Talent Search Exam. 2022

TEST CODE **1107**

for class XI (Medical)

BOOKLET **B**

Duration : 1.30 Hours | **Max. Marks : 400**

Please read the instructions carefully. You are alloted 5 minutes specifically for this purpose.

INSTRUCTIONS

A. General :

1. This booklet is your Question Paper. DO NOT break seal of Booklet until the invigilator instructs to do so. Total Questions to be Attempted 100: **Physics : 25, Chemistry : 25, Biology : 50 Questions.**
2. The Answer Sheet is provided to you separately which is a machine readable Optical Response Sheet (ORS). You have to mark your answers in the ORS by darkening bubble, as per your answer choice, by using black & blue ball point pen.
3. Things NOT ALLOWED in EXAM HALL : Blank Paper, clipboard, log table, slide rule, calculator, camera, mobile and any electronic or electrical gadget. If you are carrying any of these then keep them at a place specified by invigilator at your own risk.
4. Do not use white-fluid or any other rubbing material on answer sheet. Before handing over the answer sheet to the invigilator, candidate should check that **Roll No, Test code and Book Code** have been filled and marked correctly. Immediately after the prescribed examination time is over, the **Answer sheet is to be returned to the invigilator.**

B. Filling the Answer Sheet :

5. On Side-1 of Answer Sheet write your Name and Roll Number in the respective boxes. Do not write anything on Side-2.
6. **Marking Scheme:**
   a. If darkened bubble is RIGHT answer : 4 Marks.
   b. If no bubble is darkened in any question: No Mark.
   c. If darkened bubble is WRONG answer: –1 Mark (Minus One Mark).
7. Think wisely before darkening bubble as there is negative marking for wrong answer.

PROCEDURE OF FILLING UP THE ANSWERS IN ANSWER SHEET

Avoid Improper Marking			Proper Marking
 Partially Filled	 Lightly Filled	 Tick-Cross Marked	 Fully darken

Name of the candidate (In Capital Letters)

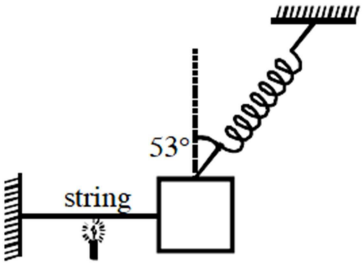
Roll Number

I have read all the instruction and shall abide by them.	**I have verified all the information filled in by the candidate.**
.....	.....
(Signature of the candidate)	**(Signature of the Invigilator)**

"Don't try to be perfect.
Just try to be better than you were yesterday."

[PHYSICS]

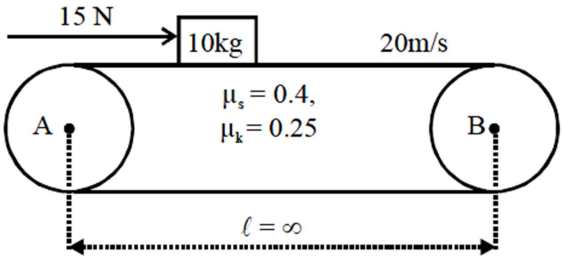
1. The block shown in the figure is equilibrium. Find acceleration of the block just after the string burns.



(a) $\frac{3g}{5}$ (b) $\frac{4g}{5}$

(c) $\frac{4g}{3}$ (d) None of these

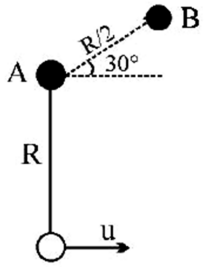
2. A block of mass 10 kg is put gently on a belt-conveyor system of infinite length at t = 0 sec, which is moving with constant speed 20 m/sec rightward at all time, irrespectively of any situation by means of a motor-system as shown in the figure. A constant force of magnitude 15 N is applied on the block continuously during its motion. The magnitude of acceleration of the block of mass 10 kg at t = 6 sec is:



(a) 4 m/s^2 (b) 3 m/s^2

(c) 2 m/s^2 (d) 0

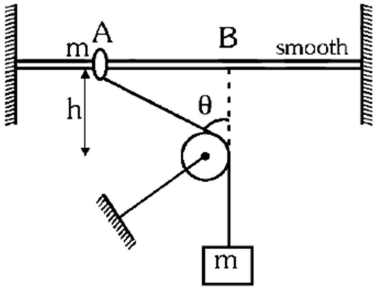
3. A ball is hanging vertically by a string of length R form peg A. There is another peg B at a distance R/2 at an angle of 30° with the horizontal as shown in the figure. Find the minimum horizontal velocity given at the lowest position so that the ball strikes the peg A. Assume string as always taut.



(a) $2\sqrt{gR}$ (b) $4\sqrt{gR}$

(c) $3\sqrt{gR}$ (d) $\sqrt{2gR}$

4. A ring of mass m slide from rest on the smooth rod as shown in the figure, due to the block of mass m. Pulley and string are massless. Then find the speed of ring when the string becomes straight. (Given θ = 60°)



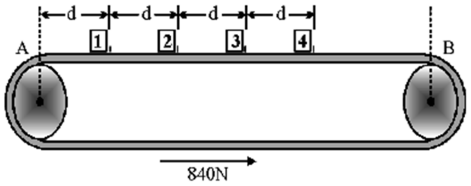
(a) $4\sqrt{gh}$ (b) $\sqrt{2gh}$

(c) $2\sqrt{2gh}$ (d) $8\sqrt{gh}$

2. Space for Rough Work

"Don't try to be perfect. Just try to be better than you were yesterday."

