Tallentex Form No. | 4 | | | | | |

Answer Sheet No. | T | 4 | | | | |

TALLENTEX 2016 : (18, October 2015)

PAPER CODE

A

TALLENTEX 2016

ALLEN'S Talent Encouragement Exam
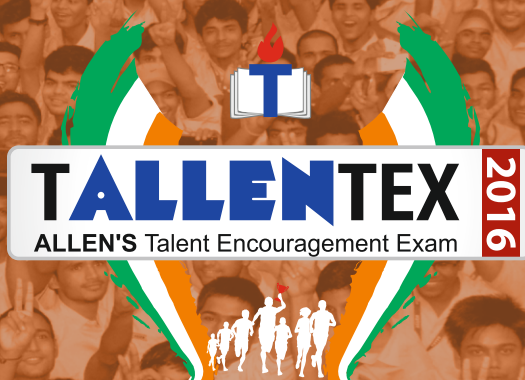
CLASS - 11th (XI)

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

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 **20 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.

TALLENTEX 2016
ALLEN'S Talent Encouragement Exam

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

(i) 'A + B' means that A is the father of B.

(ii) 'A – B' means that A is the wife of B.

(iii) 'A × B' means that A is the brother of B.

(iv) 'A ÷ B' means that A is the daugher of B.

If it is given P ÷ R + S + Q, which of the following is true ?

(1) P is the daughter of Q   (2) Q is the aunt of P

(3) P is the aunt of Q   (4) P is the mother of Q

2. Radha says, "Ravi's father is the only son of my father". How is Radha related to Ravi ?

(1) Daughter   (2) Sister   (3) Mother   (4) Aunt

3. Shabnam's school bus picks her up from her house and takes two left turns and one right turn to reach her school. If the bus is facing East, while reaching the school, which direction was the bus facing at her home?

(1) North   (2) South   (3) East   (4) West

4. If in certain code, STUDENT is written as RSTEDMS, the how would TEACHER be written in the same code ?

(1) SZZDGEQ   (2) SZDDGEQ   (3) SDZDGDQ   (4) SDZCGDQ

5. On what dates of April, 2001 did Wednesday fall?

(1) 1st, 8th, 15th, 22nd, 29th   (2) 2nd, 9th, 16th, 23rd, 30th

(3) 3rd, 10th, 17th, 24th   (4) 4th, 11th, 18th, 25th

6. The numbers have been arranged under some rule. Based on that rule which number will come in place of the question mark ?
1, 3, 8, 19, 42, 89, ?
(1) 108   (2) 184   (3) 167   (4) 97

7. A clock is set to show the correct time at 11 a.m. The clock gains 12 minutes in 12 hours. What will be the true time when the clock indicates 1 p.m. on the 5th day ?

(1) 10 a.m.   (2) 11 a.m.   (3) 12 noon   (4) None of these.

8. Find the angle between the two hands of a clock at 15 minutes past 4 o'clock

(1) 38.5°   (2) 36.5°   (3) 37.5°   (4) None of these

9. The calendar for the year 2000 will be same for :
(1) 2024   (2) 2028   (3) 2016   (4) 2008

10. 64 smaller but identical cubes are placed on a table to form a large cube. How many more such smaller cubes are now required to enclose this large cube placed on the table completely ?

(1) 112   (2) 128   (3) 116   (4) 132

Directions for (Q.11 and Q.12): The figure (X) given below is the unfolded position of a cubical dice. In each of the following questions this unfolded figure is followed by four different figures of dice. You have to select the figure which is identical to the figure (X).

11. (X)

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

12. (X)

(1) (2) (3) (4)
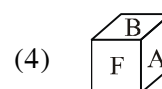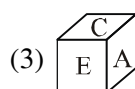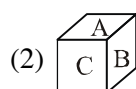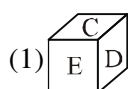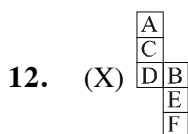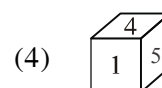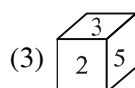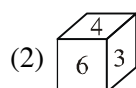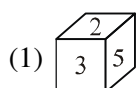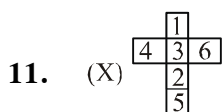
13. A cube is coloured red on two opposite faces, blue on two adjacent faces and yellow on two remaining faces. It is then cut into two halves among the plane parallel to the red faces. One piece is then cut into four equal cubes and the other one into 32 equal cubes.

How many cubes have at least two coloured faces ?

(1) 20   (2) 24   (3) 28   (4) 32

14. In the given question, choose the correct mirror image from alternative (1), (2), (3) and (4) of the figure (X).

(X)   (1)   (2)   (3)   (4)
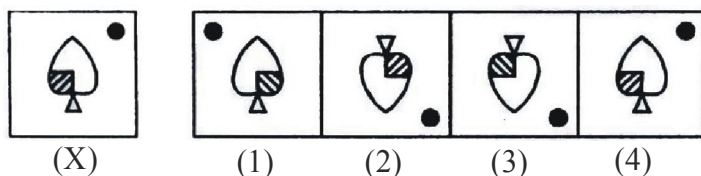
15. In a cricket season, India defeated Australia twice, West Indies defeated India twice, Australia defeated West Indies twice, India defeated New Zealand twice and West Indies defeated New Zealand twice. Which country has lost most number of times?

