A Specially Designed Initiative to Encourage Young Talent by

ALLEN CAREER INSTITUTE KOTA (RAJASTHAN)

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Tallentex Form No. 4

Answer Sheet No. T 4

TALLENTEX 2016 : (04, October 2015)

PAPER CODE

W

TALLENTEX 2016

ALLEN'S Talent Encouragement Exam

CLASS - 11th (XI)

Duration: 2 Hrs. **Maximum Marks : 320**

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

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 responsibility.

INSTRUCTIONS

1. This Booklet is your Question Paper. DO NOT break seal of Booklet until the invigilator instructs to do so.
2. Fill your TALLENTEX Form No. & Answer Sheet No. in the space provided on the top of this page.
3. Carefully fill your **PAPER CODE** and **CLASS** in space provided (Serial No. 6 & 12) of optical response sheet (ORS).
4. Make sure that the paper code and class printed on inside pages of this booklet are the same as that on this cover page.
5. 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 or blue ball point pen.
6. After breaking the Question Paper seal, check the following:
   a. There are **16 pages** in the booklet containing question no. 1 to 100 under 2 Parts i.e. Part-I & Part-II.
   b. Part-I contains total 20 questions of IQ (Mental Ability).
   c. Part-II contains total 80 questions under 4 sections, which are Physics, Chemistry, Biology & Mathematics.

   ***Important :** In Part II, attempt ANY ONE SECTION out of Section(C): Biology and Section (D) : Mathematics.
   DO NOT attempt both sections.
7. Think wisely before darkening bubble as there is negative marking for wrong answer. Answer once marked by pen cannot be cancelled.
8. Marking Scheme:
   a. If darkened bubble is RIGHT answer : 4 Marks.
   b. If darkened bubble is WRONG answer: -1 Mark (Minus One Mark).
   c. If no bubble is darkened in any question: No Mark.
9. If you are found involved in cheating or disturbing others, then your ORS will be cancelled.
10. Do not put any stain on ORS and hand it over back properly to the invigilator.
11. You can take along the question paper after the test is over.

PART-I

IQ (MENTAL ABILITY)

This section contains **20 Multiple Choice Questions.** Each question has four choices (1), (2), (3) and (4) out of which ONLY ONE is correct.

1. Read the following information carefully to answer the question given below it
(a) 'A $ B' means 'A is mother of B'.
(b) 'A # B' means 'A is father of B'.
(c) 'A @ B' means 'A is the husband of B'.
(d) 'A % B' means 'A is daughter of B'.
Which of the following expression indicates 'R is the sister of H'?
(1) R $ D @ F # H (2) H % D @ F % R
(3) R % D @ F $ H (4) None

2. A's son B is married with C whose sister D is married to E, the brother of B. How D is related to A ?
(1) Sister (2) Daughter-in-law (3) Sister-in-law (4) Cousin

3. P started from his house towards west. After walking a distance of 25 m, he turned to the right and walked 10 m. He then again turned to the right and walked 15 m. After this he is to turn right at 135° and to cover 30 m. In which direction should he go?
(1) West (2) South (3) South-West (4) South-East

4. If CIGARETTE is coded as GICERAETT, then DIRECTION will be coded as :
(1) IRDCTIONE (2) NOIETCRID (3) RIDTCENOI (4) NORTECDII

5. What was the day on 2nd May 1976?
(1) Monday (2) Saturday (3) Sunday (4) Tuesday

6. The numbers have been arranged under some rule. Based on that rule which number will come in place of the Question Mark?
1, 1, 2, 6, 24, ?, 720
(1) 100 (2) 104 (3) 108 (4) 120

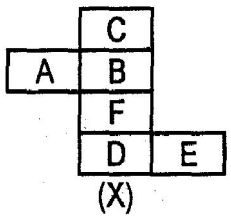
7. A clock is set right at 8 am. The clock gains 10 minutes in 24 hours. What will be the true time when the clock indicates 1 pm on the following day ?
(1) 12 O'clock (2) 48 minutes past 12 (3) 42 minutes past 12 (4) None of these

8. At what angle the hands of a clock are inclined at 50 minutes past 5 ?
(1) 125° (2) 130° (3) 135° (4) 140°

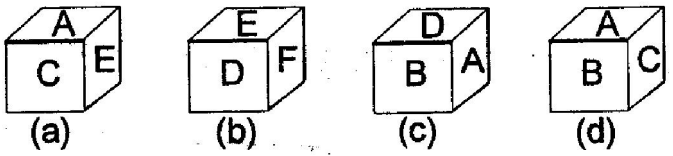
9. How many leap years and ordinary years are there in the first 100 years ?
(1) 25, 75 (2) 23, 77 (3) 24, 76 (4) 26, 74

10. All the six faces of a cube are coloured with six different coloures :- Black, Brown, Green, Red, White and Blue.
(1) Red face is opposite to the black face. (2) Green face is between red and black faces.
(3) Blue face is adjacent to white face. (4) Brown face is adjacent to blue face.
(5) Red face is in the bottom.
Which of the following is adjacent to green ?
(1) Black, White, Brown, Red (2) Blue, Black, Red, White
(3) Red, Black, Blue, Brown (4) None of these

11. The figure (X) given in problem, is folded to form a cube. Choose from amongst the alternatives (1), (2), (3) and (4), the cubes that are similar to the cube formed.