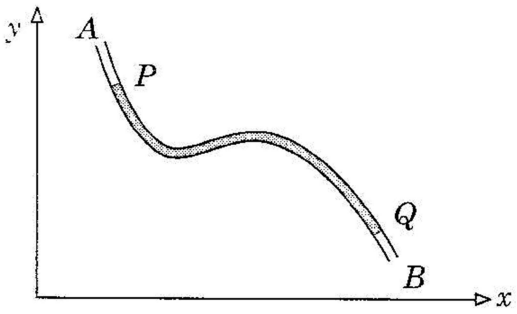
5. Guide angles have been attached to a conveyor belt at equal distances d = 200 mm. Four packages, each having a mass of 4 kg, are placed as shown on the belt, which is at rest. If a constant force of magnitude 840 N is applied to the belt, determine the velocity of package 2 as it falls off the belt at point A. Assume that the mass of the belt and pulleys is small compared with the mass of the packages. Assume that the radius of pulley is negligible in comparison with d.



(a) 5 m/s (b) 6 m/s

(c) 7 m/s (d) 9 m/s

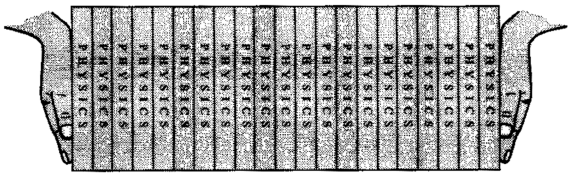
6. A uniform rope PQ of mass m and length l rests inside a fixed pipe PQ. The entire length of the pipe is in a vertical plane as shown. The ends P and Q of the rope are at points (x_1, y_1) and (x_2, y_2). Find expression for total frictional force on the rope.



(a) $\frac{mg(y_1 - y_2)}{l}$ (b) $\frac{mg(y_1 + y_2)}{l}$

(c) $\frac{2mg(y_1 + y_2)}{l}$ (d) $\frac{mg(y_2 - y_1)}{l}$

7. A boy lifts a stack of several identical books by pressing hard with his hands. Static friction coefficient between hand and book is $\mu_{hb} = 0.40$, and between each book is $\mu_{bb} = 0.25$ and mass of one book is m = 400 gram. Now the boy starts decreasing the pressure gradually. When the force pressing the book i.e. the horizontal component of the force applied by him becomes F = 120 N, the books are just about to fall down. Acceleration of free fall is g = 10 m/s^2. How many books were in the stack?



(a) 15 (b) 17

(c) 18 (d) 19

8. DRDO is reportedly developing a “super gun” with a barrel some 70 meters long, which is to be able to launch huge artillery shells several hundred miles. During World War I, Germany used a “Big Bertha” cannon to hurl shells into Paris 30 miles away. This gun also had a long barrel. What is the reason for using a long barrel in these super guns?

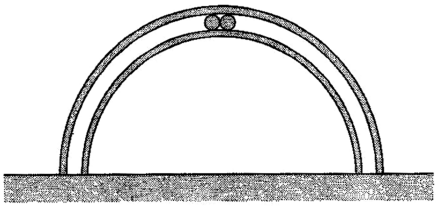
(a) To allow better cooling of the gun due to increased surface area

(b) To provide a more favourable ratio of kinetic energy to potential energy

(c) To allow the force of the expanding gases to act for a longer distance

(d) To increase the force exerted on the bullet due to the expanding gases

9. A semiconductor cylindrical tube is placed on the horizontal ground. Two identical balls that loosely fit inside the tube are simultaneously released from the top inside the tube. Each ball moves down the tube on either side.



Which of the following statements best describe or describes the total normal reaction by the ground on the tube?

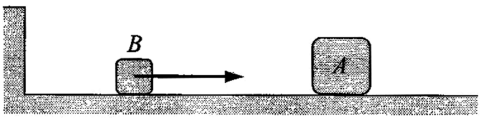
(a) It decreases continually

(b) It increases continually

(c) It first decreases, acquires a minimum value then increases

(d) The tube does not leave the ground

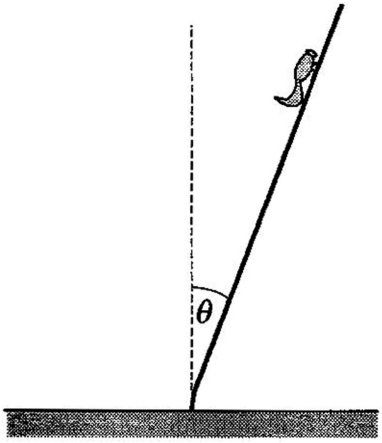
10. A block A is kept at rest on a frictionless horizontal floor some distance away from a wall. Another block B of mass m is moving towards the block A as shown in the figure. The block B may undergo elastic collisions with the block A and the wall. If the two blocks collides only once, what should be range of values of mass M of block A?



(a) $m \leq M \leq 3m$ (b) $0.5\,m \leq M \leq 3m$

(c) $M \leq 3m$ (d) $M = 3m$ only

11. A squirrel of mass m climbs slowly on a thin straight vertical rod of length L. Mass of the rod is negligible as compared to that of the squirrel and size of the squirrel is negligible as compared to the length l it climbs on the rod. Due to weight of the squirrel, the rod bends at its lower end through an angle θ and a due to elasticity of the material of the rod a restoring torque $C\theta$ is developed in the rod. If $C = 2\,mgL$, find the maximum length, the squirrel can climb on the rod.



(a) L/2

(b) 3L/4

(c) L

(d) Insufficient information

12. There are three persons A, B and C moving with constant velocity. Speed of A is 10 m/sec towards east, velocity of B relative to A is 6 m/sec at an angle of $\cos^{-1}\left(\frac{15}{24}\right)$ north of east. The velocity of C relative to B is 12 m/sec towards west. What will be the magnitude of velocity of C in m/sec?

(a) 2 m/s (b) 6 m/s

(c) 5 m/s (d) 7 m/s

13. A car moves uniformly along a horizontal sine curve y = a sin $\left(\frac{x}{\alpha}\right)$. Where 'a' and '$\alpha$' are constant. The coefficient of friction between wheels and road is μ. At what velocity will the car ride without slipping.