(1) India   (2) Australia

(3) New Zealand   (4) West Indies

16. In a certain code MEAN is written as $57✹ and DOME is written as 93$5. How is MOAN written in that code?

(1) 3$7✹   (2) $73✹   (3) $37✹   (4) $✹37

17. How many triangles are there in the following figure?

(1) 15   (2) 19   (3) 17   (4) 20
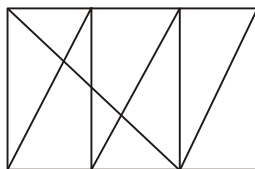
Directions for (Q.18 & Q.19) : In each of the following questions, two statements are given followed by three or four conclusions numbered I, II, III and/or IV. You have to take the given statements to be true even if they seem to be at variance from the commonly known facts and then decide which of the given conclusions logically follows from the given statements disregarding commonly known facts.

18. **Statements :** Some clothes are marbles.

Some marbles are bags.

Conclusions : I.   No cloth is a bag

II.   All marbles are bags.

III.   Some bags are clothes.

IV.   No marble is a cloth.

(1) Only either I or IV follows   (2) Only either I or II follows

(3) None follows   (4) Only either I or III follows

19. **Statements :** Some books are pens.

No pen is pencil.

Conculsions : I.   Some pens are books.

II. All pens are books.

III. No book is pencil.

(1) Only I follows   (2) Only II and III follow

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

20. Reema ranks 13th from the top and Seema 8th from the bottom. If the positions of Reema and Seema are interchanged, Seema becomes 17th from the bottom then what will be position of Reema from the top :

(1) 20th   (2) 21st

(3) 19th   (4) None of these

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. Two identical blocks each of mass m are connected by a massless spring and kept on a smooth surface as shown. Initially the spring is undeformed when a constant horizontal force F acts on one of the masses. If at any instant acceleration of block B is $\dfrac{F}{3m}$ then acceleration of block A at that instant is

(1) $\dfrac{F}{m}$ (2) $\dfrac{2F}{m}$ (3) $\dfrac{F}{3m}$ (4) $\dfrac{2F}{3m}$

22. Two particles of masses m and 4m moving in vacuum at right angles to each other experience same force $\vec{F}$ for same time T simultaneously, consequently the particle m moves with velocity 4v in its original direction. Given v = 100 m/s, what is magnitude of new velocity v' of particle 4m :-
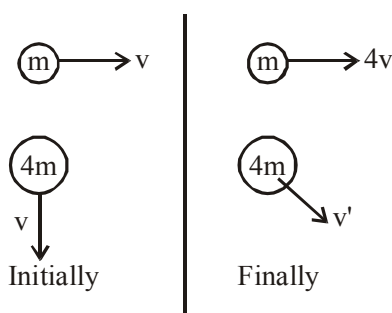
(1) 100 m/s (2) 125 m/s (3) 25 m/s (4) 50 m/s

23. A physical quantity can be written as $f = \dfrac{xy}{z}$

(i) If units of x, y and z are changed but f remains same then f must be a dimensionless quantity

(ii) If units of x, y and z are changed but f remains same then f may be a dimensionless quantity

(iii) If f is a dimensionless quantity, then changing units of x, y and z will not affect value of f

(1) All are correct (2) Only (ii) is correct

(3) Only (i) and (iii) are correct (4) Only (ii) and (iii) are correct

24. A particle moves along x-axis. The position of the particle at time t is given as $x = t^3 - 9t^2 + 24t + 1$. Find the distance traveled in first 5 seconds

(1) 20 m　　　　(2) 10 m　　　　(3) 18 m　　　　(4) 28 m

25. A stream of 200 identical clay balls move with speed 2.01 m/s in a line on a frictionless surface. Spacing between the balls is 1 cm. An additional identical ball is infront of them at a distance 1 cm as shown. If all the collision are perfectly inelastic, find time between, instant shown and last collision :- (v = 2.01 m/s)


(1) 200 s　　　　(2) 150 s　　　　(3) 100 s　　　　(4) 50 s

26. Two bodies of mass m and 4m are attached to a light string as shown in the figure. The body of mass m hanging from string is executing oscillation with angular amplitude 60° while other body is at rest on a horizontal surface. The minimum coefficient of friction between the mass 4m and the horizontal surface is (Assume pulley is smooth and light)
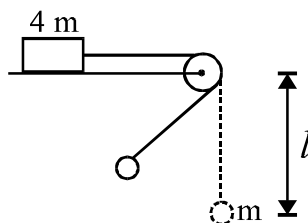
(1) 1/4　　　　(2) 3/4　　　　(3) 1/2　　　　(4) 1/8

27. Consider figure. A box starts sliding from a smooth platform at a distance h above the top of the loop and goes around the loop without falling. The minimum value. of h for successful loop is :
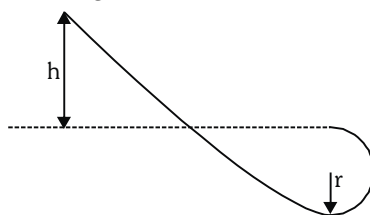
(1) r　　　　(2) $\dfrac{3r}{4}$　　　　(3) $\dfrac{r}{2}$　　　　(4) $\dfrac{3r}{2}$