(X)



(a) (b) (c) (d)

(1) d only (2) b and d only

(3) a and c only (4) c only

12. In the following question two positions of the same dice have been shown. You have to see these figures and select the number opposite to the number as asked in the question.

(i) (ii)

What is the number of dots on the face opposite to the face that contains 2 dots?

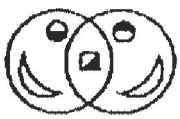
(1) 1 (2) 3 (3) 4 (4) 6

13. A cube is coloured red on two opposite faces, blue on two adjacent faces and yellow on two remaining faces. It is then cut into two halves among the plane parallel to the red faces. One piece is then cut into four equal cubes and the other one into 32 equal cubes. How many cubes do not have any red face ?

(1) 8 (2) 16 (3) 20 (4) 24

14. In the following question, choose the correct water-image of the figure (X) from amongst the four alternatives (1), (2), (3) and (4) given with it.

(X) 

(1)  (2)  (3)  (4) 

15. Direction:

(i) There is a group of five persons – A, B, C, D and E.

(ii) One of them is a horticulturist, one is a physicist, one is a journalist, one is an industrialist and one is an advocate.

(iii) Three of them – A, C and advocate prefer tea over coffee and two of them – B and the journalist prefer coffee over tea.

(iv) The industrialist and D and A are friends to one another but two of them prefer coffee to tea.

(v) The horticulturist is C's brother.

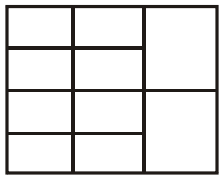
Who is the horticulturist ?

(1) A (2) B (3) C (4) D

16. In a certain code 15724 is written as QXFTB and 8369 is written as WRAP. How is 5376419 written in that code:

(1) XFRAQBP (2) XRFABQP (3) RFXABQP (4) XRFABPQ

17. How many rectangles (excluding squares) are there in the following figure?



(1) 25 (2) 28 (3) 29 (4) 30

18. Direction :

In the following question, two statements are given followed by four conclusions numbered I, II,III and IV. You have to take the given statements to be true even if they seem to be at variance from the commonly known facts and then decide which of the given conclusions logically follows from the given statements disregarding commonly known facts.

Statements : All aeroplanes are trains. Some trains are chairs.

Conclusions : I. Some aeroplanes are chairs.

II. Some chairs are aeroplanes.

III. Some chairs are trains.

IV. Some trains are aeroplanes.

(1) None follows (2) Only II and III follow

(3) Only I and III follow (4) Only III and IV follow

19. Direction : In the given question, two statements are followed by two conclusions numbered I and II. You have to take the given two statements to be true even if they seem to be at variance from commonly known facts. Read the conclusions and then decide which of the conclusions logically follows from the two given statements.

Statements : All roads are poles.

No pole is house.

Conclusions : I. Some roads are houses.

II. Some houses are poles.

(1) Only conclusion I follows (2) Only conclusion II follows

(3) Either I or II follows (4) Neither I nor II follows

20. Some boys are sitting in a line. Mahendra is on 17^{th} place from left and Surendra is on 18^{th} place from right. There are 8 boys in between them. How many boys are there in the line ?

(1) 43 (2) 42 (3) 41 (4) 44

PART-II

SECTION-A : PHYSICS

This section contains **20 Multiple Choice Questions.** Each question has four choices (1), (2), (3) and (4) out of which ONLY ONE is correct.

21. A particle starts moving from rest on a straight line with a constant acceleration 2 m/s^2 . What is distance travel by particle when its velocity becomes 4 m/s ?

(1) 4 m (2) 2 m (3) 1 m (4) 0 m

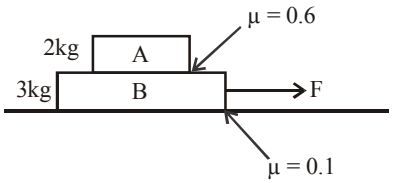
22. A mass m moves with a velocity v and collides with another mass 2m at rest. After collision the first mass moves with velocity $\frac{v}{\sqrt{3}}$ in a direction perpendicular to the initial direction of motion. Find the speed of the 2nd mass after collision

(1) $\frac{2}{\sqrt{3}}v$ (2) $\frac{v}{\sqrt{3}}$ (3) v (4) $\sqrt{3}\,v$

23. An experiment measures quantities a, b, c and x is calculated from $x = ab^2/c^3$. If the maximum percentage error in a, b and c are 1%, 3% and 2% respectively, the maximum percentage error in x will be

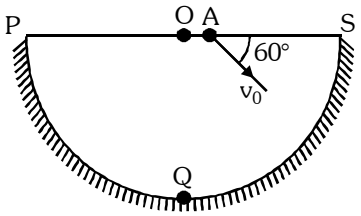
(1) 13 % (2) 17 % (3) 14 % (4) 11 %

24. In the figure shown below friction force between A and B is f_1 and between B and ground is f_2. If $f_1 = 2f_2$ then find F :-



(1) 20 N (2) 25 N (3) 30 N (4) 40 N

25. A ball is thrown from point A making an angle 60° with line OAS as shown in the figure, where OA = $\frac{R}{\sqrt{3}}$ [O is the centre of spherical surface of PQS]. If after striking the hemi-spherical surface, the ball rebounds in direction parallel to OA. The coefficient of restitution between the ball and the surface is [Neglect the effect of gravity and any type of frictional force]