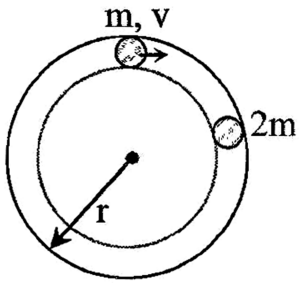
(a) $v_{max} = \alpha\sqrt{\frac{\mu g}{a}}$

(b) $v_{max} = \frac{\alpha\mu g}{a}$

(c) $v_{max} = \alpha^2\sqrt{\frac{\mu g}{a}}$

(d) None of these

14. A particle of mass 'm' moving with a speed 'v' hits elastically another stationary particle of mass 2m on a smooth horizontal circular tube of radius 'r'. The time in which the next collision will take place is equal to $\left(\frac{x2\pi r}{v}\right)$. Find the value of 'x'.



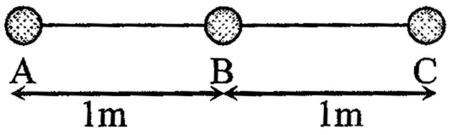
(a) 3

(b) 1

(c) 2

(d) 5

15. Three identical balls A, B and C each of mass m = 3 kg are connected by string AB and BC as shown in the figure. The whole system is placed on a smooth horizontal surface.



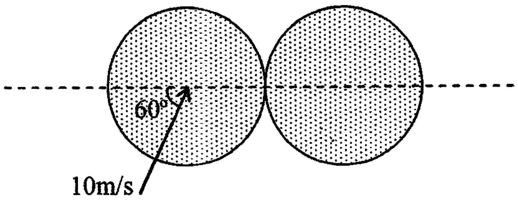
Now the ball B is given an initial velocity $v_0 = \sqrt{3}$ m/s, perpendicular to the string and along the horizontal surface. Find the tension (in Newton) in the string just before the balls A and C collide.

(a) 1 (b) 3

(c) 4 (d) 2

16. A ball of mass 1 kg moving the speed of 10 m/s on a smooth horizontal plane collides obliquely with another ball of same mass at rest as shown in the figure. Coefficient of restitution for the collision is

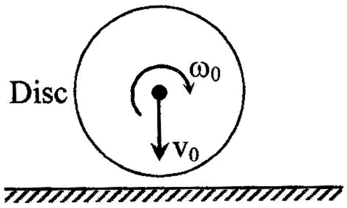
0.5. If the speed of the striking ball after the collision is $\frac{35}{x}$ m/s, then x is:



(a) 2 (b) 3

(c) 4 (d) 6

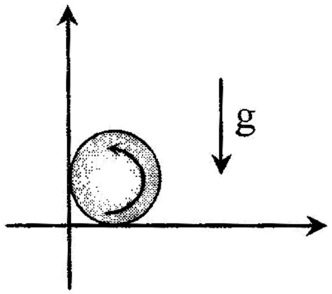
17. The figure shown is just before collision, the velocity of centre of uniform disc is v_0 vertically downward and ω_0 is the angular velocity as shown. If is found that collision is elastic and after collision disc stops rotating then if coefficient of friction is $\left(\frac{1}{P}\right)$ then the value of P is? If $v_0 = R\omega_0$. (R is radius of disc)



(a) 2 (b) 4

(c) 5 (d) 3

18. A uniform cylinder of radius R (= 3 m) is spinning about its axis at an angular velocity $\omega_0 (= 40\sqrt{\pi}\ \text{rad/sec})$ and placed between two perpendicular wall. The coefficient of friction between the walls and cylinder is μ (= 2). Then, 25K turns will the cylinder make before its stops. Find the value of K.



(a) 1 (b) 3

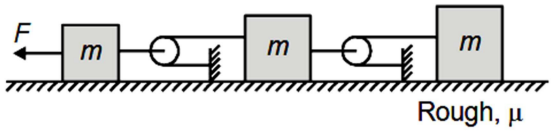
(c) 2 (d) 4

19. A horizontal force acting on a box of mass 1 kg has a magnitude of $F = 1t^2$ N, where t is in second. If the box starts from rest, determine its speed at t = 3 s. The coefficient of static friction and kinetic friction between the box and horizontal surface are μ_s = 0.4 and μ_k = 0.3 respectively. ($g = 10\ m/s^2$)

(a) 19 m/s (b) 1.3 m/s

(c) 3.33 m/s (d) 10.2 m/s

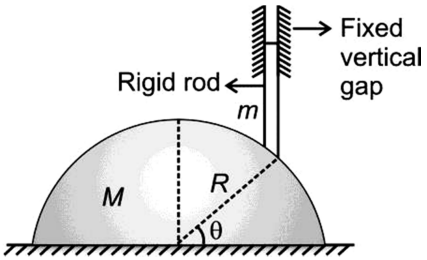
20. On a table, three blocks are placed as shown in the figure. Mass of each block is m and coefficient of friction for each block is μ. A force F is applied on the first block so as to move the system. The minimum required F should be:



(a) $8\mu mg$ (b) $9\mu mg$

(c) $7\mu mg$ (d) $5\mu mg$

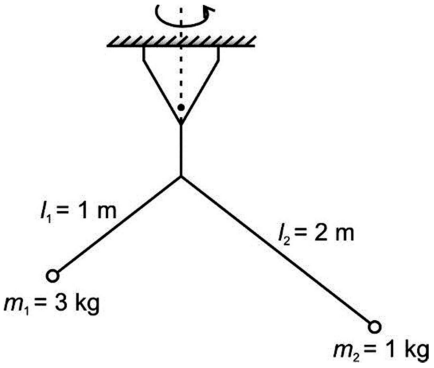
21. Find the acceleration of the hemisphere immediately after the system is released from rest. There is no friction anywhere.



