PART – A

Fill in the blanks from the options given below (Questions **1** to **7**) :

1. Somebody is knocking _____ the door.
   A) at B) across C) through D) with

2. She never listens _____ her mother.
   A) at B) for C) to D) in

3. My friend shared his book _____ me.
   A) for B) with C) on D) at

4. Sheela was _____ in the river.
   A) depressed B) drowse C) drowned D) drug

5. The children came _____ as animals.
   A) dressed B) make up C) looked D) glitter

6. If in _____ consult your doctor.
   A) drought B) draft C) decline D) doubt

7. The firm is involved in a legal _____ with a rival company.
   A) disrepute B) disrespect C) dispute D) disrupt

Mark the correct tense in the given sentences (Questions **8** to **10**) :

8. He had been driving for about an hour.
   A) past perfect continuous B) past perfect
   C) past continuous D) past simple

9. She has not waited long.
   A) present perfect B) present simple
   C) present perfect continuous D) present continuous

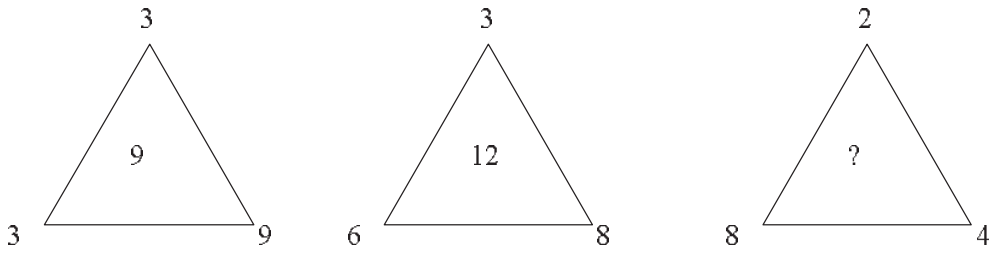
10. Did you meet her ?
    A) present simple B) past simple C) present perfect D) past perfect

11. Peter walked 10 meters towards North, took turn left and walked 15 meters and again took left turn and walked 10 meters and stopped walking. Which direction was he facing when he stopped ?
    A) West B) North C) East D) South

12. Introducing a girl, John said, Her mother is the only daughter of my mother-in-law." How is John related to that girl ?

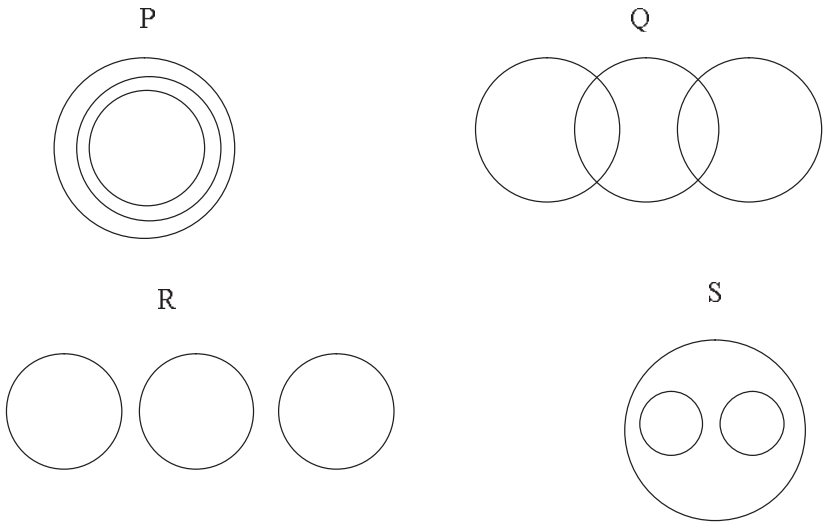
A) Uncle
B) Father
C) Brother
D) Husband

13. Direction : Find the missing number (?) in the following :



A) 8
B) 4
C) 2
D) 6

14. Which of the following diagrams shows the relationship amongst English, Greek, Latin ?



A) P
B) Q
C) R
D) S

15. A cube is coloured red on all of its faces. It is then cut into 64 smaller cubes of equal size. The smaller cubes so obtained are now separated. How many smaller cubes will have at least two surfaces painted with red colour ?