28. A hemisphere of mass 3 m and radius R is free to slide with its base on a smooth horizontal table. A particle of mass m is placed on the top of the hemisphere. If particle is displaced with a negligible velocity, then find the angular velocity of the particle relative to the centre of the hemisphere at an angular displacement θ, when velocity of hemisphere is v.
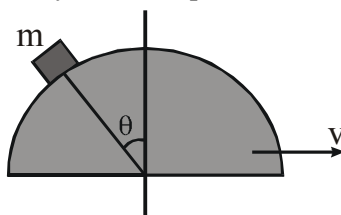
(1) $\dfrac{4v}{R \cos \theta}$　　　(2) $\dfrac{3v}{R \cos \theta}$　　　(3) $\dfrac{5v}{R \cos \theta}$　　　(4) $\dfrac{2v}{R \cos \theta}$

29. A body is starting from rest moved along a straight line by a machine delivering constant power. The distance moved by the body in time 't' is proportional to :

(1) $t^{3/2}$ (2) t^2 (3) $t^{1/2}$ (4) t

30. In the system of pulleys shown what should be the value of m_1 such that it remains at rest :
(Assume pulleys and strings are light and friction less)
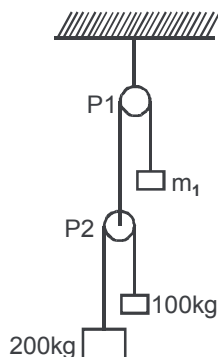
(1) $\dfrac{100}{3}$ kg   (2) $\dfrac{800}{3}$ kg   (3) $\dfrac{700}{3}$ kg   (4) $\dfrac{200}{3}$ kg

31. The velocity time graph for a particle moving along x-axis is shown in the figure. Then its displacement-time graph is correctly shown by
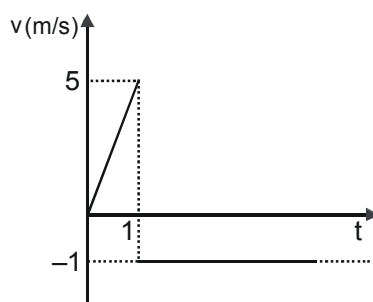
32. Two particles start their motion from origin in x-y plane. If at time t = 0 particle A of mass 1kg moving towards x-axis with constant velocity 2 m/s and another particle B of mass 1kg starts moving along y-axis with constant acceleration 2 m/s^2 then equation of trajectory of centre of mass of A and B will be

(1) $y = 2x + const.$ 　　(2) $x = 2y + const.$ 　　(3) $y = \dfrac{x^2}{2} + const.$ 　　(4) $x = \dfrac{y^2}{2} + const.$

33. The range of a projectile, when launched at an angle of 15° with the horizontal is 2 km. What is the range of the projectile when launched at an angle of 45° to the horizontal ?
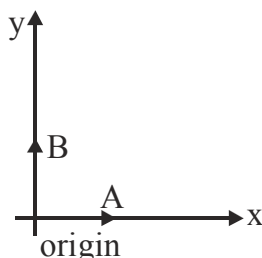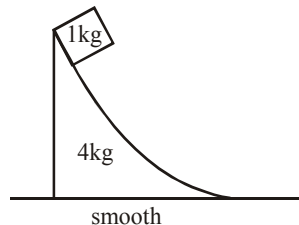
(1) 2 km 　　　　(2) 4 km 　　　　(3) 6 km 　　　　(4) 2.5 km

34. A block of mass 1 kg is kept on a smooth wedge of mass 4kg which is placed on a smooth horizontal surface as shown. System is released from rest. When block 1 kg reaches on horizontal surface its velocity is found to be 4 m/s. Work done by normal contact force on 1 kg block during its motion is:-

(1) zero 　　　　(2) 2 joule 　　　　(3) – 2 joule 　　　　(4) 8 joule

35. Which one of the following relations is dimensionally consistent where h is height to which a liquid of density ρ rises in a capillary tube of radius r. T is the surface tension of the liquid, θ is the angle of contact and g is the acceleration due to gravity ?

(1) $h = \dfrac{2T\cos\theta}{r\rho g}$ 　　(2) $h = \dfrac{2Tr}{\rho g\cos\theta}$ 　　(3) $h = \dfrac{2\rho g\cos\theta}{2Tr}$ 　　(4) $h = \dfrac{2Tr\rho g}{\cos\theta}$

36. A ball is projected up from ground with velocity v_0. A video film is shot for this projection up to the time it lands on ground. Now this film is played backward, consider moment of impact with ground as t = 0. Mark the **CORRECT** graph for time reversal. Taking upward direction as positive.
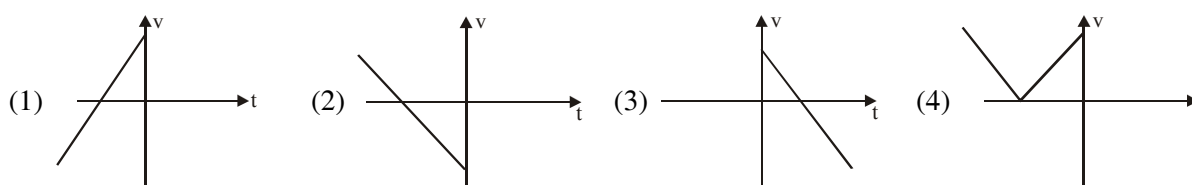
37. A locomotive of mass M starts moving so that its velocity varies as $v = \alpha\sqrt{s}$, where α is a constant and s is the distance transversed. The total work done by all the forces acting on the locomotive during the first t second after the start of motion is