(a) $\frac{mg}{M+m\sin^2\theta}$ (b) $\frac{mg}{M\tan^2\theta+m}$

(c) $\frac{mg}{M\tan\theta+m\cot\theta}$ (d) Zero

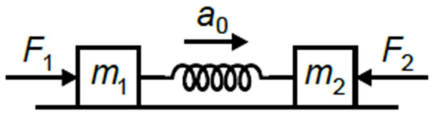
22. Two balls of mass m_1 and m_2 are suspended on two threads of length l_1 and l_2 at the end of a freely hanging rod. Find the angular velocity (ω) with which the rod + support should be rotated about the vertical axis so that the rod remains in vertical position:



(a) $2(10)^{1/4}$ rad/s (b) Zero

(c) 14 rad/s (d) $(10)^{\frac{1}{4}}$ rad/s

23. Two blocks m_1 and m_2 are connected with a compressed spring and placed on a smooth horizontal surface as shown in figure.



Force constant of the spring is k. Under the influence of forces F_1 and F_2, at an instant, blocks move with common acceleration a_0. At that instant force F_2 is suddenly withdrawn. Mark correct option.

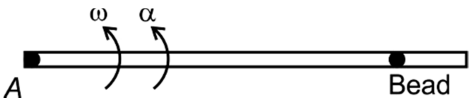
(a) Instantaneous acceleration of m_1 is $a_0 - \frac{F_1}{m_1}$

(b) Instantaneous acceleration of m_2 is $a_2 = a_0 + \frac{F_2}{m_2}$

(c) Instantaneous acceleration of m_1 is $a_1 = 0$

(d) Instantaneous acceleration of m_2 is $a_2 = 0$

24. A bead is constrained to move on rod in gravity free space as shown in figure. Initially the rod and the bead are stationary. Now the rod is rotated with constant angular acceleration α about its end A. μ is coefficient of friction. Rod rotates in the plane of paper. If at an instant the angular velocity of rod is ω then for that instant:



(a) If $\mu > \frac{\omega^2}{\alpha}$ friction on bead is static in nature

(b) If $\mu > \frac{\omega^2}{\alpha}$ friction on bead is kinetic in nature

(c) If $\mu < \frac{\omega^2}{\alpha}$ friction is static

(d) If bead does not slide relative to rod, then friction will not exist between bead and rod

25. A car is moving on the banked rough road inclined at an angle θ with the speed $v_0 = \sqrt{R\,g\tan\theta}$ (where R is the radius of curvature of the road). If speed of the car becomes $v < v_0$. Then friction force on the car will:

(a) Act down to the slope

(b) Act up to the slope

(c) Not act

(d) Act down to the slope or up to the slope depends on the mass of the car

[CHEMISTRY]

26. Consider the following reaction,

$$KClO_3(s) \xrightarrow{\Delta} KCl(s) + \frac{3}{2}O_2(g)$$

$$SO_2(g) + \frac{1}{2}O_2(g) \longrightarrow SO_3(g)$$

If yield of both reactions is 100% and 67.2 L of SO_3 is produced at STP, then minimum mass of $KClO_3$ required in the reaction is (Molar mass of $KClO_3$ = 122.5 g/mol)

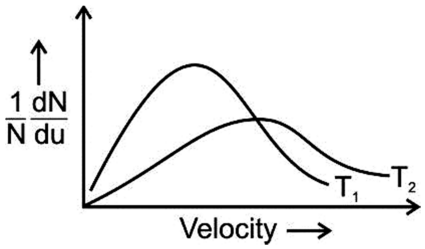
(a) 122.5 g

(b) 245 g

(c) 367.5 g

(d) 490 g

27. Consider the Maxwell-Boltzmann velocity distribution curve and select the correct option.



(a) Temperature T_1 must be greater than the temperature T_2

(b) Area under the curve can vary with the temperature

(c) The distribution of curve is different for the CO and N_2 gas at the same temperature

(d) Fraction of molecules with the lower speed range decrease with increase in temperature

28. Select the incorrect statement about helium.

(a) The ionization energy of helium is highest

(b) The electron gain enthalpy of helium is positive

(c) Helium belongs to a group of elements, which are largest in size in respective period

(d) The last electron of helium enter in 1s orbital so it is placed with the s-block element in modern periodic table

29. Density (in g/L) of CO_2 gas at S.T.P. is:

(a) 1.96 (b) 19.6

(c) 22 (d) 11

30. Consider the reactions.

$$4NH_3 + \underset{\text{(Excess)}}{5O_2} \xrightarrow{\text{Yield} = 100\%} 4NO + 6H_2O$$

$$2NO + \underset{\text{(Excess)}}{O_2} \xrightarrow{\text{Yield} = 100\%} 2NO_2$$

$$3NO_2 + \underset{\text{(Excess)}}{H_2O} \xrightarrow{\text{Yield} = 100\%} 2HNO_3 + NO$$

11.2 L of NH_3 react at S.T.P. with excess of O_2 according to the above reaction. The mass of HNO_3 formed (in g) in above reaction is:

(a) 17 (b) 20

(c) 21 (d) 12

31. It requires 40 ml of 1 M H_xA to react completely with 20 ml of 1 M $Ca(OH)_2$. What is the value of x?

(a) 0 (b) 3

(c) 2 (d) 1

32. The minimum atomic number of an element in which number of s-electron = number of d-electron:

(a) 28 (b) 26

(c) 32 (d) 22

33. Consider the following statements.

I. Element with atomic number 43 belong to d-block element.

II. $_{64}Gd$ is present in group 3.

III. Se has two unpaired in p-orbital.

The correct statement(s) is(are):

(a) Only III (b) Only I & II

(c) Only I & III (d) I, II & III

34. Which one of the following about an electron occupying the 1s orbital in a hydrogen atom is incorrect? (The Bohr radius is represented by a_0)

(a) The probability density of finding the electron is maximum at the nucleus

(b) The electron can be found at a distance $2a_0$ from the nucleus

(c) The magnitude of the potential energy is double that of its kinetic energy on an average

(d) The total energy of the electron is maximum when it is at a distance a_0 from the nucleus