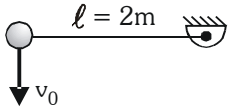


(1) e = 0.50 (2) e = 0.75 (3) e = 0.25 (4) None of these

26. The potential energy of a particle in a field is $U = \frac{a}{r^2} - \frac{b}{r}$, where a and b are constant. The value of r in terms of a and b where force on the particle is zero will be :

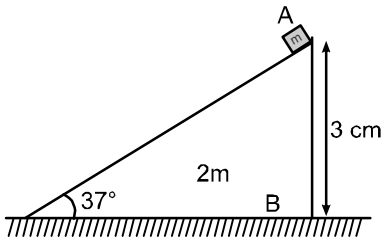
(1) $\frac{a}{b}$ (2) $\frac{b}{a}$ (3) $\frac{2a}{b}$ (4) $\frac{2b}{a}$

27. A small sphere is given vertical velocity of magnitude $v_0 = 5$ m/s and it swings in a vertical plane about the end of massless string. The angle θ with the vertical at which string will break, knowing that it can withstand a maximum tension equal to twice the weight of the sphere, is [g = 10 m/s^2]



(1) $\cos^{-1}\frac{2}{3}$ (2) $\cos^{-1}\left(\frac{1}{4}\right)$ (3) 60° (4) 30°

28. A block A of mass m situated at highest point of wedge B of mass 2 m is released from rest. Then distanced moved by wedge B when block A just reaches on the horizontal surface is :
(Assume all surfaces are smooth)

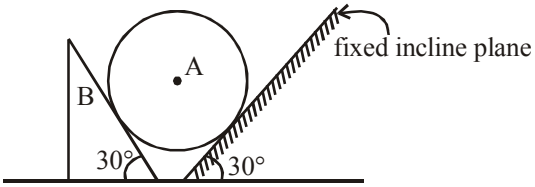


(1) 4/3 cm (2) 8/3 cm (3) 2/3 cm (4) None of these

29. The distance x moved by a body of mass 0.5 kg by a force varies with time t as $x = 3t^2 + 4t + 5$ where x is expressed in metre and t in seconds. What is the work done by the net force acting on the body in the first 2 seconds ?

(1) 25 J (2) 50 J (3) 60 J (4) 75 J

30. In the figure shown, find ratio of magnitudes of velocities of A and B (V_A/V_B). Neglect friction everywhere.

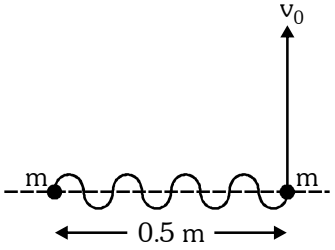


(1) $\sqrt{3}$ (2) $\frac{1}{\sqrt{3}}$ (3) $\frac{1}{2}$ (4) 2

31. A particle moving on the circumference of a circle of radius r describes an angle θ. The displacement and distance moved by particle are

(1) r, rθ (2) 2r sin (θ/2), rθ (3) r sin θ, r (θ/2) (4) 2r, 2r sin θ

32. Two particles each of mass m are connected by a string of length 1m. The particles are kept on a smooth horizontal plane. The initial separation between the particles is 0.5 m. One of the particles is given a velocity v_0 as shown in the figure. The magnitude of angular velocity of one particle with respect to the other particle just after the string becomes taut is



(1) v_0 (2) $\sqrt{3}v_0$ (3) $\frac{v_0}{2}$ (4) $\frac{\sqrt{3}v_0}{2}$

33. When a mass is suspended from a vertical spring in a uniform gravity spring elongates by a distance x. When the spring is cut in two parts and same mass is suspended again from the combinatin of springs as shown, combination of both the springs stretched by $\frac{x}{4.5}$. Find the ratio of length of bigger spring to the length of smaller spring.

(original spring) (after cutting)

(1) 1 (2) 2 (3) 3 (4) 4

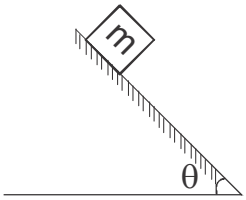
34. A particle of mass M has half the kinetic energy of another particle of mass $\frac{M}{2}$. If the speed of the heavier particle is increased by $2ms^{-1}$, its new kinetic energy equals the original kinetic energy of the lighter particle. What is the original speed of the heavier particle ?

(1) $2(1+\sqrt{2})ms^{-1}$ (2) $2(1+2\sqrt{2})ms^{-1}$ (3) $(2\sqrt{2}+1)ms^{-1}$ (4) $(2\sqrt{2}-1)ms^{-1}$

35. The dependence of g on geographical latitude at sea level is given by $g = g_0(1 + \beta\sin^2\phi)$ where ϕ is the latitude angle and β is a dimensionless constant. It Δg is the error in the measurement of g then the error in measurement of latitude angle is

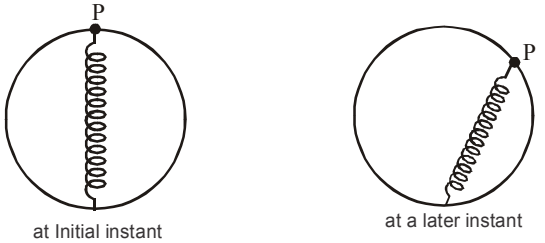
(1) zero (2) $\Delta\phi = \frac{\Delta g}{g_0\beta\sin(2\phi)}$ (3) $\Delta\phi = \frac{\Delta g}{g_0\beta\cos(2\phi)}$ (4) $\Delta\phi = \frac{\Delta g}{g_0}$