(1) $\dfrac{1}{2}M\alpha^4 t^2$ 　　　(2) $\dfrac{1}{4}M\alpha^4 t^2$ 　　　(3) $\dfrac{1}{8}M\alpha^4 t^2$ 　　　(4) $\dfrac{1}{16}M\alpha^4 t^2$

38. A composite rod consists of two uniform rods of equal length but of different masses m_1 and m_2 ($m_2 > m_1$). The composite system is rotated about an axis passing through the joint and perpendicular to the rod with an angular velocity ω as shown. Graph showing variation of magnitude of tension with x, at the instant shown is

(1)

(2)

(3)

(4)
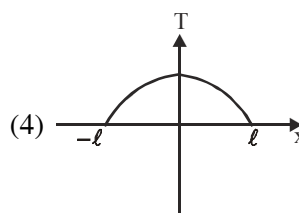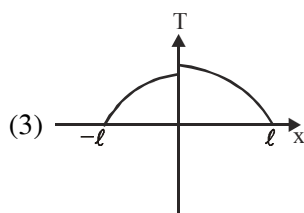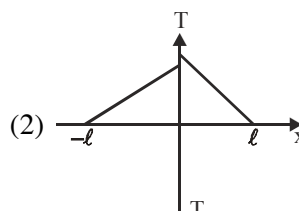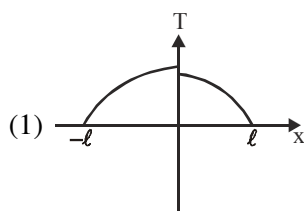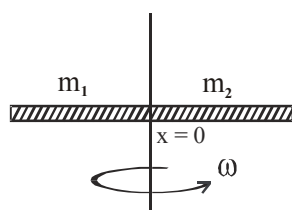
39. A pendulum has a length ℓ. Its bob is pulled aside from its equilibrium position through an angle α and then released. The speed of the bob when it passes through the equilibrium position is given by :

(1) $\sqrt{2g\ell}$ 　　　　　　　　　　(2) $\sqrt{2g\ell\cos\alpha}$

(3) $\sqrt{2g\ell(1-\cos\alpha)}$ 　　　　　(4) $\sqrt{2g\ell(1-\sin\alpha)}$

40. Two projectiles are fired from same height, same point at same time. The trajectory of one projectile with respect to other is

(1) Parabola 　　　　　　　　　(2) Straight line

(3) Ellipse 　　　　　　　　　　(4) Hyperbola

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. Wavelength of radiations emitted when an electron jumps from a state A to C is 3000 Å and it is 6000 Å when the electron jumps from state B to C. Wavelength of the radiations emitted when an electron jumps from state A to B will be

(1) 2000 Å   (2) 3000 Å   (3) 4000 Å   (4) 6000 Å

42. For the reaction $2P + Q \rightarrow R$, what will be the number of moles of R formed, starting with 8 mol of P and 5 mole of Q ?

(1) 8 mol of R   (2) 5 mol of R   (3) 4 mol of R   (4) 13 mol of R

43. In a sample of H-atoms, electrons de-excite from a level 'n' to 1. The total number of lines belonging to Balmer series are two. The electrons are now ionised from level 'n' by photons of energy 13 eV. The kinetic energy of the ejected photoelectrons will be

(1) 12.15 eV   (2) 11.49 eV   (3) 12.46 eV   (4) 12.63 eV

44. Which of the following contains the greatest number of atoms ?

(1) 1.0 g of butane (C_4H_{10}) (2) 1.0 g of nitrogen (N_2)

(3) 1.0 g of silver (Ag)   (4) 1.0 g of water (H_2O)

45. Among the following, the order of increasing electron affinity is

(1) $N < P < F < Cl$ (2) $N < P < Cl < F$

(3) $P < Cl < N < F$ (4) $P < N < F < Cl$

46. A 4 : 1 molar mixture of He and CH_4 gases is contained in a vessel at 20 bar pressure. The gas mixture leaks out because of a hole in the vessel. The ratio of number of moles of He to CH_4 in the mixture effusing out initially will be

(1) 8 : 1   (2) 1 : 8   (3) 1 : 4   (4) 4 : 1

47. The number of F^- ions in 4.2g AlF_3 is [Atomic mass of Al = 27, F = 19; Take $N_A = 6.02 \times 10^{23}$]

(1) 0.05   (2) 9.03×10^{22}

(3) 3.01×10^{22} (4) 0.15

48. The behaviour of a real gas is usually depicted by plotting compressibility factor Z versus P at a constant temperature. At high temperature and high pressure, Z is usually more than one. This fact can be explained by van der Waals' equation when

(1) The constant **a** is negligible and not **b**   (2) The constant **b** is negligible and not **a**

(3) Both constants **a** and **b** are negligible   (4) Both constants **a** and **b** are not neglgible

(*where* **a** *and* **b are van der waals' constant**)

49. Which of the following is correct order for acidic strength of the given oxides ?

(1) $Na_2O < K_2O < Rb_2O$

(2) $MgO < CaO < SrO$

(3) $N_2O > N_2O_3 > N_2O_5$

(4) $K_2O < CaO < ZnO$

50. The expression of the function R (r) for 2s orbital is

$$R(r) = \left(\frac{Z}{2a_o}\right)^{3/2} \left(2 - \frac{Zr}{a_o}\right) e^{(-zr/2a_o)}$$

How many radial nodes this orbital has and at what distance(s) ?