35. The alkaline earth metal halide (X = Cl, Br, I) having maximum covalent character is:

(a) BeX_2 (b) SrX_2

(c) CaX_2 (d) MgX_2

36. Threshold frequency of a metal is f_0. When light of frequency $2f_0$ is incident on the metal plate, maximum velocity of electron emitted is v_1. When frequency of incident radiation is $5f_0$, maximum velocity of emitted electron is v_2. The ratio of $\frac{v_1}{v_2}$ is:

(a) 1 : 4 (b) 1 : 2

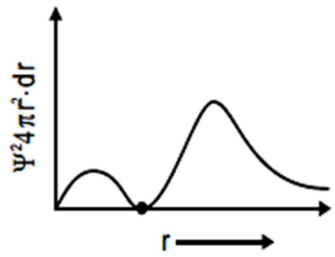
(c) 2 : 3 (d) 3 : 5

37. If p is the momentum of the fastest electron ejected from a metal surface after the irradiation of light having wavelength λ, then for 1.5p momentum of the photoelectron, the wavelength of the light should be: (Assume kinetic energy of ejected photoelectron to be very high in comparison to work function):

(a) $\frac{3}{4}\lambda$ (b) $\frac{4}{9}\lambda$

(c) $\frac{2}{3}\lambda$ (d) $\frac{1}{2}\lambda$

38. Consider the graph given below for a subshell of 'X'.



The number of angular nodes in X is one, then angular momentum of electron in orbit 'n' is:

(a) $h/2\pi$ (b) h/π

(c) $3h/2\pi$ (d) $2h/\pi$

39. The quantum number of four electrons are given below:

I. n = 4, l = 2, m_l = –2, ms = $-\frac{1}{2}$

II. n = 3, l = 2, m_l = 1, ms = $+\frac{1}{2}$

III. n = 4, l = 1, m_l = 0, ms = $+\frac{1}{2}$

IV. n = 3, l = 1, m_l = 1, ms = $-\frac{1}{2}$

The correct order of their increasing energies will be:

(a) IV < II < III < I (b) I < III < II < IV

(c) IV < III < II < I (d) I < II < III < IV

40. During the titration of x g of NaOH dissolved in 50 ml aqueous solution, 30 ml of 0.1 N H_2SO_4 was added. The resulting solution was found to be basic and the remaining solution was neutralized with 10 ml of 0.2 M HCl solution. The value of x is:

(a) 0.05 (b) 0.10

(c) 0.20 (d) 0.15

41. In H atom, if the radius of the 3rd orbit is R then the radius of the 4th orbit in Li^{2+} ion is $\frac{xR}{27}$. Then the value of x is:

(a) 16 (b) 14

(c) 12 (d) 15

42. How many electrons will be present in sub-shell(s) having zero radial node and m_s (spin quantum no.) value of $-\frac{1}{2}$ for n = 4?

(a) 3 (b) 5

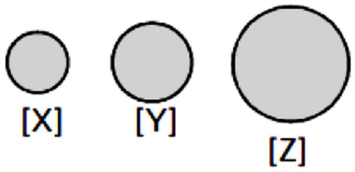
(c) 7 (d) 6

43. An element of group 18 has total s, p and d electrons equal to x, y and z respectively. If x + z = y then period number of element is:

(a) 2 (b) 4

(c) 6 (d) 5

44. The following sphere represents relative size of cations (not in order, not in scale) Li^+, Ca^{2+} and Al^{3+}.



The correct order of magnitude of lattice energy of their fluorides is:

(a) X > Y = Z

(b) X < Y < Z

(c) X > Z > Y

(d) X < Z < Y

45. In the compound M–O–H, the M–O bond will ionize in aq. medium readily if:

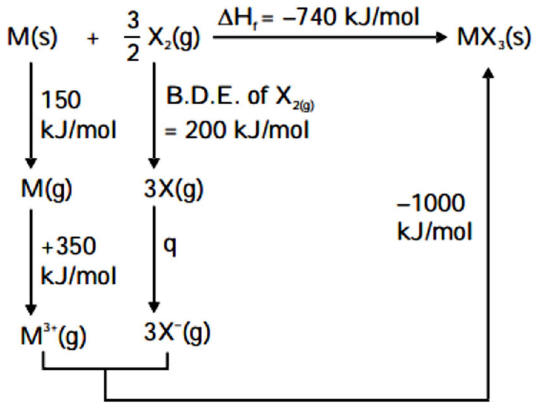
(a) Δ(E.N.) of M and O < Δ(E.N.) of O and H

(b) Δ(E.N.) of M and O = Δ(E.N.) of O and H

(c) Δ(E.N.) of M and O > Δ(E.N.) of O and H

(d) Cannot be predicated

46. Consider the following Born-Haber's cycle for formation of $MX_3(s)$.



Then calculate value $\frac{q_1}{50}$, here q_1 is electron affinity of X(g) in kJ/mol.

(a) 4.50 (b) 3.60

(c) 5.60 (d) 6.30

47. An electron is continuously accelerated in vacuum tube by applying potential difference. Its de Broglie wavelength is decreased by 1%, which among the following is/are correct about above electron.

(a) Its kinetic energy is increased by about 2%

(b) Its kinetic energy is increased by about 1%

(c) Its potential energy is decreased by about 1%

(d) Its kinetic energy is increased by about 3%

48. Which of following represents the correct order of EA?

(a) O > C > N > Br > Cl > F

(b) Cl > F > O > C > N > Be

(c) Cl > O > F > C > N > Be

(d) O > C > Cl > N > Be > F

49. Process $Na^{+} \xrightarrow{I} Na_{(g)} \xrightarrow{II} Na_{(s)}$:

(a) In (I) energy released, (II) energy absorbed

(b) In both (I) and (II) energy is absorbed

(c) In both (I) and (II) energy is released

(d) In (I) energy absorbed, (II) energy released

50. The correct order of IE_2 of C, N, O and F is:

(a) O > F > N > C (b) F > O > N > C

(c) C > N > O > F (d) O > N > F > C

[BIOLOGY]

51. Select the correct statement:

(a) Liverworts asexually reproduce by fragmentation and gemmae formation

(b) Protonema stage is found in Riccia

(c) Funaria, Sphagnum and Marchantia are mosses

(d) Bryophytes are truely terrestrial

52. Sunflower show:

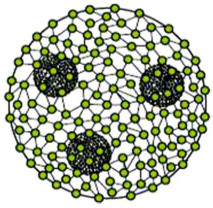
(a) Alternate phyllotaxy

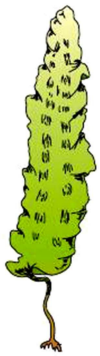
(b) Opposite phyllotaxy

(c) Whorled phyllotaxy

(d) None of these

53. Diagram of four algae are given below. Select the correct statement following the diagram:

A. 