36. In the figure shown find frictional force acting on the block of mass m. Coefficient of friction between surface and block is μ and $\tan\theta < \mu$



(1) $mg\sin\theta$ (2) $\mu mg\cos\theta$ (3) $\mu mg\tan\theta$ (4) zero

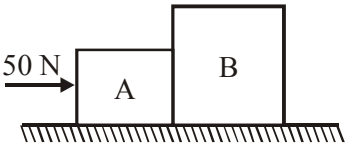
37. A massless spring having zero relaxed length has one end attached to a given point on a fixed smooth horizontal hoop of radius R, while other end is attached to a bead that is constrained to lie on the hoop. Initially the bead is at point P as shown where it is given negligible a small side kick. Find the length of spring when reaction force on bead is zero :-

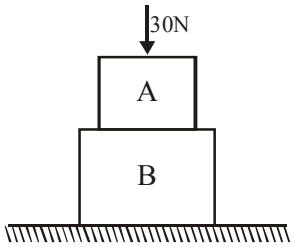


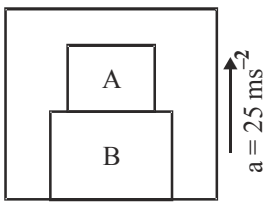
at Initial instant at a later instant

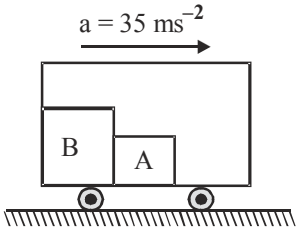
(1) $R\sqrt{\frac{8}{3}}$ (2) $\frac{2R}{3}$ (3) $\frac{R}{3}$ (4) $R\sqrt{2}$

38. In which of the following cases the contact force between A & B is maximum? ($m_A = m_B = 1kg$)

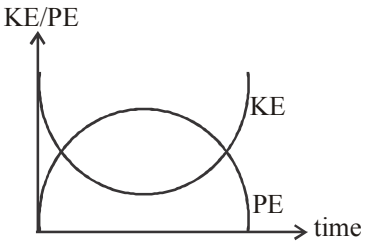
(1) 

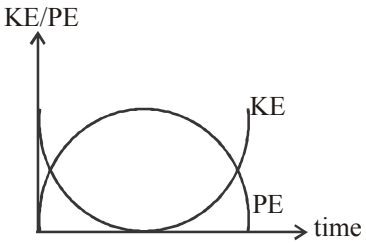
(2) 

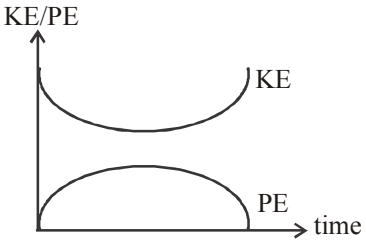
(3) 

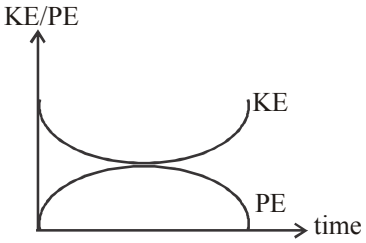
(4) 

39. A particle is projected at an angle $\theta = 30°$ with the horizontal. Which of the following curves best represents the variation of kinetic energy and gravitational potential energy as a function of time? {Take the horizontal as the reference level for the gravitational potential energy.}

(1) 

(2) 

(3) 

(4) 

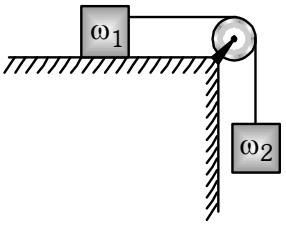
40. A weight ω_1 on a smooth table is connected by a light string paring over smooth pulley to another weight ω_2 which is free to move vertically as shown in the figure. The tension in the string is

(1) ω_2

(2) $\frac{\omega_1 + \omega_2}{2}$

(3) $\frac{\omega_1\omega_2}{\omega_1 + \omega_2}$

(4) $\omega_1 + \omega_2$



SECTION-B : CHEMISTRY

This section contains **20 Multiple Choice Questions.** Each question has four choices (1), (2), (3) and (4) out of which ONLY ONE is correct.

41. The wavelength of photon emitted when an electron jumps from a 4d orbital to a 2p orbital in Hydrogen atom, is [The Rydberg constant is 1.097×10^{-2} nm^{-1}]

(1) 656.3 nm (2) 486.2 nm

(3) 364.6 nm (4) 2.057×10^{-3} nm

42. A solution of density 2.00 g/cm^3 contains solute X (MW = 80.0). The solution is analyzed to have 60.0% X by weight. What is the molarity of solution ?

