{T_1}\right)^{\gamma}$$
$$\left(\frac{1}{3}\right)^{\gamma-1} = \left(\frac{T_2}{300}\right)^{1.4} \left[\because \frac{7}{5} = 1.4\right]$$
$$0.4 \left[\log 1 - \log 3\right] = 1.4 \left[\log T_2 - \log 300\right]$$

$$T_2 = 217 \text{ K}$$

**30.** According to photoelectric equation,

$$E_{K} = h\nu - h\nu_{0} \qquad \dots (i)$$

If the energy of photon hv is less than the work function  $hv_0$  of metallic surface, then electrons will never be ejected from surface regardless of intensity of incident light.

Also, from Eq. (i), when  $v = v_0, E_K = 0$ 

:. Graph (d) represents variation of  $E_K$  with v.

**31.** In first case, 
$$v = \frac{3}{2L} \sqrt{\frac{T_1}{m}}$$

In second case, 
$$\mathbf{v} = \frac{5}{2L}\sqrt{\frac{T_2}{m}}$$
  
 $\therefore \frac{3}{2L}\sqrt{\frac{T_1}{m}} = \frac{5}{2L}\sqrt{\frac{T_2}{m}}$   
 $\Rightarrow \sqrt{\frac{T_2}{T_1}} = \frac{3}{5} \text{ or } \frac{T_2}{T_1} = \frac{9}{25}$   
 $\Rightarrow T_2 = \frac{9}{25}T_1$   
 $= \frac{9}{25} \times 8 = 2.88 \text{ g}$   
**32.** Mass of hemisphere  $= \frac{2}{3}\pi r^3 \rho$   
Mass of cone  $= \frac{1}{3}\pi r^2 h \rho$   
The mass moments about the centre of mass is zero. So,  
 $m_H(\frac{r}{2}) = m_c(\frac{h}{4})$   
 $\Rightarrow \frac{2}{3}\pi r^3 \rho \times \frac{r}{2} = \frac{\pi r^2 h \rho}{3} \times \frac{h}{4}$   
 $\Rightarrow h^2 = 4r^2 \text{ or } h = 2r = 4 \text{ m}$   
**33.** For resistance thermometers,  
 $t = \frac{R_t - R_{0^\circ}}{R_{100} - R_{0^\circ}} \times 100^\circ \text{ C}$   
 $t = \frac{9}{6} \times 100 = 150^\circ \text{ C}$   
**34.** As,  $C_V = \frac{R}{r-1}$   
For monoatomic gas,  $C_V = \frac{R}{\frac{5}{3}-1} = \frac{3}{2}R$   
For diatomic gas,  $C_V = \frac{R}{\frac{7}{5}-1} = \frac{5}{2}R$   
For mixture,  $C_V' = \frac{nC_V + n'C_V}{n+n'}$   
 $= \frac{1 \times \frac{3}{2}R + 3 \times \frac{5}{2}R}{1+3}$   
 $= \frac{9}{4}R = \frac{9}{4} \times 8.3$   
 $= 18.7 \text{ JK}^{-1} \text{ mol}^{-1}$ 

$$mg = \frac{GMm}{R^2} = 72 \text{ kgf}$$

Then on mars surface, the value of gbecomes CMIC

$$g' = \frac{GM'}{R'^2} = \frac{GM/9}{(R/2)^2} = \frac{4GM}{9R^2}$$
$$\Rightarrow g' = \frac{4}{9}g$$
The weight of body on mars is
$$mg' = m \times \frac{4}{9}g = \frac{4}{9}mg$$
$$= \frac{4}{9} \times 72 = 32 \text{ kgf}$$
(MODULE 2)

**36.** As, 
$$F = \frac{\mu_0}{2\pi} \cdot \frac{l/2}{r}$$
  
 $= \frac{\mu_0}{2\pi} \cdot \frac{l \cdot l}{a} = \frac{\mu_0 l^2}{2\pi a}$   
**37.** Impulse imparted to ball = Change in momentum  $= mv$   
As, angular momentum  
 $h$   
 $= moment of momentum$   
 $l\omega = mvh \Rightarrow \frac{2}{5}mr^2\omega = mvh$   
 $\Rightarrow \qquad \omega = \frac{5vh}{2r^2}$   
**38.** Let a wire length *L* is bend in a circular form of radius  $r$   
 $2\pi r = L$   
 $\Rightarrow \qquad r = \frac{L}{2\pi} \qquad ...(i)$   
 $\int r = \frac{L}{2\pi} \qquad ...(i)$   
The magnetic dipole moment of a circular ring,  
 $M = lA$   
 $M = h\pi r^2 \qquad ...(ii)$   
On putting the the value of  $r$  from Eq.  
(i), we get  
 $\Rightarrow \qquad M = l\pi \left(\frac{L}{2\pi}\right)^2 = l\pi \frac{l^2}{4\pi^2} = \frac{ll^2}{4\pi}$   
**39.** From the relation,  
 $\Delta E = 13.6 \text{ eV} - \frac{13.6 \text{ eV}}{n^2}$   
 $= 13.6 \text{ eV} - \frac{13.6 \text{ eV}}{(2)^2} = 10.2 \text{ eV}$   
Therefore, excitation potential  
 $= \frac{10.2}{e} \text{ eV} = 10.2 \text{ V}$   
**40.** Work done on equipotential surface is zero because potential difference is zero.  
**41.** Let *d* be the distance travelled by ray in the direction of mirror, then