(1) 2, 0, $\dfrac{2a_0}{Z}$ (2) 1, $\dfrac{2a_0}{Z}$ (3) 2, $\dfrac{a_0}{Z}, \dfrac{2a_0}{Z}$ (4) 0

51. If spin quantum number has four values instead of two then what will be the maximum of elements that can be present in the 6th period ?

(1) 32   (2) 16   (3) 64   (4) 8

52. Four sets of values of quantum numbers (n, ℓ, m and s) are given below. Which set does not provide a permissible solution of the wave equation ?

(1) 3, 2, – 2, $+\dfrac{1}{2}$

(2) 3, 3, 1, $-\dfrac{1}{2}$

(3) 3, 2, 1, $+\dfrac{1}{2}$

(4) 3, 2, 2, $-\dfrac{1}{2}$

53. Correct order relationship of bond dissociation enthalpies is :-

(1) N – N > P – P

(2) F – F > Cl – Cl

(3) C – C > Si – Si

(4) O – O > S – S

54. If density of vapours of a substance of molar mass 18 gm/mole at 1 atm pressure and 500 K is 0.36 kg m^{-3} , then value of Z for the vapours is : (Take R = 0.082 L atm mole^{-1} K^{-1})

(1) $\dfrac{41}{50}$

(2) $\dfrac{50}{41}$

(3) 1.1

(4) 0.9

55. Which of the following species does not involve d-orbital in the hybridisation of central atom?

(1) BrF_4^-

(2) I_2Cl_6

(3) I_3^+

(4) ICl_2^-

56. There is no 2s-2p intermixing in the -

(1) F_2 molecule

(2) B_2 molecule

(3) N_2 molecule

(4) C_2 molecule

57. The increase in volume of air, when temperature of 600 ml of it, is increased from 27°C to 47°C under constant pressure, is

(1) 20 mL

(2) 640 mL

(3) 40 mL

(4) 500 mL

58. At 300 K and and 1.0 atm. pressure the density of gaseous HF is found to 3.3 g/L

[Atomic mass H = 1, F = 19, R = 0.08 L atm mole^{-1} K^{-1}]. This means :

(1) HF gas consists of HF, H_2 and F_2 molecules

(2) HF gas consists of clusters of HF molecules such that each cluster consists of 4 HF molecules bonded through H-bonds.

(3) A cluster consists of 6 HF molecules bonded with H-bonds

(4) A cluster consists of 2 HF molecules which are covalently bonded with each other.

59. Select the correct option.

(1) Average speed increases with pressure if temperature is kept constant.

(2) Root mean square speed is greater for Cl_2 as compared to He at same temperature.

(3) Fraction of molecules (of a gas at given temperature) with average speed is greater than those moving with root mean square speed.

(4) Root mean square speed of O_2 at 600 K & SO_2 at 300 K is same.

60. A sample of unknown hydrocarbon, C_xH_y, was completely burned in an excess of oxygen. The weights of products formed were:

Carbon dioxide	CO_2	**220 mg**
Water	H_2O	**45 mg**

Based on the above data, the empirical formula of the compound is:

(1) C_2H
(2) CH_2
(3) CH_3
(4) CH

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. Match the following characteristics of tissues with their figures :-
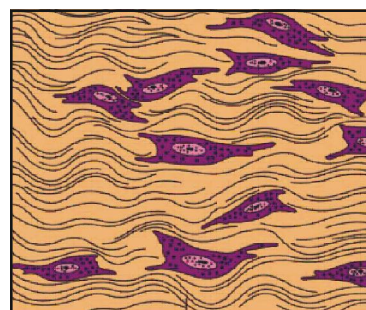

(A) Support frame work of epithelium   (i)
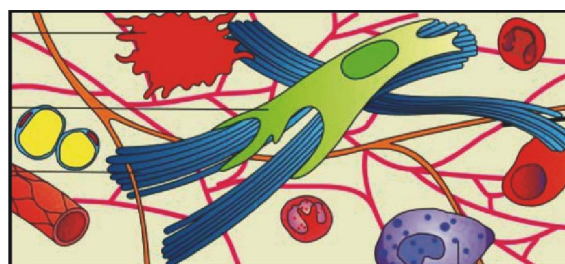

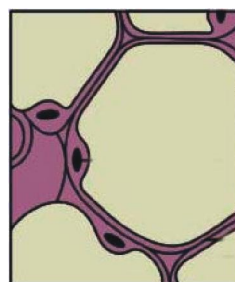(B) Specialized to store fat   (ii)

(C) Joins bone to muscles   (iii)

(D) Present in skin   (iv)

(1) A-iii, B-iv, C-i, D-ii   (2) A-iv, B-iii, C-ii, D-i

(3) A-iv, B-ii, C-iii, D-i   (4) A-iii, B-iv, C- ii, D-i

62. Indian Botanical Garden and National Botanical Research Institute are located respectively in :-

(1) Howrah & Patna   (2) Howrah & Lucknow

(3) Patna & Lucknow   (4) Lucknow & Howrah

63. Suppose a single-celled organism has a microtubular defect that result in non-motility. Which of the following cell types will be unaffected by this defect ?