(1) 24.0 M (2) 12.5 M

(3) 15.0 M (4) 12.0 M

43. A photon ejects an electron from the ground state of $He^{+.}$ .This ejected electron has the same de-Broglie wavelength as that of an electron in the ground state of H atom. The energy of the incident photon is:

(1) 68 eV (2) 54.4eV

(3) 13.6eV (4) 128.8eV

44. A mixture of CO and CO_2 is found to have a density of 1.70 g/L at STP. The mole fraction of CO in the mixture is

(1) 0.37 (2) 0.40 (3) 0.30 (4) 0.50

45. Which of the following is an exothermic process ?

(1) $Be(g) + e^- \rightarrow Be^-(g)$ (2) $Li(g) + e^- \rightarrow Li^-(g)$

(3) $Na(g) \rightarrow Na^+(g) + e^-$ (4) $N(g) + e^- \rightarrow N^-(g)$

46. A real gas that obeys the equation of state $p(V - nb) = nRT$, where b and R constants. If the pressure and temperature are such that $V_m = 9b$. The value of the compression factor is

(1) $\frac{9}{10}$ (2) $\frac{10}{9}$ (3) $\frac{9}{8}$ (4) $\frac{8}{9}$

47. Given

Solution A- 0.1M NaCl 1L solution and

Solution B- 0.2M $CaCl_2$ 2L solution.

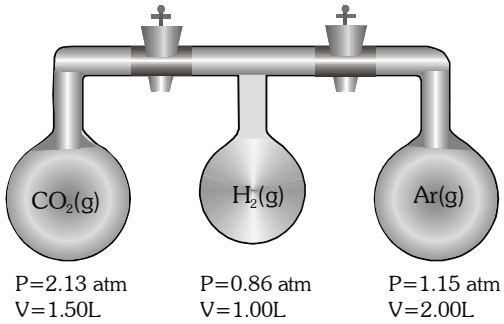
What would be the final number of moles of Cl^- ions if both solutions are mixed together ?

(No volume contraction occurs on mixing)

(1) 1.8 (2) 2.7

(3) 0.9 (4) 0.8

48. The apparatus shown consists of three bulbs connected by stopcocks. What is the pressure inside the system when the stopcocks are opened ? Assume that the lines connecting the bulbs have zero volume and that the temperature remains constant.



(1) 2.13 atm (2) 1.41 atm (3) 1.23 atm (4) 1.14 atm

49. Which of the following ionic radius order is **INCORRECT** ?

(1) $N^{-3} > O^{-2} > F^{-} > Na^{+} > Mg^{+2}$ (2) $Mn^{+2} > Mn^{+3} > Mn^{+7}$

(3) $Li^{+} < Na^{+} < K^{+} < Rb^{+}$ (4) $P^{+5} > P^{+3}$

50. The work function of potassium is 2.25 eV. A beam with a wavelength of 400 nm has an intensity of 10^{-9} W/m^2. What is the number of electrons emitted per meter square per second from the surface assuming 3% of the incident photons are effective in ejecting electrons ?
(h = 6.63 x 10^{-34} J-sec, c = 3 x 10^{8} m/sec.)

(1) $2\times10^{9}\ \frac{\text{Photons}}{\text{m}^2\text{s}}$ (2) $6.0\times10^{7}\ \frac{\text{Photons}}{\text{m}^2\text{s}}$

(3) $5\times10^{10}\ \frac{\text{Photons}}{\text{m}^2\text{s}}$ (4) $1.5\times10^{9}\ \frac{\text{Photons}}{\text{m}^2\text{s}}$

51. Lithium's first and second ionization energies are 519 kJ/mol and 7300 kJ/mol, respectively. Element X has a first ionization energy of 590 kJ/mol and a second ionization energy of 1150 kJ/mol. Element X is most likely to be :

(1) Oxygen (2) Sodium (3) Calcium (4) Xenon

52. Select the correct statement(s) :

I. Greater is the mass of the particle, lesser is the error in measurement of velocity.

II. For an electron, if uncertainty in position tends to zero, then uncertainty in momentum is extremely small.

III. If λ_1 and λ_2 are the two different wavelengths used to detect the position of electron and uncertainty in velocity be v_1 and v_2 respectively, then if $\lambda_1 > \lambda_2$, then $v_2 > v_1$.

(1) only I (2) I and II

(3) I,II & III (4) I and III

53. Three resonating structures are shown for N_2O

(A) $:N\equiv N-\ddot{O}:$ (B) $:\ddot{N}=N=\ddot{O}:$ (C) $:\ddot{N}-N\equiv O$

The correct order of their stability is

(1) A > B > C (2) C > B > A (3) B > C > A (4) C > A > B

54. When NH_3 reacts with HCl then which of the following option correctly represents the change in H–N–H bond angle?

(1) around 1° (2) around 4° (3) around 2.5° (4) around 5°

55. Which of the following will have maximum O–O bond length ?

(1) O_2 (2) O_2^+ (3) O_2^- (4) O_2^{2-}

56. Which of the following molecule is expected to be linear as well as polar ?

(1) BF_3 (2) SiO_2 (3) CO_2 (4) XeFCl

57. The van der Waals' parameters for gases W, X, Y and Z are

Gas	a(L^2atm/mol^2)	b(L/mol)
W	4.0	0.027
X	8.0	0.030
Y	6.0	0.032
Z	12.0	0.027

Which gas (from above) has the highest critical temperature ?

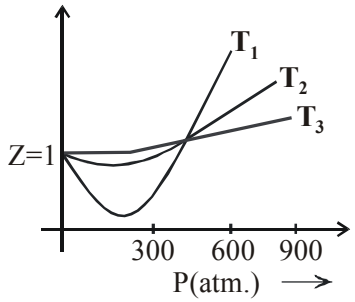
(1) W (2) X (3) Y (4) Z

58. Which of the following orders regarding bond angle is correct?

(1) $BF_3 > BCl_3$ (2) $OF_2 > OCl_2$

(3) $NH_3 > NH_4^+$ (4) $H_2O > OF_2$

59. The variation of compressibility factor 'Z' with pressure at different temperatures T_1, T_2 and T_3 is given as follows



Match the temperature in Column I with the Column II values.