B. 

C. 

D. 

(a) A and B belong to same group and have cellulose in their cell walls

(b) B and D belongs to different groups and both have cellulose and algin in their cell walls

(c) A and C belongs to same group and both have chlorophyll a and b as major photosynthetic pigments

(d) C and D belongs to different groups and both have floridean starch as stored food material

54. Match the following:

Column-I		Column-II	
I.	Strawberry	A.	Sucker
II.	Jasmine	B.	Offset
III.	Pistia	C.	Runner
IV.	Pineapple	D.	Stolon

(a) I-C, II-D, III-B, IV-A (b) I-B, II-C, III-A, IV-D

(c) I-C, II-A, III-B, IV-D (d) I-A, II-B, III-C, IV-D

55. Isogamous reproduction is observed in:

(a) Volvox, Spirogyra

(b) Spirogyra, Fucus

(c) Volvox, Fucus

(d) Spirogyra, Chlamydomonas

56. Select the incorrect set of statements:

A. Methanogens produce biogas from dung in biogas plant.

B. Protistans may have siliceous cell wall.

C. Euglenoids usually possess two equal flagella.

D. Dinoflagellates are usually marine.

E. Mycoplasma are wall less prokaryotes.

(a) A and C (b) B and E

(c) B and C (d) C only

57. Which of the following are members of deuteromycetes?

(a) Alternaria, Trichoderma

(b) Ustilago, Puccinia

(c) Neurospora, Claviceps

(d) Penicillium, Yeast

58. Identify the incorrect information about given fungi:

(a) Puccinia - it causes wheat rust

(b) Neurospora - extensively used in genetics

(c) Claviceps - source of LSD

(d) Ustilago - it is also known as rust fungi

59. _A_ belong to a class of fungi in which sexual reproduction is absent members of the class produce _B_ , _C_ :

(a) A-Alternaria, B-Conidia, C-Exogenously

(b) A-Alternaria, B-Zoospores, C-Endogenously

(c) A-Colletotrichum, B-Conidia, C-Endogenously

(d) A-Colletotrichum, B-Zoospores, C-Exogenously

60. Read the following statements:

A. Diatoms and Desmids share common kingdom.

B. Euglenoids are mostly marine.

C. Mycoplasma are obligate aerobes.

D. Diatoms are chief producers of ocean.

E. Heterocysts in cyanobacteria are helpful in nitrogen fixation.

How many of the above statements are correct?

(a) All (b) One

(c) Two (d) Three

61. Natural classification was proposed by:

(a) Bentham and Hooker

(b) Oswald Tippo

(c) Carolus Linnaeus

(d) Aristotle

62. The biological concept of species given by Ernst Mayr is based on:

(a) Morphological characters

(b) Floral characters

(c) Sexual characters

(d) Sexual reproduction

63. Pneumatophores are:

I. Positive geotropism

II. Negative geotropism

III. Grown in marshy area

IV. Found in mangroves

V. Positive phototropism

VI. Negative phototropism

(a) I, III, IV, VI (b) II, III, IV, V

(c) I, III, V (d) II, IV, VI

64. Match the columns and find out the correct combination:

A. Couplet	I. Information of any one taxon
B. Lead	II. Preserved specimen
C. Monograph	III. Specially designed for ready reference
D. Manuals	IV. Each statement in the key
	V. A pair of contrasting characters

(a) A-V, B-IV, C-I, D-III (b) A-IV, B-II, C-III, D-I

(c) A-I, B-III, C-II, D-IV (d) A-III, B-I, C-IV, D-II

65. For higher plants, flowers are chiefly used as a basis of classification, because:

(a) These show a great variety in colour

(b) It can be preserved easily

(c) Reproductive parts are more conservative than vegetative parts

(d) They have strong fragrance

66. Read the following statements.

A. Isolated-metabolic reactions in-vitro are living things.

B. Reproduction is synonymous with growth in Chlamydomonas.

C. Reproduction is an all-inclusive defining characteristic of living organisms.

D. Extrinsic growth cannot be taken as defining property of living organisms.

How many of the above statement (s) is/are not true?

(a) One (b) Two

(c) Three (d) Four

67. Which of the following are true with reference to taxonomical aids?

A. Separate taxonomic keys are required for each taxonomic category.

B. Herbarium is a store house of collected plant and animal specimens.

C. Each statement in the key is called couplet.

D. Keys are used for identification purpose.

(a) A and B (b) A and D

(c) A and C (d) C and D

68. Glucose is taken in test tube and acted upon by hexokinase enzyme. Resulting substrate is glucose-6- phosphate. This isolated metabolic reaction is:

(a) Occurring in test tube which can be considered as living

(b) Considered to be in vivo

(c) Considered to be in vitro and living reaction

(d) Considered as non-living reaction

69. Which one of the following is a taxonomical aid for identification of plants and animals based on similarities and dissimilarities?