24 m -<u></u> d 8 cm 53° 53°

$$\tan 53^{\circ} = \frac{d}{8 \times 10^{-2}}$$

$$d = 8 \times 10^{-2} \tan 53^{\circ}$$

$$= 8 \times \frac{4}{3} \times 10^{-2}$$

$$= \frac{0.32}{3}$$
Total number of reflections before it reaches the other end
$$= \frac{24}{d} = \frac{24}{0.32/3}$$

$$= \frac{24 \times 3}{0.32} = 225$$
**42.** The displacement of particle from mean position is  $y = A \sin \omega t$ 
As,  $\omega = \frac{2\pi}{T} = \frac{2\pi}{3} \operatorname{rad s}^{-1}$ 

$$\Rightarrow 12.5 = 25 \sin \frac{2\pi}{3}t$$

$$\Rightarrow \sin \frac{2\pi}{3}t = \frac{12.5}{25} = \frac{1}{2}$$

$$\Rightarrow \sin \frac{2\pi}{3}t = \sin \frac{\pi}{6}$$

$$\Rightarrow t = \frac{1}{4} = 0.25 \text{ s}$$
Total time between two points of 12.5 m is given by
$$2t = 2 \times 0.25 = 0.5 \text{ s}$$
**43.**  $I_g = \frac{V}{G}$ 
and  $R = \frac{nV}{I_g} - G$ 

$$= \frac{nV}{V/G} - G = (n - 1) G$$
**44.** We know that a phase change of  $\pi$  occurs, when the reflection takes place at the boundary of denser medium. This

 $\Rightarrow$ 

 $\Rightarrow$ 

 $\Rightarrow$ 

 $\Rightarrow$ 

44. We occ at th is equivalent to a path difference of  $\lambda$  / 2. Total phase difference =  $\pi - \pi = 0$ Thus, the two waves superimpose in phase.

Resultant amplitude = 
$$\sqrt{l} + \sqrt{\left(\frac{l}{4}\right)}$$
  
=  $\frac{3}{2}\sqrt{l}$   
Resultant intensity =  $\left(\frac{3}{2}\sqrt{l}\right)^2$   
=  $\frac{9}{4}l = \frac{9}{4}$  fold

**45.** From Gauss theorem,

$$\phi_E = \frac{q_{in}}{E_0}$$
$$= \frac{+8e - 8e}{E_0} = 0$$

- 46. The sulphide ore is converted to oxide before reduction because oxides are easier to reduce. In this way, ore conversion is suitable for reduction.
- 47. Victor Meyer's method is used to distinguish between primary, secondary and tertiary alcohols. By identifying the colour produced, the alcohols are identified. Rest all the other methods given are used to distinguish between primary, secondary and tertiary amines.
- 48. Glycine is only optically inactive amino acid due to absence of chiral carbon atom. н

$$H_2N$$
—C—COOH  
H  
Glycine

**49.** Bithional, an antiseptic, is mixed to medicated soaps to impart antiseptic properties.



50. The basic character of the given compounds follows the following trend in aqueous solution.

 $(CH_3)_3N < CH_3NH_2 < (CH_3)_2NH$ This is due to combined effects of steric, hindrance, solvation and +I-effect.



This reaction is an example of Schotten-Baumann reaction.

52. Piperidine and morpholine both are non-aromatic and N-atom is  $sp^3$ hybridised in them, so these are more basic as compared to other two (which are aromatic and have  $sp^2$  hybridised N-atom). -/-effect of O-atom in

morpholine makes it less basic as compared to piperidine. Now, out of pyridine and pyrolle, pyridine is much stronger base as the lone pair of nitrogen atom in pyridine is not involved in resonance. So, the order of basic strength is : I > III > II > IV.



m-CPBA causes formation of epoxide ring from less hindered side and ring opening will also occur from less hindered side.

**55.**  $CoCl_3 \cdot 6H_2O + AgNO_3 \longrightarrow 2 mol AgCl$ 1 mol

As two CI atoms are outside the coordinate sphere. So, the coordination number of Co = 6. Thus,  $[Co(H_2O)_5CI]CI_2 \cdot H_2O.$ 

- **56.** The ligand  $N(CH_2CH_2NH_2)_3$  is tetradentate. The given ligand have four donor atoms. They donate four pair of electrons to metal ion.
- 57. Due to presence of incomplete filled d-sub shell it shows variable valency. Hence, it can extend its valency.
- 58. CO is a neutral ligand. : Oxidation state of Ni in [Ni(CO)<sub>4</sub>] is 0.
- 59. Chromatography is based on the principle of differential adsorption of different components over an adsorbent. In this method, weakly adsorbed component is eluted first and the strongly adsorbed component is elucted afterwards.
- **60.**  $\operatorname{Fe}^{3+} = [_{18}\operatorname{Ar}] 3d^5 4s^0, n = 5$

$$\mu = \sqrt{n (n + 2)}$$

$$\mu = \sqrt{5(5 + 2)} = \sqrt{35} = 5.91 \text{BM}$$

61. Xe shows highest chemical reactivity because of its low ionisation energy. Xe forms most of the compounds with F and O like XeF<sub>2</sub>, XeF<sub>4</sub>, XeF<sub>6</sub>, XeO<sub>3</sub> etc.