(1) Sperm   (2) Algae

(3) Protista   (4) Bacteria

64. Read the following statements

(i) The cortex consists of several layers of thin-walled parenchyma cells with inter cellular spaces

(ii) The inner most layer of the cortex is called endodermis

(iii) Initiation of lateral roots and vascular cambium during the secondary growth takes place from pericycle

(iv) The parenchymatous cells which lie between the xylem and the phloem are called conjuctive tissue

(v) All tissue on the inner side of the endodermis such as pericycle, vascular bundle and pith constitute stele.

All these characterstic indicate the type of anatomy of

(1) Dicot Root   (2) Dicot Stem

(3) Monocot Stem   (4) Monocot Root

65. Which of the following animals shed their scales as skin cast ?

(1) Snakes and Toad   (2) Lizard and Frog

(3) Snakes and Lizard   (4) Toad and Pigeon

66. Plasmodesmata connections help in :-

(1) Cytoplasmic streaming

(2) Synchronous mitotic divisions

(3) Locomotion of unicellular organisms

(4) Movement of substances between cells

67. Select the **correct** statements from the following statements :-

(i) Increase in mass and increase in number of individuals are twin characteristics of growth.

(ii) Metabolic reactions can be demonstrated outside the body in isolated cell free system

(iii) Self consciousness is a defining property of living organisms.

(1) (i) and (ii)   (2) (ii) and (iii)

(3) (i) and (iii)   (4) (i), (ii) and (iii)

68. Which of the following is **not correct** about the monocotyledonous stem ?

(1) Scattered vascular bundles

(2) Hypodermis collenchymatous

(3) Phloem parenchyma absent

(4) Well developed bundle sheath

69. In which one of the following genus name, with its two characters are **correctly** matched?

	Genus name	Two characters
1	*Fasciola*	(a) Flame cells for excretion
		(b) Fertilisation external
2	*Saccoglossus*	(a) Excretion by proboscis gland
		(b) Circulation open type
3	*Salpa*	(a) Exclusively marine
		(b) Notochord extends from head to tail
4	*Asterias*	(a) Water vascular system
		(b) Bilateral symmetry in adult

70. In plant cells, upto 90 percent of the volume of cell can be occupied by :-

(1) Nucleus

(2) Vacuole

(3) ER

(4) Mitochondria

71. Which of the following is/are important for blood clotting :-

(1) Ca^{++} Only

(2) Ca^{++} and K^+

(3) Vitamin K and Mg^{++}

(4) Ca^{++} and vitamin K

72. A few major discoveries in cell biology are listed :-

(I) An improved model of the structure of cell membrane was proposed by Singer and Nicolson.

(II) A dense particle observed by George Palade.

(III) Structure first described by Robert Brown.

(IV) Leeuwenhoek first saw and described a live cell.

The **correct** chronological order of these events starting with the earliest event is :-

(1) I, II, IV, III

(2) IV, III, I, II

(3) IV, III, II, I

(4) II, I, III, IV

73. In which phase of mitosis spindle fibres attach to kinetochores ?

(1) Anaphase

(2) Prophase

(3) Metaphase

(4) Interphase

74. Which one statement is **incorrect** for phylum Porifera ?

(1) The body of poriferons supported by a skeleton made up of spicules or spongin fibres.

(2) Sexes are not seperate.

(3) Sponges reproduce asexually by binary fission and sexually by formation of gametes.

(4) Fertilisation is internal and development is indirect having a larval stage which is morphologically distinct from the adult.

75. In the diagram of the transverse section of dicot stem given below, certain parts have been indicated by alphabetes, choose the answer in which these alphabets have been **correctly matched** with the parts which they indicate :-
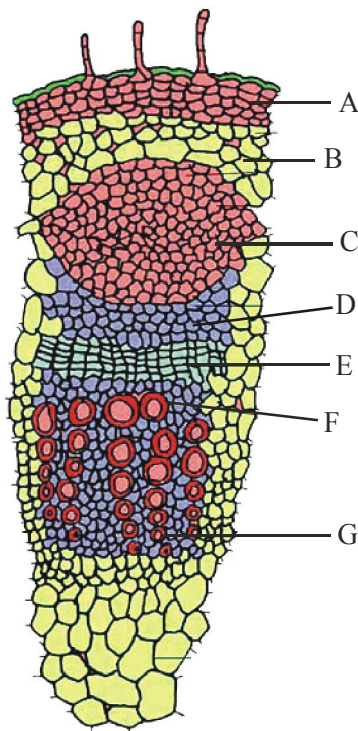
(1) A = Collenchyma, B = Parenchyma, C = Pericycle, D = Epidermis, E = Cambium