A) 4 B) 18

C) 32 D) 24

16. P and Q each working alone can do a work in 10 days and 15 days, respectively. They started the work together but Q left after sometime and P finished the remaining work in 5 days. After how many days from the start did Q leave?

A) 3 days B) 6 days

C) 2 days D) 4 days

17. What is the total surface area of a cube of side 3 cm ?

A) 27 sq. cm. B) 36 sq. cm.

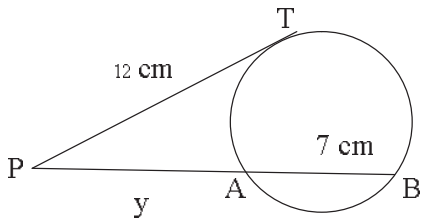
C) 54 sq. cm. D) 72 sq. cm.

18. The speeds of three scooters are in the ratio of 2:3:4. Find the ratio between the time taken by these scooters to travel the same distance.

A) 2:3:4 B) 4:3:2

C) 4:3:6 D) 6:4:3

19. Find the value of y in the following figure. PT = 12 cm is a tangent to the circle and AB = 7 cm.



A) 16 cm B) 9 cm

C) 12 cm D) 7 cm

20. If $\left(2x-\frac{3}{x}\right)=5$, find the value of $\left(4x^2-\frac{9}{x^2}\right)$

A) 25 B) 30

C) 35 D) 49

21. The Governor of the Reserve Bank of India is

A) Mr. Raghuram Rajan
B) Mr. D. Subba Rao
C) Mr. Urjit Patel
D) Mr. Rajiv Maharishi

22. Match the book given in Table-1 with the respective authors given in Table-2

	Table – 1		Table – 2
a	Harry Potter and the Chamber of Secrets	i	Alexander Frater
b	Chasing the Monsoon	ii	Chetan Bhagat
c	Two States	iii	J.K. Rowling
d	Love Story	iv	Erich Segal

A) a-iv, b-ii, c-iii, d-i
B) a-iii, b-i, c-ii, d-iv
C) a-iv, b-i, c-ii, d-iii
D) a-i, b-ii, c-iii, d-iv

23. Arjuna Awards are given for

A) Music
B) Outstanding performance in sports
C) Dance
D) Both A) and B)

24. International Women's Day is celebrated on

A) March 5th
B) March 08th
C) April 10th
D) April 14th

25. India's space rocket launching centre is at

A) Port Blair
B) Hassan
C) Kochi
D) Sriharikota

45. A person crosses a 600 m long street in 5 minutes. What is his speed in km per hour ?
A) 3.6 B) 7.2 C) 8.4 D) 10

46. A man walking at the rate of 5 km/ hr crosses a bridge in 15 minutes. The length of the bridge (in meters) is
A) 600 B) 750 C) 1000 D) 1250

47. A train travels at an average of 50 miles per hour for 2 ½ hours and then travels at a speed of 70 miles per hour for 1 ½ hours. How far did the train travel in the entire 4 hours ?
A) 120 miles B) 150 miles C) 200 miles D) 230 miles

48. A is twice as good a workman as B and together they finish a piece of work in 18 days. In how many days will A alone finish the work ?
A) 36 days B) 42 days C) 27 days D) 48 days

49. A does a work in 10 days and B does the same work in 15 days. In how many days they together will do the same work ?
A) 5 days B) 6 days C) 8 days D) 9 days

50. A man can do a job in 15 days. His father takes 20 days and his son finishes it in 25 days. How long will they take to complete the job if they all work together ?
A) Less than 6 days B) Exactly 6 days
C) Approximately 6.4 days D) More than 10 days

Directions Q. No. 51 – 55 : Complete the series.