**62.** 
$$CH_3 >= O + NH_2 - NH_2$$
  
 $CH_3 >= O + OH_2 - NH_2 - OH^{\Theta}$   
 $CH_3 >= CH_2$ 

This conversion is termed on Wolf-Kishner reduction.

- **63.** The mixture of conc. HCl and HNO<sub>3</sub> made in 3 : 1 ratio is called aqua-regia. The reaction is given below :  $HNO_3 + 3HCI \longrightarrow NOCI + CI_2 + 2H_2O$ Conc. Conc.
- **64.** KMnO<sub>4</sub> is used in analytical chemistry as it is used in quantitative analysis for detecting halides and oxalates. It is used as an oxidising agent in the laboratory as well as in industry. It is also used in bleaching of wool, cotton and silk.
- 65. Functions of salt-bridge Complete the cell circuit, maintains electrical neutrality in the solution of two half-cells, prevent diffusion of the solutions from one half-cell to the other.
- **66.**  $2N_2O_5 \longrightarrow 4NO_2(g) + O_2(g)$ Rate law for the above reaction is given as : Rate =  $k[N_2O_5]$

So, order of the reaction is 1.

67. Photochemical decomposition of HNO<sub>3</sub> produces NO<sub>2</sub> and O<sub>2</sub> gases.

$$2HNO_3 \xrightarrow{h_V} H_2O + 2NO_2 + \frac{1}{2}O_2$$

68. Average kinetic energy (per molecule)

$$=\frac{3}{2} KT$$
$$=\frac{3}{2} \times \frac{8.314 \text{ JK}^{-1}}{6.023 \times 10^{23} \text{ mol}^{-1}} \times 298$$

 $= 6.2 \times 10^{-21} \text{ JK}^{-1} \text{ molecule}^{-1}$ 

- 69. Species having same total number of valence electrons are isoelectronic with each other. Total valence electrons in  $NO^+ = 5 + 6 - 1 = 10$ 
  - Total valence electrons in

 $SbH_5 = 5 + 5 = 10$ 

- ... NO<sup>+</sup> and SbH<sub>5</sub> are isoelectronic.
- **70.** (i) For *s*-block element, electronic configuration is [Xe]  $5s^1$ .
  - (ii) For p-block element, electronic configuration is [Xe]  $4f^{14}5d^{10}6s^26p^2$
  - (iii) For d-block element, electronic configuration is [Kr]  $4d^{10}5s^{1}$ .
  - (iv) For *f*-block element. electronic configuration is [Xe]  $4f^75d^16s^2$ .

**71.** 
$$\lambda \propto \frac{1}{Z^2}$$
  
 $\frac{\lambda_{(Li^{2+})}}{\lambda_{(H)}} = \frac{1}{9} \Rightarrow \lambda_{(Li^{2+})} = \frac{821}{9} = 91.2 \text{ nm}$   
**MODULE 2**

72. An isothermal process is a change of a system, in which the temperature remains constant. For isothermal process

> $\Delta T = 0$ Hence,  $\Delta U = 0 = Q \pm W$  $Q = -W = -nRT \ln \frac{V_2}{V}$

ring are called pyranose. e.g. Glucose.  
**74.** Mixing of gases increases the entropy.  
**75.** 
$$N_2O_4 \longrightarrow 2NO_2$$
  
Initial moles 1 0  
Moles at equilibrium  $1-\alpha$   $2\alpha$   
Total number of moles at equilibrium  
 $= 1-\alpha + 2\alpha = 1+\alpha$ 

**76.** 
$$\operatorname{CaCO}_{3}(s) \xrightarrow{\Delta} \operatorname{CaO} + \operatorname{CO}_{2} \uparrow$$
  
 $\operatorname{CaO} + \operatorname{H}_{2}\operatorname{O} \longrightarrow \operatorname{Ca(OH)}_{2} \xrightarrow{\operatorname{CO}_{2} (\operatorname{excess})} \underset{Ca(\operatorname{HCO}_{3})_{2}}{\overset{C}{\operatorname{Ca(HCO}_{3})_{2}}} \xrightarrow{C} \operatorname{Ca(\operatorname{HCO}_{3})_{2}} \xrightarrow{C} \operatorname{Ca(\operatorname{HCO}_{3})_{2}} \xrightarrow{C} \operatorname{Ca(\operatorname{HCO}_{3})_{2}} \xrightarrow{C} \operatorname{CaCO}_{3} + \operatorname{CO}_{2} + \operatorname{H}_{2}\operatorname{O}}$ 