   F = Metaxylem, G = Protoxylem

(2) A = Collenchyma, B = Parenchyma, C = Pericycle, D = Phloem, E = Cambium

   F = Metaxylem, G = Protoxylem

(3) A = Hypodermis, B = Epidermis, C = Pericycle, D = Phloem, E = Cambium

   F = Protoxylem, G = Metaxylem

(4) A = Cortex , B = Hypodermis, C = Endodermis, D = Pericycle, E = Epidermis

   F = Vascular cambium, G = Medullary ray

76. Which of the following genus has pseudocoelom ?

(1) *Taenia* and *Fasciola*

(2) *Wuchereria* and *Ancylostoma*

(3) *Hirudinaria* and *Nereis*

(4) *Limulus* and *Locusta*

77. The amount of DNA in a cell can be determined by measuring the fluorescence of a dye that binds in direct proportion to the amount of DNA. The histogram below represents the fluoroescence of a eukaryotic germ cell during different stages of cell division. (I, II, III, IV and V) :-
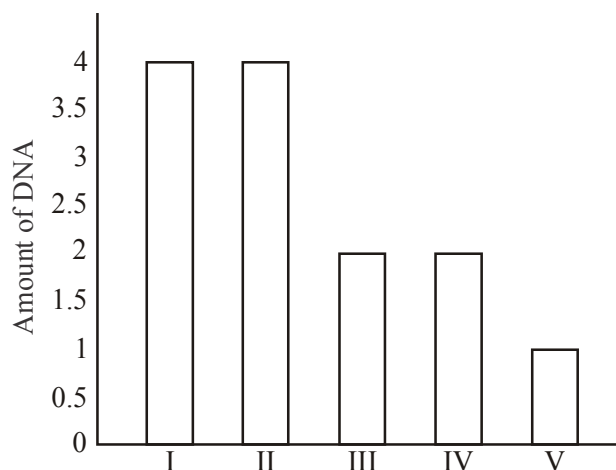
Which of the following sequences represents the **correct match** of stage I–V with the division stages from A–E ?

A. Anaphase I of meiosis

B Anaphase II of meiosis

C. Cytokinesis following telophase II

D. Prophase II of meiosis

E. Prophase I of meiosis

	A	B	C	D	E
(1)	II	IV	V	III	I
(2)	II	II	III	V	IV
(3)	V	IV	III	III	I
(4)	II	II	IV	III	V

78. Find out the **mismatch** :-

(1) *Chelone* – Turtle

(2) *Aptenodytes* – Penguin

(3) *Ichthyophis* – Limbless amphibia

(4) *Macropus* – Fighting fish

79. Select the **correct** match :-

(1) Elaioplast – Oil

(2) Aleuroplast – Starch

(3) Mitochondria – Grana

(4) Amyloplast – Protein

80. The chief epithelium of PCT i.e. proximal convoluted tubule, of nephron is :-

(1) Simple columnar

(2) Stratified squamous

(3) Brush bordered cuboidal

(4) Transitional

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.

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81. Let $x_0 = 2015$ and define $x_{n+1} = \dfrac{1 + x_n}{1 - x_n}$ for $\forall n \in W$, where W represents set of whole numbers and $S = \left(x_{2016} + x_{2012} + 66\right)^{\frac{1}{8}}$. If $\sin\theta = \dfrac{2}{S}$ then value of θ is

(1) $15°$ (2) $30°$ (3) $45°$ (4) $60°$

82. Number of value(s) of a for which $ax^2 + x + 1 = 0$ has exactly one solution is equal to

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

83. If $\log_{0.6}\left(\log_6 \dfrac{x^2 + x}{x + 4}\right) < 0$, then number of negative integral values of x is

(1) 0   (2) 1

(3) 2   (4) Infinite

84. Let the equation $(1 + 2i)x^3 - 2(3 + i)x^2 + (5 - 4i)x + 2a = 0$ has at least one real root, where $a \in R$. Then sum of all possible values of a, is (where $i = \sqrt{-1}$)

(1) 12   (2) 14   (3) 16   (4) 9

85. The value of $\dfrac{1 + \tan 7° + \tan 38° + \tan 7° \tan 38°}{1 + \tan 11° + \tan 34° + \tan 11° \tan 34°}$ is

(1) 0   (2) 1   (3) $\dfrac{\tan 7°}{\tan 11°}$ (4) $\tan 7° \tan 11°$

86. The difference between maximum and minimum distance between the lines $(2\sin\theta)x + (3\cos\theta)y + 1 = 0$ and $(2\sin\theta)x + (3\cos\theta)y + 2 = 0$ is (where $\theta \in R$)

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

87. Let P be a point moving on the circle $x^2 + y^2 - 2x = 1$. AB be the chord of contact of the point P with respect to the circle $x^2 + y^2 - 2x = 0$, having centre at point C then the locus of circumcentre of the $\triangle CAB$, is

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

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

88. Number of integral value(s) of x satisfying the inequality $2015x^2 - 5050x + 3035 \leq 0$ is

(1) 0   (2) 1   (3) 2   (4) infinite

89. If the roots of the quadratic equation $ax^2 + bx + c = 0$ are $\dfrac{k+1}{k}$ and $\dfrac{k+2}{k+1}$ then $\left(\dfrac{a}{a+b+c}\right)^2$ equals

   (1) k^2 (2) $(k+1)^2$ (3) $(k+2)^2$ (4) $k^2(k+1)^2$

90. Let $a_1, a_2, a_3, \ldots\ldots\ldots, a_{21}$ be in arithmetic progression. If $\displaystyle\sum_{k=1}^{21} a_k = 693$, then $\displaystyle\sum_{r=0}^{10} a_{2r+1}$ equals