51. 1, 8, 9, 64, 25, 216, ….
A) 24 B) 343 C) 49 D) 512

52. 4, 8, 12, 20, 32, 52, …
A) 84 B) 94 C) 86 D) 68

53. 1, 1, 4, 8, 9, 27, …
A) 4 B) 36 C) 12 D) 16

54. ADA, CFD, EHH, GJM, …
A) IJM B) HLM C) ILS D) ILR

55. 1, 4, 9, 16, 25, …
A) 35 B) 36 C) 48 D) 49

Directions : For each question 4 alternatives have been given choose the best alternative.

1. The average of 9 numbers is 30. The average of first 5 numbers is 25 and that of the last 3 numbers is 35. What is the 6^{th} number ?

2. In a class of 60, where girls are twice that of boys, Amal ranked seventeenth from the top. If there are 9 girls ahead of Amal, how many boys are after him in rank ?

   A) 3 B) 7 C) 12 D) 23

3. 2/3 is what percent of 1/3 ?

   A) 50 B) 33.33 C) 150 D) 200

4. The length of a train and that of a platform are equal. If with a speed of 90 km/hr. the train crosses the platform in one minute, then the length of the train (in meters) is

   A) 500 B) 600 C) 750 D) 900

5. Three numbers are in the ratio of 3:4:6 and their product is 1944. The largest of these numbers is

6. The age of Anu's father is four times his age.If 5 years ago,the fathers age was seven times the age of his son at that time, what is Anu's father's present age ?

7. Profit after selling a commodity for Rs. 425 is the same as the loss after selling it for Rs. 355.What is the cost of the commodity ?

   A) Rs. 385 B) Rs. 390 C) Rs. 395 D) Rs. 400

8. The sum of two numbers is 40 and their difference is 4. The ratio of the numbers is

   A) 21 : 19 B) 22 : 9 C) 11 : 9 D) 11 : 18

9. If the area of a triangle is 1176 cm^2. The base : corresponding altitude is 3:4, then the altitude of the triangle is

   A) 42cm B) 36cm C) 52cm D) 56cm

10. A and B can do a work in 6 and 12 day respectively. They began the work together but A leave after 3 days. Then the total number of days needed for the completion of the work is

    A) 4 B) 5 C) 6 D) 9

11. If the Sale Price of 12 articles is equal to the cost price of 18 articles. What is profit %?

    A) 20% B) 40 % C) 50 % D) 60%

12. A man buys two cycles for a total cost of Rs. 900. By selling one for 4/5 of its cost and other for 5/4 of its cost, he makes a profit of Rs. 90 on whole transaction. Find the cost price of lower priced cycle.

    A) Rs. 360 B) Rs. 250 C) Rs. 300 D) Rs. 420

13. The price of rice falls by 20%. How much rice can be bought now with the money that was sufficient to buy 20 kg of rice previously ?

    A) 5 kg B) 15 kg C) 25 kg D) 30 kg

14. x% of y + y% of x = ?

    A) 3% of xy B) 2% of xy C) 5% of xy D) None of these

15. If the price of gold increases by 30%, find by how much the quantity of ornaments must be reduced so that the expenditure may remain the same as before ?

    A) $27\frac{2}{3}$ % B) $23\frac{1}{3}$ % C) 30% D) 19%

16. If 4 examiners can examine a certain number of answer books in 8 days by working 5 hours a day, for how many hours a day would 2 examiners have to work in order to examine twice the number of answer books in 20 days.

    A) 6 B) 7 C) 8 D) 9

17. In a mixture of 40 litres, the ratio of milk and water is 4:1. How much water must be added to this mixture so that the ratio of milk and water becomes 2:3 ?

A) 20 litres B) 32 litres C) 40 litres D) 30 litres

18. A man goes down stream at x km/h and upstream at y km/h. The speed of the boat in still water is

A) $0.5(x + y)$ B) $0.5(x – y)$ C) $x + y$ D) $x – y$

19. By walking at $\frac{3}{4}$ of his usual speed, a man reaches office 20 minutes later than usual. His usual time is

A) 65 minutes B) 60 minutes C) 70 minutes D) None of these

20. A train 150 m long moving at a speed of 25 m/s overtakes a man moving at 5 m/s in opposite direction . The train will pass the man in

A) 5 sec B) 6 sec C) $4\frac{2}{7}$ sec D) 8 sec

21. Ganesh earns Rs. 50 on his first day and spends Rs. 20 on the next day.If he continues to earn, find the day in which he has Rs.170 in hand?