77. Percentage of chlorine

 $= \frac{35.5}{143.5} \times \frac{\text{mass of AgCl}}{\text{mass of the compound}} \times 100$  $= \frac{35.5}{143.5} \times \frac{0.287}{0.099} \times 100 = 71.71\%$ 

**78.** As *B* is a powerful reducing agent reduces CO<sub>2</sub>, NO and SiO<sub>2</sub>, *B* replaces C, Si and N from CO<sub>2</sub>, SiO<sub>2</sub> and NO respectively as

 $4B + 3CO_2 \longrightarrow 2B_2O_3 + 3C$  $4B + SiO_2 \longrightarrow 2B_2O_3 + 3Si$  $4B + 6 NO \longrightarrow 2B_2O_3 + 3N_2$ 

79. Nucleophile always attack on electron deficient site. Presence of electron withdrawing groups such as NO<sub>2</sub>, CHO etc., decreases the electron density on benzene nucleus, hence such groups activate the ring towards nucleophilic attack. While presence of electron releasing groups such as -----OR increases the electron density, thus deactivates the benzene nucleus toward nucleophilic attack. NO2 group activates the ring more than ---Cl towards nucleophilic attack.

80. SeriesName of seriesStable end products4nThorium
$$^{208}_{82}$$
Pb4n+1Neptunium $^{209}_{83}$ Bi4n+2Uranium $^{206}_{82}$ Pb4n+3Actinium $^{207}_{82}$ Pb

- 81. Dissolved oxygen is essential for aquatic life. Organic waste is oxidised by microorganisms using dissolved oxygen. Hence, oxygen from water decreases which is harmful for aquatic life.
- 82. According to collision theory,  $k = Z_{AB} e^{-E_a/RT}$ where,  $Z_{AB}$  = collision frequency
- 83. Na<sup>⊕</sup> lies in octahedral voids formed by Cl<sup>⊖</sup>. Here, Na<sup>+</sup> present at body centre touches six Cl<sup>-</sup> ions. Each Cl<sup>-</sup> ion in the lattice is present at the face centre of each cube.

[Distance between Na<sup>+</sup> and Cl<sup>-</sup> =  $\frac{a}{2}$ ]

Distance between two nearest (one at body centre and other at edge centres)

 $Na^{\oplus} = a/\sqrt{2}$ 

... The number of nearest neighbours of Na<sup>+</sup>ion

 $= 6 \text{Cl}^- \text{ ions}$ 

The number of next nearest neighbours of Na<sup>+</sup> ions  $= 12 \text{Na}^+ \text{ ions}$ 

- **84.**  $C_2H_6I$  and  $C_2H_5OH$  pair will not form ideal solution. Here, C<sub>2</sub>H<sub>5</sub>OH will show H-bonding as well as polarity both.
- 85. According to Faraday's law, 14

$$W = Z \cdot Il$$
  
Given the value of it is same for H

and 
$$O_2$$
.

Then,  

$$\frac{w_{H_2}}{w_{O_2}} = \frac{z_{H_2}}{z_{O_2}}$$

$$\frac{w_{H_2}}{w_{O_2}} = \frac{E_{H_2}}{E_{O_2}}$$

$$\frac{0500}{w_{O_2}} = \frac{2}{16}$$

$$w_{O_2} = \frac{16 \times 0.5}{2}$$

$$w_{O_2} = 4.00 \text{ g}$$

# **NEET** Test Drive

**86.** Weight of benzene =  $V \times d$ 

$$= 50 \times 0.879$$
 g

= 43.95 g Weight of compound = 0.643 g

$$\Delta T_f = 50.51 - 50.03 = 0.48$$

$$\therefore \quad \Delta T_f = K_f \times \frac{M}{M}$$
$$= \frac{1000}{W_{\text{benzene}}}$$
$$0.48 = 5.12 \times \frac{0.643}{M} \times \frac{1000}{43.95}$$

- $M = 156.05 \text{ g mol}^{-1}$
- 87. The oxygen atom in phenol has more dominating resonance effect than inductive effect.

Increase in charge separation decreases the stability of a resonating structure.



Stability of resonating structures in decreasing order will be : I > IV = II > III.

**88.** p<sub>1</sub> = 100 kPa, (t<sub>1/2</sub>)<sub>1</sub> = 364 s

$$p_2 = 50 \text{ kPa}, (t_{1/2})_2 = 182 \text{ s}$$

$$\frac{100}{50} = \frac{304}{182} = 2$$
  
$$\frac{p_1}{P_2} = \frac{(t_{1/2})_1}{(t_{1/2})_2} = \frac{a_1}{a_2}$$

 $\therefore t_{1/2 \propto a}$  where, a = initial concentration or presence of reactants and this is true for zero order reaction.