(a) Flora

(b) Keys

(c) Monographs

(d) Catalogues

70. Botanical gardens and Zoological parks have:

(a) Collection of endemic living species only

(b) Collection of exotic living species only

(c) Collection of endemic and exotic living species

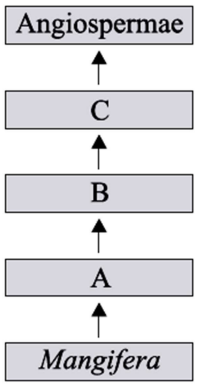
(d) Collection of only local plants and animals

71. Two animals belong to the same kingdom but different classes. They may belong to the same:

(a) Phylum (b) Order

(c) Division (d) Family

72. Recognize the following flow diagram and find the correct options according to taxonomic hierarchy.



(a) 'A' is comparable to muscidae while 'B' is at the same level as that of primata

(b) 'C' includes all the angiosperms having two cotyledons in their seeds

(c) For wheat 'A' is poaceae, 'B' is poales and 'C' is monocotyledonae

(d) All of the above statements are correct

73. Select the wrong statements.

A. Lower the taxon, more are the characteristics that the members within the taxon share.

B. Order is the assemblage of genera which exhibit a few similar characters.

C. Cat and dog are included in the same family Felidae.

D. Binomial nomenclature was introduced by Carolus Linnaeus.

(a) A, B and C (b) B, C and D

(c) A and D (d) B and C

74. Among the following, select the correct statements.

A. In majority of higher plants and animals, growth and reproduction are mutually exclusive events.

B. In non-living objects growth is by accumulation of material on the surface.

C. An isolated metabolic reaction outside the body of an organism, preformed in an test tube is neither living nor non-living.

D. All organisms, from the prokaryotes to the most complex eukaryotes can sense and respond to environmental cues.

(a) B C and D (b) A, B and C

(c) A, D and C (d) All of these

75. Few rules are written following regarding binomial nomenclature. Identify the wrong one:

(a) Biological names are Latinized and printed in italics

(b) Generic and specific name starts with capital letter

(c) Generic and specific name when hand written is underlined

(d) All are correct

76. Endothelium is an example of:

(a) Simple cuboidal epithelium

(b) Simple columnar epithelium

(c) Simple squamous epithelium

(d) Stratified cuboidal epithelium

77. Tendon which connect skeletal muscles to bone, rich in:

(a) Reticular fibres (b) Elastic fibres

(c) Collagen fibres (d) Yellow fibres

78. Histamine, heparin and serotonin is secreted by:

(a) Macrophage (b) Plasma cells

(c) Mast cells (d) Adipocytes

79. Macrophages of areolar connective tissue are:

(a) Modified eosinophils

(b) Modified basophils

(c) Modified neutrophils

(d) Modified monocytes

80. All of the following tissue are avascular except:

(a) Elastic cartilage

(b) White fibrous cartilage

(c) Hyaline cartilage

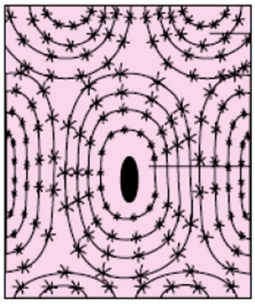
(d) Bone

81. Which of the following inorganic material mainly found in bone?

(a) NaCl (b) $Ca_3(PO_4)_2$

(c) KCl (d) NaOH

82. Identify the given below tissue with its type and select the right option for the two together.



(a) Tissue-Cartilage, Type-Specialized connective tissue

(b) Tissue-Tendon, Type-Dense irregular connective tissue

(c) Tissue-Ligament, Type-Dense regular connective tissue

(d) Tissue-Bone, Type-Specialized connective tissue

83. Fill up the blanks A to E with correct combination.

I. Osteocytes are present in spaces called _____ A _____.

II. _____ B _____ and _____ C _____ give strength to bones.

III. Most of _____ D _____ in vertebrates embryos are replaced by _____ E _____ in adults.

(a) A-Cavities, B-Phosphorus, C-Fibres, D-Tissue, E-Cells

(b) A-Lacunae, B-Calcium salts, C-Collagen fibres, D-Cartilage, E-Bones

(c) A- Lacunae, B-Potassium salts, C- Calcium, D-Muscles, E-Cartilage

(d) A- Lacunae, B-Iron, C-Phosphorus, D-Cells, E-Tissue

84. Choose the correct option which has all the right statements for bones.

A. Bones have a hard and non-pliable ground substance.

B. Matrix of bone is rich in calcium salt and free from collagen fibres.

C. The bone marrow in some bones is the site of production of blood cells.

D. Bone is a type of specialized connective tissue.

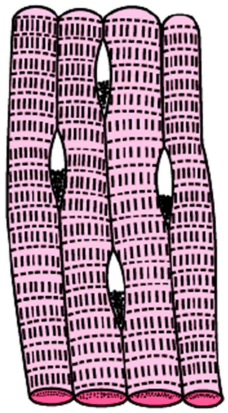
(a) A, B and C

(b) A, C and D

(c) A and D only

(d) All of the above

85. Identify the tissue shown in the diagram and Match with its characteristics and its location.



(a) Skeletal muscles, unbranched muscles, found in the walls of the heart

(b) Striated muscles, show branching, found in the walls of the heart

(c) Skeletal muscle, shows striations and closely attached with the bones of the limbs

(d) Striated muscles, tapering at both-ends, attached with the bones of the ribs

86. Match the terms given in column – I with their feature given in column II and choose the correct option.

Column-I (Terms)	Column-II (Features)
A. Exocrine gland	I. They help to stop substances from leaking across a tissue
B. Endocrine gland	II. Hormones are secreted directly into the fluid bathing the gland
C. Tight junctions	III. They perform cementing to keep neighbouring cells together
D. Adhering	IV. Secretes mucus, saliva, earwax, oil, milk, digestive enzymes

(a) A-IV; B-II; C-I; D-III (b) A-II; B-IV; C-I; D-III

(c) A-IV; B-II; C-III; D-I (d) A-IV; B-I; C-II; D-III

87. Valine amino acids is:

(a) α -amino acid (b) β -amino acid

(c) γ -amino acid (d) All the three types

88. How many total carbons are present in palmitic acid, excluding COOH group?

(a) 15 (b) 16

(c) 17 (d) 20

89. Heterocyclic ring is found in which compound?

(a) N-bases

(b) Ring structure of monosaccharide's

(c) Protein

(d) Both (a) & (b)

90. Which of the following statement is correct?

(a) Lipid is biomacromolecule

(b) Lipid has <1000 daltons molecular weight

(c) Proteins are heteropolymer

(d) All the above are correct except (a)

91. A long protein chain when folded upon itself like a hollow woolen ball gives rise to which structure given in the figure below?