   (1) 363   (2) 330   (3) 297   (4) 396

91. If two circles $x^2 + y^2 + 2n_1 x + 2y + \dfrac{1}{2} = 0$ and $x^2 + y^2 + n_2 x + n_2 y + n_1 - \dfrac{1}{2} = 0$ intersect each other orthogonally where $n_1, n_2 \in I$, then number of possible ordered pairs (n_1, n_2) is -

   (1) 0   (2) 2   (3) 4   (4) 6

92. If the line $y = \sqrt{3}\,x$ cuts the curve $x^3 + y^3 + 3xy + 5x^2 + 4x + y - 1 = 0$ at points A, B, C,

   then the value of OA . OB . OC is (where O is origin, OA represents distance between points O & A)

   (1) $\dfrac{4}{13}\left(3\sqrt{3}-1\right)$ (2) $\left(3\sqrt{3}+1\right)$ (3) $\dfrac{2}{\sqrt{3}}+7$ (4) $\dfrac{2}{\sqrt{3}}\left(3\sqrt{3}-1\right)$

93. The least positive integer 'x' for which $\dfrac{2x-1}{2x^3 + 3x^2 + x}$ is positive, is

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

94. If $\dfrac{a}{\sqrt{bc}} - 12 = \dfrac{4\sqrt{b}}{\sqrt{c}} + \dfrac{9\sqrt{c}}{\sqrt{b}}$, then family of lines $\sqrt{a}\,x + \sqrt{b}\,y + \sqrt{c} = 0$ always passes through a fixed

   point whose coordinates are (a > 0, b > 0, c > 0) -

   (1) (−1,2)   (2) $\left(-\dfrac{1}{3}, \dfrac{2}{3}\right)$ (3) $\left(\dfrac{1}{3}, -\dfrac{2}{3}\right)$ (4) (1,–2)

95. The value of sum $\displaystyle\sum_{r=1}^{10}\left(2^{r-1} + 8r - 3\right)$ is equal to

   (1) 1343   (2) 1234   (3) 1334   (4) 1433

96. If z_1, z_2, z_3, z_4 are the roots of equation $z^4 + z^3 + z^2 + z + 1 = 0$ then $\displaystyle\prod_{i=1}^{4}(z_i + 2)$ is equal to

   (1) 1   (2) 8   (3) 11   (4) 17

97. The perimeter of the shaded region of the given figure is :

(where radii of two externally touching circles with centres C_1 & C_2 are $\dfrac{3}{2}$ & $\dfrac{1}{2}$ respectively and having common tangent ℓ)
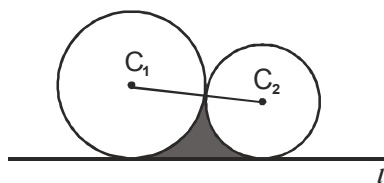
(1) $\dfrac{5\pi}{6}+\sqrt{3}$

(2) $\dfrac{2\pi}{3}+\sqrt{3}$

(3) $\pi-\sqrt{3}$

(4) $\pi+\dfrac{\sqrt{3}}{2}$

98. Number of solution(s) of $\sin\left(\sqrt{2}x\right)+\sin\left(\sqrt{3}x\right)=2$ is equal to

(1) 0   (2) 1   (3) 2   (4) infinite

99. If the equations $|z| = 1$ and $\arg(z–2) = \theta$, $0 < \theta < \pi$ has exactly one solution, then θ is-

(1) $\dfrac{2\pi}{3}$

(2) $\dfrac{5\pi}{6}$

(3) $\dfrac{4\pi}{3}$

(4) $\dfrac{3\pi}{4}$

100. If (x, y) satisfies $x^2 + y^2 - 4x + 2y + 1 = 0$, then the complete set of values of the expression $3x + 4y$, is

(1) [–10, 10]   (2) [–8, 12]   (3) [–12, 8]   (4) [8, 12]

SPACE FOR ROUGH WORK

Answer Key

TALLENTEX 2016
ALLEN'S Talent Encouragement Exam

Class- 11th (XI)
Held on : 18 October 2015

Q.No.	Ans	Q.No.	Ans	Q.No.	Ans	Q.No.	Ans	Q.No.	Ans
1	3	21	4	41	4	61	4	81	3
2	4	22	2	42	3	62	2	82	3
3	2	23	4	43	1	63	4	83	1
4	3	24	4	44	1	64	1	84	4
5	4	25	3	45	1	65	3	85	2
6	2	26	3	46	1	66	4	86	4
7	2	27	3	47	2	67	1	87	1
8	3	28	1	48	1	68	2	88	2
9	2	29	1	49	4	69	2	89	4
10	3	30	2	50	2	70	2	90	1
11	4	31	4	51	3	71	4	91	2
12	2	32	3	52	2	72	3	92	1
13	1	33	2	53	3	73	3	93	1
14	1	34	3	54	2	74	3	94	2
15	3	35	1	55	3	75	2	95	4
16	3	36	2	56	1	76	2	96	3
17	2	37	3	57	3	77	1	97	1
18	4	38	3	58	2	78	4	98	1
19	1	39	3	59	3	79	1	99	2
20	4	40	2	60	4	80	3	100	2