**89.** EAN = (atomic number – oxidation state  $+ 2 \times CN$ 

> $= 27 - 3 + 2 \times 6$ = 24 + 12 = 36

90. Noble gases are slightly soluble in water and their solubility increases with increase in atomic number on moving down the group. Thus, the correct order of solubility is

Xe > Kr > Ar > Ne > He.

# MODULE 2)

factor

- **91.** The virus of hepatitis-A contains a single strand of RNA and has no envelope.
- **92.** Among the given options, option (d) is incorrectly matched. Hypoglossal is a motor nerve which controls the movements of the tongue. It originates from the ventral side of the medulla oblongata.
- 93. Phycophages are the viruses which are parasitic on algae. Mycophages are fungal viruses. Retroviruses carry enzyme reverse transcriptase. They have RNA genome. Tumour viruses cause benign and malignant tumours in animals and humans.
- **94.** K-T boundary refers to the mass extinction of 60 million years ago when dinosaurs disappeared. It is connected with deposits of iridium which are rare on the earth.
- **95.** *C*-represents coleoptile which is a protective covering for plumule in the embryo.
- **96.** Statements I and III are correct, while statement II is incorrect. This can be corrected as : The slow block polyspermy develops in response to the formation of fertilisation membrane and polyspermy is the process of entry of more than one sperm into the oocyte.
- **97.** In a polygonum type of embryo sac, the egg apparatus is situated towards the micropylar end.
- **98.** Phototropism is the curvature movement that takes place when plant is provided with artificial or natural light only from one direction. It can be positive (towards light) or negative (away from light).
- **99.** The plants growing in aquatic habitat are known as hydrophytes. They have no cuticle over the epidermis. The aerenchyma is well-developed and secondary growth is absent.
- **100.** Streptokinase is an enzyme produced by streptococci that catalyse the conversion of plasminogen to plasmin. It is administered intravenously as a thrombolytic agent in the treatment of acute coronary arterial thrombosis.
- **101.** The production of fertile soil on bare rocks is primary succession. It begins in an area where no living organisms ever existed. It takes several hundred to thousand years under favourable climatic conditions to produce fertile soil.

**102.** Agrobacterium tumefaciens, a pathogen of several dicot plants is able to deliver a piece of DNA, known as T-DNA, to transform normal plant cells into a tumour cell and direct these tumour cells to produce the chemicals required by the pathogen. The Ti plasmid of Agrobacterium tumefaciens has now been modified into a cloning vector which is no more pathogenic to the plants. It is able to deliver the genes of our interest into a variety of plants.

BIOLOGY

- 103. Digeorges' Syndrome (DGS) also called as thymic aplasia occurs because of the deficiency of T-cells. DGS is caused by abnormal formation of certain tissues during the foetal development.
- **104.** The percentage of lipoprotein is maximum in chylomicrons. Chylomicrons transport lipids absorbed from the intestine to various tissues, where their triglyceride components are hydrolysed by the activity of the lipoprotein lipase, allowing the released free fatty acids to be absorbed by the tissues.
- **105.** The statement (b) is incorrect regarding *Spirogyra.* In it, conjugation tube is formed. The male gamete passes through this tube to unite with female gamete.
- **106.** Acetyl Co-A is the intermediate compound that links glycolysis to Krebs cycle. The end product of glycolysis is pyruvate. It is converted into acetyl Co-A before it enters the Krebs cycle.
- **107.** Apoinducer is a protein that binds with the DNA to activate transcription. Catabolite Activator Protein (CAP) activates transcription through interactions with RNA-polymerase. This interaction causes binding of DNA near the transcription start site, thus effectively catalysing the transcription initiation process.
- **108.** In cockroach, corpora allatum is an endocrine gland which generates juvenile hormone. It plays a crucial role in metamorphosis. Removal of the corpora allata can cause immature larva to pupate at its next molt, resulting in miniature adult.

**109.** Options (a) and (b) both are correctly matched. The physical xerophytes are plants that grow in soils which are physically dry due to the shortage of water.

Physiological xerophytes are plants that grow in soils having sufficient water but it is not available to the plants due to high salt concentration.

- **110.** Attenuation is a mechanism of control of some bacterial operons which results in premature termination of transcription and is based on the fact that, in bacteria, transcription and translation proceed simultaneously.
- **111.** In protoplast fusion, tissues of two different plants are cultured. Their cells are separated and treated with pectinase and cellulase to produce naked protoplast which are then made to fuse by electrofusion.
- **112.** In humans, in week 3, the neural tube develops and the brain and spinal cord begin to develop.
- **113.** The number of chromosomes in leaf cells is 24 (2*n*). Aleurone cells are the part of endosperm which is triploid in nature. Therefore, the number of chromosomes in it would be 36 (3*n*).
- **114.** The statement (d) is incorrect regarding significance of biopatents. It can be corrected as

Bioethics is the branch of ethics, philosophy and social commentary that deals with the biological sciences and their potential impact on society.

- **115.** Bordered pits are found on the radial walls of xylem tracheids and vessels. Bars of Sanio develop below these pits.
- **116.** Catabolic repression is a system of gene control in some bacterial operons in which glucose is used preferentially and the metabolism of other sugars is repressed in the presence of glucose.