Column I	Column II
(a) T_1	1. 500 K
(b) T_2	2. 1000 K
(c) T_3	3. 200 K

(1) a – 3, b – 1, c – 2 (2) a – 1, b – 2, c – 3

(3) a – 2, b – 3, c – 1 (4) Information is insufficient.

60. 64 gm of an organic compound has 24 g carbon and 8 g hydrogen and the rest is oxygen. The empirical formula of the compound is

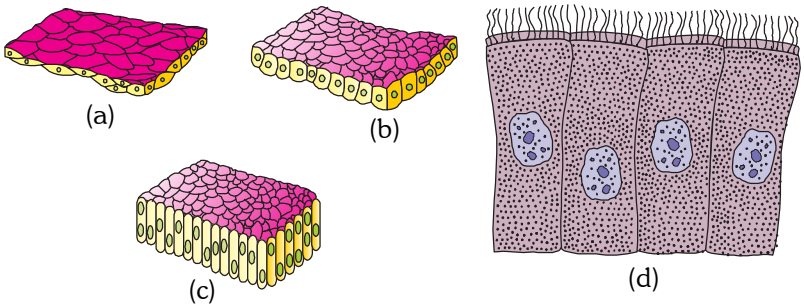
(1) CH_4O (2) CH_2O (3) C_2H_4O (4) None of these

Attempt any one of the Section - C : Biology OR Section - D : Mathematics

SECTION-C : BIOLOGY

This section contains **20 Multiple Choice Questions.** Each question has four choices (1), (2), (3) and (4) out of which ONLY ONE is correct.

61. Four figures (a), (b), (c) & (d) are given below :-



On the basis of above figures find out the **incorrect** match :-

	Column I (Tissue type)		**Column II (Occurence)**
(1)	a	–	Air sacs of lungs
(2)	b	–	Bronchioles
(3)	c	–	Lining of stomach
(4)	d	–	Fallopian tubes

62. For identification of an organism through key usually :-

(1) One similar character is used (2) Two contrasting characters are used

(3) Many similar characters are used (4) Only one statement called lead is used

63. Comparing small and large cells, which statement is **correct**?

(1) Small cells have a small surface area per volume ratio

(2) Exchange rate of nutrients is fast with large cells.

(3) Exchange rate of nutrients is slow with small cells

(4) Small cells have a large surface area per volume ratio

64. (i) Cellulose (ii) Hemi cellulose (iii) Lignin (iv) Pectin

Among the above given substances, (a) which substance is not found at the corner thicknings of hypodermal cells in dicot stem and (b) this substance is found in the walls of which components ? Choose the **correct** option regarding (a) & (b) from the following : -

(1) (a) Hemicellulose, (b) Tracheids and xylem fibres

(2) (a) Lignin, (b) Only in vessels and bast fibres

(3) (a) Lignin, (b) Vessels , xylem fibres and phloem fibres

(4) (a) Pectin, (b) Tracheids, phloem fibres and vessels

65. Which is the correct sequence of the path of water current flowing in *Spongilla* ?

(1) Osculum → Spongocoel → Ostium (2) Osculum → Ostium → Spongocoel

(3) Spongocoel → Osculum → Ostium (4) Ostium → Spongocoel → Osculum

66. Desmosomes are usually found in :-

(1) Epithelial tissue (2) Muscular tissue

(3) Nervous tissue (4) All of these

67. Which one of the following terms is **correctly** matched with their correct description ?

	Term	Description
(1)	Taxon	Provide the index to the plant species found in a particular area
(2)	Flora	Contains the actual account of habitat and distribution of plants of a given area
(3)	Monograph	Collection of preserved plants and animals
(4)	Catalogues	Contain information on any one taxon

68. Annual ring in a tree signify the age of the tree. Annual rings are made up of ?
(1) Growing secondary phloem (2) Growing secondary xylem
(3) Growing primary phloem (4) Growing primary xylem

69. Consider the following characters given below :-
(i) Notochord present during the embryonic period.
(ii) Central nervous system is dorsal, hollow and single.
(iii) A post anal part (tail) is present.
(iv) Central nervous system is ventral, solid and double.
(v) Heart is dorsal (if present)
(vi) Gill slits are absent
Select **correct** option:
(1) *Nereis* having (i), (iii), (v) and (vi) characters
(2) *Hemidactylus* having (i), (ii) and (iii) characters only
(3) *Balaenoptera* does not have (iv), (v) and (vi) characters
(4) Both (2) and (3) are correct

70. An important site of formation of steroidal hormones in animal cells, is :
(1) RER (2) SER (3) Golgi Apparatus (4) Nucleus

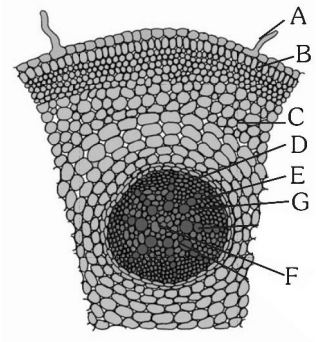
71. Which one is a false statement for *Periplaneta*?
(1) It is uricotelic in nature.
(2) The sclerites are joined by arthrodial membrane.
(3) Hepatic caeca is at the junction of mid gut and hind gut.
(4) Malpighian tubules are associated with the excretion.