(a) 

(b) 

(c) 

(d) 

92. Which of the following is incorrect w.r.t. Watson-Crick model for ds BDNA?

(a) Follows Chargaff's rules

(b) Pitch of DNA = 34 Å

(c) Rise/bp = 3.4 nm

(d) Strand turn/bp ascent = 36°

93. Choose the correct representation w.r.t. enzyme:

(a) Holoenzyme = Apoenzyme-Co-factor

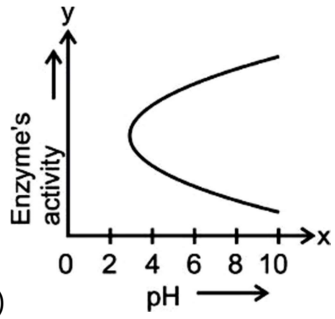
(b) Apoenzyme = Holoenzyme + Co-factor

(c) Co-factor = Prosthetic group + Co-enzyme

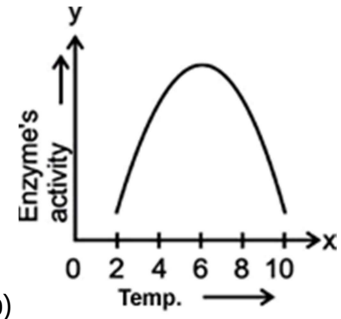
(d) Holoenzyme = Apoenzyme + Co-factor

94. Which of the following graph correctly depicts the activity of most of the enzymes at different pH values?

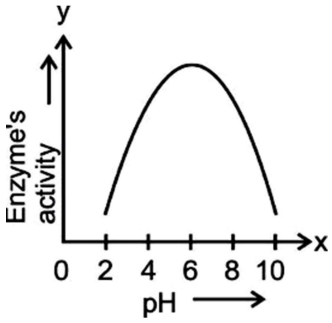
(a)



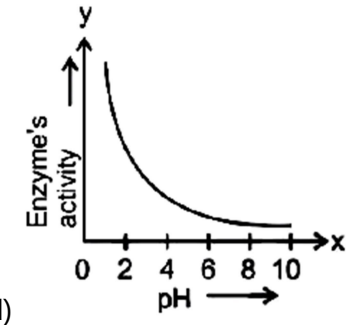
(b)



(c)



(d)



95. Which of the following statements is wrong?

(a) Kidney does not play any significant role in the removal of ammonia

(b) Ureotelic animals excrete most of the nitrogenous waste as urea

(c) Ammonia and urea are the waste products derived from the metabolic breakdown of proteins

(d) None of the above is wrong

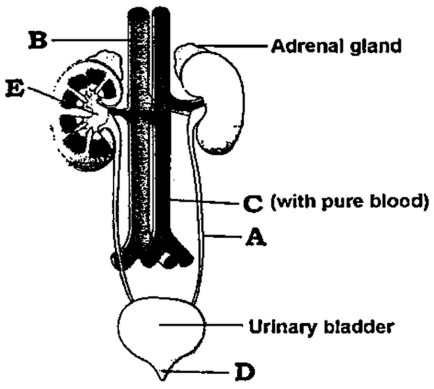
96. Match the column I with column II.

Column I	Column II
A. Nephridia	I. Crustaceans (Prawn)
B. Malphigian tubules	II. Annelids (Earthworm)
C. Antennal glands or Green glands	III. Insects (Cockroach)

(a) A-I, B-II, C-III (b) A-III, B-II, C-I

(c) A-II, B-III, C-I (d) A-II, B-I, C-III

97. Observe the following figure.



Identify A to E structure.

(a) A-Superior vena cava, B-Inferior vena cava, C-Dorsal aorta, D-Urethra, E-Pelvis

(b) A-Inferior vena cava, B-Superior vena cava, C-Dorsal Aorta, D-Urethra, E-Pelvis

(c) A-Urethra, B-Inferior vena cava, C-Dorsal Aorta, D-Urethra, E-Pelvis

(d) A-Dorsal Aorta, B-Inferior vena cava, C-Urethra, D-Cortex, E-Pelvis

98. Which is the correct sequence of air passages in man?

(a) External Nostril → Nasal passage → Internal nostril → Pharynx → Larynx → Trachea → Bronchi → Bronchioles → Alveoli

(b) Nose → Larynx → Pharynx → Bronchioles → Bronchi → Alveoli

(c) Nose → Pharynx → Trachea → Larynx → Bronchi → Bronchioles → Alveoli

(d) Nose → Larynx → Bronchi → Pharynx → Trachea → Bronchioles → Alveoli

99. **Assertion :** Human bone has Haversian canals.

Reason : Haversian canals are interconnected by Volkmann's canals.

(a) Both Assertion and Reason are true and the Reason is the correct explanation of the Assertion

(b) Both Assertion and Reason are true but Reason is not a correct explanation of Assertion

(c) Assertion is true but Reason is false

(d) Both Assertion and Reason are false

100. **Assertion :** The cells that produce and secrete fibres are called fibroblasts.

Reason : Fibroblasts are the characteristic cells of all types of connective tissue.

(a) Both Assertion and Reason are true and the Reason is the correct explanation of the Assertion

(b) Both Assertion and Reason are true but Reason is not a correct explanation of Assertion

(c) Assertion is true but Reason is false

(d) Both Assertion and Reason are false