Catabolite repression allows microorganisms to adapt quickly to preferred carbon/energy source (like glucose) first. This is achieved through inhibition of synthesis of enzymes involved in catabolism of carbon sources.

**117.** Population of organisms evolves to maximise their reproductive fitness, i.e. Darwinian fitness in the habitat in which



## NEET Test Drive

they live, under a particular set of selection pressures. Organisms evolve towards most efficient reproductive strategy. Life history traits of organisms have evolved in relation to the constraints imposed by components of habitat in which they live.

- **118.** Cohesin is a multi-subunit protein complex that holds the sister chromatids together after DNA replication, i.e. in prophase and metaphase, during anaphase removal of cohesin leads to the separation of sister chromatids.
- **119.** Viruses are known as wandering genes because nucleic acid is the only active part of it. The infectivity of virus is due to nucleic acid, while host specificity is determined by the protein coat.
- **120.** Total volume of air a person can inspire after a normal expiration is the inspiratory capacity. It includes Tidal Volume (TV) + Inspiratory Reserve Volume (IRV).
- **121.** Benign tumour does not invade other tissues or spread to other sites. It is usually well-encapsulated in connective tissue.
- **122.** Creatine is an endogenous organic compound, which is synthesised from simpler amino acids, namely glycine, arginine and sulphur containing amino acid, methionine. Its synthesis takes place in the kidney and liver which is then transported to muscles through the blood.

Creatine is found in vertebrates where it facilitates recycling of ATP molecules. This is achieved by converting ADP back to ATP through donation of phosphate group.

**123.** CAP-*c*AMP binds to a specific site on the DNA, stimulating transcription of the *lac* genes and production of lactose-metabolising enzymes.

The *lac* operon is an operon required for the transport and metabolism of lactose in *E.coli* and many other bacteria.

In the absence of lactose, the *lac* repressor, halts the production of enzymes encoded by *lac* operon. *c*AMP binds to Catabolite Activator Protein (CAP), which assists RNA polymerase in binding to the DNA. This significantly increases the production of  $\beta$ -galactosidase, enabling the cell to hydrolyse lactose and release galactose and glucose.

MODULE 2)

**124.** CO<sub>2</sub> is produced by the burning of fossil fuel.

 $CH_4$  is produced by freshwater wetlands. CFC is a non-toxic gas.

N<sub>2</sub>O is produced by industrial processes.

125. Intrafascicular cambium is cambium between xylem and phloem.Interfascicular cambium is parenchymatous cells of medullary rays.

Tyloses are balloon-like structures. Heartwood is physiologically inactive.

- **126.** Testis is a primary sex organ as it produces male gametes and secretes sex hormone, testosterone.
- 127. Enhancers are DNA sequences that facilitate the expression of a given gene. They may be located few hundred base pairs away from the gene.Whereas, promoter is a DNA sequence at which RNA polymerase may bind,

leading to the initiation of transcription.128. Thyroxine is formed by the amino acid

- **128.** Thyroxine is formed by the amino acid tyrosine, which is made by the body from another amino acid phenylalanine.
- **129.** Maintenance of favourable dynamic constancy is called thermoregulation, while maintenance of constant internal temperature by an organism is called homeostasis. The oldest living plant on earth is bristle cone pine of California.
- **130.** Vitamin-B<sub>12</sub> or cyanocobalamin is a cobalt containing vitamin found in meat, liver and fish. It promotes DNA synthesis and maturation of RBCs. The absorption of cobalamin in the intestine requires the action of a glycoprotein, Castle's intrinsic factor.
- **131.** Hepaticopsida has capsule without any columella.

In Anthocerotopsida, sterile columella is present.

In Bryopsida, sporophyte is well-differentiated into foot, seta and capsule.

Marchantiales includes Riccia.

**132.** Golden rice is a  $\beta$ -carotene enriched variety of *Oryza sativa*. It was created by transforming rice with two  $\beta$ -carotene biosynthesis genes, *psy* and *crtl*. The *crtl* gene was isolated from the soil bacterium, *Erwinia uredovora*.

133.	Hormone	Function				
	Human chorionic gonadotropin	Maintains corpus luteum				
	Progesterone	Suppresses uterine contractions				
	Oestrogen	Promotes growth of myometrium				
	Relaxin	Softens cervix to prepare for dilation				

**134.** Undersecretion of growth hormone causes dwarfism. Very small people are produced due to the undersecretion of growth hormone. Such people are called 'midgets'.