72. A drug inhibits the function of a cell organelle which recieve material (for modification) from ER. Which of the following cell will not be affected by this drug ?
(1) Bacteria (2) Protista (3) Plant (4) Animal

73. Plants can show mitotic division in :-
(1) Only haploid cells (2) Only diploid cells
(3) Both haploid and diploid cells (4) Neither haploid nor diploid cells

74. Choose **incorrect** statement regarding phylum Mollusca–
(1) This is the second largest animal phylum
(2) Gills are found in the mantle cavity
(3) Radula an excretory organ is found
(4) *Dentalium* is commonly called Tusk shell.

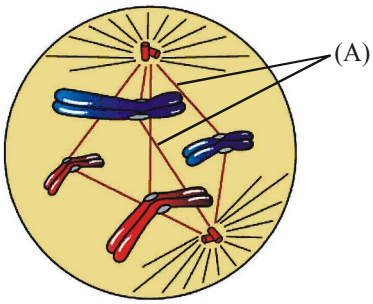
75. Transverse section of a part of a typical monocotyledonous root has been shown in the given figure. Identify the different parts (from A to G) and select the **correct** answer :-



(1) A – Root hair, B – Epidermis, C – Cortex, D – Endodermis, E – Pericycle, F – Pith, G – Phloem
(2) A – Root hair, B – Endodermis, C – Cortex, D – Pericycle, E – Epidermis, F – Pith, G – Phloem
(3) A – Root hair, B – Epidermis, C – Pericycle, D – Endodermis, E – Cortex, F – Pith, G – Phloem
(4) A – Root hair, B – Cortex, C – Epidermis, D – Pericycle, E – Endodermis, F – Passage cell, G – Protoxylem

76. Which of the following is **not a** matching pair of an animal with a certain feature ?
(1) *Obelia* : Metamerism
(2) Ctenophores : Bioluminiscence
(3) *Planaria* : High regeneration capacity
(4) *Ascaris* : Pseudocoelom

77. Consider the following figure of cell division :-



In the above diagram, components labelled as 'A' are essential for mitosis & meiosis ,(a) what is the main role of 'A' and (b) in which phase of mitosis and meiosis 'A' play their main role ?
(1) (a) Splitting of centromeres (b) Phase in which duplicated centrioles move towards opposite poles.
(2) (a) Pulling of chromosomes (b) Only in phase in which two chromatid chromosome converts into single chromatid ones.
(3) (a) Pulling of chromosomes (b) Phase in which splitting of centromeres may or may not occur.
(4) (a) Decondensation of chromosomes (b) Phase in which chromosomes lost their identity as discrete elements.

78. Which one is a **mis-match pairing**?
(1) *Petromyzon* – Cyclostomata
(2) *Branchiostoma* – Urochordata
(3) *Pterophyllum* – Osteichthyes
(4) *Ichthyophis* – Amphibia

79. Select the **incorrect** pair :-
(1) Cell wall – Structural support
(2) Central vacuole – Storage
(3) Chloroplast – Chlorophyll
(4) Plasmodesmata – Protection

80. The inter cellular material (matrix) of cartilage is :-
(1) Solid and non pliable
(2) Solid and pliable
(3) Semisolid and nonpliable
(4) Semisolid and pliable

SECTION-D : MATHEMATICS

This section contains **20 Multiple Choice Questions.** Each question has four choices (1), (2), (3) and (4) out of which ONLY ONE is correct.

81. If $\sum_{r=1}^{\infty}\frac{8}{(2r-1)\sqrt{(2r+3)(2r+5)}+\sqrt{(2r+1)(2r-1)}(2r+3)}=\sqrt{a}+\sqrt{\frac{5}{3}}-\sqrt{c}$, where a, c are coprime numbers, then the value of $a+\frac{c}{4}$ is equal to

(1) 3 (2) 5 (3) 8 (4) 4

82. If $x+\frac{1}{x}=3$ then the value of $x^5+\frac{1}{x^5}$ is

(1)100 (2) 123 (3) 243 (4) 172

83. The smallest integral value of p such that $px^2+12x+6>3x^2-p\ \forall x\in R$, is :

(1) 5 (2) 6
(3) 7 (4) 8

84. If the equation $Z^2 + Z + \alpha = 0$ has a purely imaginary root and α lies on the circle $|Z| = 1$ then the value of $(1 + \alpha + \bar{\alpha})$ is

(1) $\sqrt{2}$ (2) $\sqrt{3}$ (3) $\sqrt{5}$ (4) $\sqrt{6}$

85. If $T_n = (\sin^n\theta + \cos^n\theta)$, then for permissible values of θ, $\frac{T_5 - T_3}{T_7 - T_5}$ is always equal to

(1) $\frac{T_1}{T_3}$ (2) $\frac{T_2}{T_4}$ (3) $\frac{T_5}{T_7}$ (4) $\frac{T_3}{T_7}$

86. If the perpendicular from origin to the line y = mx + c meet at a point (–1, 2). Then the value of m + c is

(1) 2 (2) 3 (3) 4 (4) 5

87. Consider a pair of circles $(|x| - 1)^2 + |y|^2 = 1$. If minimum length of path traced by a particle which starts from P(–3, 0) and reaches Q(3, 0) without entering inside any circle, is ℓ, then

(1) $6 < l < 7$ (2) $7 < l < 8$
(3) $8 < l < 9$ (4) $9 < l < 10$

88. The graph of the function $y = 16x^2 + 8(a + 2)x - 3a - 2$ is strictly above the x-axis, then number of integral values of a is