- **135.** In honeybees, an offspring formed from the union of a sperm and an egg develops as a female and an unfertilised egg develops as a male (drone) by means of parthenogenesis. Thus, males have half the number of chromosomes than that of a female.
- **136.** Bilirubin is produced in the macrophage-monocyte system by the breakdown of haemoglobin to biliverdin and then bilirubin. It is carried to the liver by attaching to the albumin as it is insoluble in water. In liver, bilirubin is conjugated with glucuronic acid by the enzyme glucuronyltransferase, making it soluble in water.
- **137.** In cockroach, XX-XO sex chromosome complement is found. In this pattern, the female has two X-chromosomes (called XX) while male has only one X-chromosome (called XO). The X-chromosome is completely absent here. Thus, the presence of unpaired X-chromosome determines the masculine sex. The female produces only one type of eggs and male produces two types of sperms, i.e. 50% with one X-chromosome and 50% without any sex chromosome.
- **138.** The depletion of ozone layer leads to an increase in ground level ultraviolet radiation, because ozone is an effective absorber of ultraviolet radiation. The effects of ozone depletion include inhibition of photosynthesis in phytoplanktons which affects the food chains. It damages nucleic acids in living organisms (mutation). The ozone depletion causes an increase in UV radiations reaching the earth' surface which can cause skin cancer.
- **139.** Insulin increases glucose uptake in liver, leucocytes and smooth, cardiac and skeletal muscles. It does not do so in brain, renal tubules, intestinal mucosa and RBCs.

**140.** The *lac* operon of *E.coli* contains genes involved in lactose metabolism.

Two regulators turn the operon 'on' and 'off' in response to lactose and glucose levels, the *lac* repressor and Catabolite Activator Protein (CAP). The *lac* repressor senses lactose through allolactose and stops acting as repressor. CAP activates transcription of operon sensing low glucose levels through *c*AMP.

- 141. Tay-Sachs disease is an example of incomplete dominance. In this disease, mutations in the gene coding for an enzyme, hexosaminidase that causes neurological dysfunction. This enzyme breaks down lipid byproducts gangliosides in the cell's lysosomes. In Tay-Sachs disease, homozygous recessive individuals are severely affected with a fatal lipid-storage disorder, whereas, heterozygous individuals have only 50% of enzyme activity found in normal individuals.
- **142.** Water potential refers to the chemical potential of water in a system. The water potential of pure water is zero. Water potential increases when pure water is heated as there is increase in free energy. Hence, all the statements are correct regarding water potential.
- **143.** The labellings of occipital and temporal bones have been interchanged. The bone labelled occipital bone here is actually temporal bone and the bone labelled as temporal bone is actually occipital bone.
- **144.** *Eryx johnii* (Sand boa) is a double-headed snake. It has a small, non-prehensile thick tail bearing a resemblance to head. It is a species of non-venomous snake in the subfamily Erycinae of the family Boidae. It is adapted to burrowing so, the head is wedge-shaped.
- **145.** Himalayan ranges separate Palaearctic and Oriental regions.
- **146.** Lysozymes present in the saliva act as an antibacterial agent that prevent infections.
- **147.** Craidukov's phenomenon is the capacity of changing colour according to the wavelength of incident light. It is exhibited by species that develop green shades in red light, brownish-yellow in blue light, etc. It is also known as chromatic adaptation.
- **148.** Hydroponics is a technique of growing plants in a nutrient solution. Hydroponics have been successfully

employed as a technique for the commercial production of vegetables such as tomato, seedless cucumber, etc. Thus, this technique facilitates the production of seasonal vegetables. It also avoids soil borne pathogens.

However, the cost of these experiments is high and also requires skilled people to perform it.

- **149.** Crinoidea is a class of stalked and sedentary echinoderms.
- **150.** Maternal blood sampling is a non-invasive technique to detect foetal disorders.

The test measures the level of three or four substances, e.g. alfa fetoprotein, hCG, etc., in a sample of mother's blood during pregnancy. These tests are done to detect birth defects in the foetus such as Down's syndrome, brain or spinal defects, etc.

- **151.** Pollination by snails is called malacophily and by ants is called myrmecophily, e.g. *Anemone nemarosa.*
- **152.** The statement (d) is incorrect regarding viruses as they can reproduce only inside a host cell.
- **153.** Sewage is treated in Sewage Treatment Plants (STP) before disposal to make it less polluting. This treatment is carried out in two stages, *viz.* primary treatment and secondary treatment. The primary treatment steps basically involve the physical removal of large and small particles from the sewage through filtration and sedimentation.
- **154.** On the basis of functions, the meristematic tissue is divided into protoderm, procambium and ground meristem.

Protoderm is the outermost meristematic layer of apical meristem which develops into epidermis. Procambium is located inside

protoderm and gives rise to primary vascular tissue.

Ground meristem is the precursor of ground tissue which forms pith, cortex, hypodermis and pericycle.

**155.** All the pairs are correctly matched. The photosynthetic pigments in Chlorophyceae are chlorophyll-*a* and *b* carotenoids.

The photosynthetic pigments in Phaeophyceae are chlorophyll-a and *c*, fucoxanthin.

The photosynthetic pigments in Rhodophyceae are chlorophyll-*a*, phycocyanin, phycoerythrin and xanthophyll.

- **156.** The MN blood group in humans is an example of codominance. In codominance, there is joint expression of both alleles in a heterozygote. In this situation, two alleles of a single gene are responsible for producing two distinct and detectable gene products.
- **157.** Tumour-suppressor genes (e.g. p<sup>53</sup> gene) are very important to maintain the genomic integrity. They help in stopping division of cells having damaged DNA.
- **158.** In glomerulus, the afferent arteriole is shorter and wider than efferent arteriole which is longer and narrower.
- **159.** The radioactive waste should be disposed after sufficient pre-treatment, in suitably shielded containers buried within rocks, about 500m deep below the Earth's surface and in specially constructed buildings.

The radioactive waste may be reprocessed, but this method is abandoned as it increases the volume of wastes almost 150 times.

- **160.** Heterotrophic bacteria resemble oldest fossil.
- **161.** The options (a), (b) and (c) are the characteristics of virusoids. Prions are the proteinaceous infectious particles. They have a distinct extracellular form which is entirely a protein.
- 162. Oral contraceptive pill is a popular method of contraception used by females. They work by inhibiting ovulation and implantation.
  'Saheli' is a new oral contraceptive pill for females that contain a non-steroidal preparation. It is once a week pill with very few side effects and high contraceptive value.
- **163.** MAB is associated with studying impact of human interference on environment. It is an international biological programme of UNESCO. It is also associated with pollution in biotic and abiotic environments. It is involved in conservation strategies for present and future.
- **164.** Cardiac sphincter is a valve that guards the oesophagus and stomach. It prevents the food from the stomach to come back to mouth. In newborns, it is not fully matured, allowing the stomach contents to flow backwards.



# NEET Test Drive

- **165.** Sclerophyllous are leaves which are stiff and hard, e.g. *Banksia.* Trichophyllous are leaves covered with hairs, e.g. *Nerium.* Malacophyllous are leaves which are soft and fleshy, e.g. *Begonia.*
- **166.** Vegetative propagation is a form of asexual reproduction of plants where new plants grow from a single parent plant. The plants produced through vegetative propagation are clones and are morphologically as well as genetically similar to each other and their parent.
- **167.** Maltose is a disaccharide containing two molecules of glucose. It is formed during germination of starchy seeds and is digested with the help of enzyme maltase produced in small intestine.
- **168.** The excretory system of cockroach helps in eliminating the nitrogenous wastes from the body in the form of uric acid. The structures associated with excretory functions are Malpighian tubules, fat bodies, uricose glands, nephrocytes and cuticle. Urate cells present in the fat bodies absorb and store uric acid throughout life. This is called storage excretion as they remain stored in the cells of the corpora adipose.

- **169.** An appreciable amount of gaseous exchange of carbon between organisms and environment occurs. Thus, the statements (a) and (b) are true for carbon cycle.
- **170.** Real time PCR utilises SYBR green for detection and estimation of DNA products. SYBR green is a cyanine dye used to stain DNA. It binds with DNA molecules by intercalating between the DNA bases.
- **171.** Brown sugar is also called smack. It is an opioid derivative, derived from morphine. Its chemical name is diacetyl morphine hydrochloride and is more powerful analgesic than morphine.
- **172.** Tropical rainforests–*Dipterocarpus* Tropical deciduous forests–Sal Desert–*Acacia* sp. Coastal biome–Mangroves

173.	Сгор	Hybrid variety
	Barley	Erectiferum
	Peppermint	Todd's Mitcham
	Castor	Aruna
-	Rice	Atomita-2
-	Wheat	Pusa Lerma

**174.** Pulmonary surfactant is a mixture of lipids and proteins which is secreted by the epithelial cells, *viz.* clara cells.

Its main function is to reduce surface tension, thereby preventing the bronchioles and the lungs from collapsing.

- **175.** In the given flow chart, *a* and *b* respectively represent ACTH and cortisol. Control of glucose to glycogen is a result of the release of adrenocorticotropic releasing factor.
- **176.** In *Drosophila*, gynandromorphs occur due to loss of X-chromosome. A gynandromorph is an organism that contains both male and female characteristics. It is mainly used in entomology. These organisms can be butterflies, moths, etc.
- **177.** *Hippocampus* (seahorse) is a marine bony fish having bony plates and scutes besides scales. It has a brood pouch on the belly of males for incubating eggs.
- **178.** According to Blackman's law, when a process depends on a number of factors, its rate is limited by the pace of the slowest factor. Therefore, at a particular time, photosynthesis can be limited by CO<sub>2</sub> concentration or light.
- **179.** The option (d) is incorrectly matched pair. It can be corrected as follows Yellow fever is caused by *Flavivirus*. Smallpox is caused by variola virus.
- **180.** Both flagella and cilia have a 9+2 arrangement of microtubules. Dynein 'arms' attached to the microtubules serve as the molecular motors.

# SCORE CHART

No. of Correct Answers : A ..... Total Marks :  $x = (A \times 4) - (B \times 1)$  No. of Incorrect Answers : B .....

**Scores and Expected Rank** : If the score lies above 665, then rank will be in between 1-50. For other scores, rank estimations are given below

Score	Rank
664 - 642	51 - 150
641 – 636	151 – 250
635 – 630	251 - 400
629 – 625	401 - 500