(1) 6 (2) 5 (3) 4 (4) 3

89. If the roots of the polynomial $2x^3 - 4x^2 + 7x - 5 = 0$ are a,b,c then find the value of

$$\frac{1}{(b-4)(a-2)+2a-4}+\frac{1}{(b-4)(c-2)+2c-4}+\frac{1}{(a-4)(c-2)+2c-4}$$

(1) $\frac{5}{3}$ (2) $\frac{4}{5}$ (3) $\frac{5}{9}$ (4) $\frac{8}{9}$

90. $\sum_{k=1}^{\infty}\left(\frac{1-k}{2^k}\right)$ is equal to-

(1) –3 (2) –4 (3) –8 (4) –1

91. Let p,q,a ∈ R such that $p^2 + q^2 - 2p = 0$, then the minimum value of $\sqrt{(p-a)^2+(a+q-4)^2}$ is-

(1) 1 (2) $\frac{3}{\sqrt{2}}+1$ (3) $\frac{3}{\sqrt{2}}-1$ (4) $\frac{3}{\sqrt{2}}$

92. Sum of slopes of all possible lines passing through origin (O) and intersecting the lines x + y = 1 & x + 2y = 1 at A & B respectively such that $3(OA.OB) = 1$, is (where OA represents distance between origin and point A)

(1) 1 (2) $\frac{12}{5}$ (3) 3 (4) $\frac{5}{6}$

93. Number of solutions of the system of equations and inequations : a – b > –4, a – b < 4 and a + b = 16, a,b ∈ I is-

(1) 3 (2) 5 (3) 7 (4) Infinitely many

94. The number of points in x-y plane equidistant from lines x – y = 0; x + y = 0 & 2x + 3y = 12 are-

(1) 1 (2) 3 (3) 4 (4) 5

95. If $\frac{1\underbrace{000.....01}_{\text{n zeros}}}{1\underbrace{000.....01}_{\text{(n+1) zeros}}} < \frac{1\underbrace{000.....01}_{\text{m zeros}}}{1\underbrace{000.....01}_{\text{(m+1) zeros}}}$ then which of the following is true ?

(1) m > n (2) m < n (3) n > m + 2 (4) n < m + 2

96. The value of $i^{2015} + i^8 + i^{-2015}$ is (where $i = \sqrt{-1}$)

(1) 0 (2) –1 (3) 1 (4) i

97. Let C(O, r) be a circle of centre O and radius r. A point I is said to be "inverse of point P" with respect to circle C(O, r) if OI·OP = r^2, where I lies in the direction of $\overrightarrow{OP}$.

Let I_1, I_2, I_3 be the inverses of $P_1(2, 2)$,$P_2(1, -1)$ and $P_3(-1, 1)$ respectively, with respect to circle C(A,R) where A(0,0), R = 2. Area of $\Delta P_1P_2P_3$ is Δ_1 and area of $\Delta I_1 I_2 I_3$ is Δ_2 then value of $\frac{\Delta_2}{\Delta_1}$ is

(1) 4 (2) 2 (3) 1 (4) None of these

98. The number of real values of x such that
$(2^{-x} + 2^x - 2\cos x)(3^{x+\pi} + 3^{-x-\pi} + 2\cos x)(5^{\pi-x} - 2\cos x + 5^{x-\pi}) = 0$, is

(1) 1 (2) 2 (3) 3 (4) infinite

99. The complex number 3 + 4i is rotated about origin by an angle of $\frac{\pi}{2}$ in anti-clockwise direction and then stretched 2-times. The complex number corresponding to new position is (where $i = \sqrt{-1}$)

(1) 8 – 6i (2) –8 + 6 i
(3) 6 – 8 i (4) –6 + 8 i

100. The equation of circle which touches axis of y at the origin and passes through (3, 4) is

(1) $2(x^2 + y^2) - 3x = 0$ (2) $3(x^2 + y^2) - 25x = 0$
(3) $4(x^2 + y^2) - 25x = 0$ (4) $4(x^2 + y^2) - 25x + 10 = 0$

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Revised Answer Key

TALLENTEX 2016
ALLEN'S Talent Encouragement Exam

Class- 11th (XI)

Held on : 04 October 2015

Q.No.	Ans
1	3
2	2
3	3
4	3
5	3
6	4
7	2
8	1
9	3
10	1
11	1
12	1
13	2
14	4
15	1
16	2
17	B
18	4
19	4
20	1

Q.No.	Ans
21	1
22	2
23	1
24	3
25	4
26	3
27	2
28	1
29	3
30	2
31	2
32	3
33	2
34	1
35	2
36	1
37	1
38	2
39	3
40	3

Q.No.	Ans
41	2
42	3
43	1
44	1
45	2
46	3
47	3
48	2
49	4
50	2
51	3
52	4
53	1
54	3
55	4
56	4
57	4
58	4
59	1
60	1

Q.No.	Ans
61	2
62	2
63	4
64	3
65	4
66	1
67	2
68	2
69	2
70	2
71	3
72	1
73	3
74	3
75	1
76	1
77	3
78	2
79	4
80	2

Q.No.	Ans
81	4
82	2
83	3
84	3
85	1
86	2
87	1
88	3
89	4
90	4
91	3
92	3
93	1
94	3
95	2
96	3
97	3
98	2
99	2
100	2

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