A) 9^{th} B) 10^{th} C) 11^{th} D) 12^{th}

22. If A is 20% more than B and B is 30% less than C, then by what percent C is greater than A ?

A) 23% B) 15% C) 10% D) 19%

23. A solution of 60 litres of acid and water contains 65% acid. How much water must be added to get a solution of 52% acid ?

A) 20 B) 18 C) 15 D) 12

24. If in 3 kg of metal, which is one- third silver and the rest aluminium, is mixed with 7 kg of another metal,which is two-seventh silver and the rest is aluminum. What is the ratio of silver to aluminium in the mixture?

A) 3:7 B) 7:3 C) 1:7 D) 2:7

25. If 5 men working 8 hours a day earn Rs. 5,000 in 15 days. Then how much will 15 men working 6 hours day earn (in Rs.) in 15 days ?

A) 12,500 B) 11,750 C) 10,250 D) 11,250

Identify Next Number in the Series (26 – 31)

26. 4, 9, 20, 43, …….
A) 90 B) 84 C) 96 D) 95

27. 3, 7, 13, 21, 31 …….
A) 34 B) 37 C) 42 D) 43

28. 3, 15, 35, 63, ……, 143
A) 75 B) 81 C) 99 D) 125

29. 4, 7, 12, ….., 28, 39
A) 15 B) 19 C) 21 D) 23

30. 2, 7, 14, 32, 58, …….
A) 64 B) 75 C) 80 D) 86

31. 17, 14, 15, 12, 13, …….
A) 7 B) 11 C) 14 D) 9

Data Interpretation

Four Students W, X, Y, Z appeared in four papers I, II, III and IV in a test. Their scores out of 100 are given below :

Students	Papers			
	I	II	III	IV
W	60	81	45	55
X	59	43	51	A
Y	74	A	71	65
Z	72	76	A	68

Where A stands for absent. Read the above table and answer below mentioned questions 32 – 36.

32. Which student has secured between 60 – 65% marks in aggregate?
A) W B) X C) Y D) Z

33. Which student has obtained the lowest average in aggregate ?
A) W B) X C) Y D) Z

34. Which student has obtained the highest average in aggregate ?

A) W B) X C) Y D) Z

35. In which paper the lowest marks were obtained by the students ?

A) I B) II C) III D) IV

36. Which student has secured the highest percentage in the papers appeared ?

A) W B) X C) Y D) Z

General Knowledge (37 – 50)

37. The International Mother Language Day is observed on which day ?

A) February 21 B) March 12 C) April 9 D) May 6

38. Which cricketer has broken the fastest Test Century record ?

A) Steven Smith B) David Warner

C) Brandon MacCullum D) HasimAmla

39. For what is the Manas sanctuary in Assam is known for

A) tiger B) wild bear C) wild ass D) birds

40. The term "open market operations means" sale and purchase of _____ by the Reserve Bank Of India

A) gold B) government securities

C) iron and steel D) foreign exchange

41. Who among the following is known as the father of "Indian Unrest" ?

A) Mahatma Gandhi B) Subhas Chandra Bose

C) Bal Gangadhar Tilak D) V. D. Savarkar

42. In human digestive system, Bile is secreted by

A) pancreas B) liver C) kidneys D) stomach

43. In which State of India is Dogri spoken ?

A) Orissa B) Assam C) West Bengal D) Jammu & Kashmir

44. Chloromycetin is a drug for :

A) Dengu fever B) Malaria C) Typhoid D) Leprosy

45. What is the currency of China?

A) Yen B) Yuan C) Won D) Som

46. Who founded Khalsa ?

A) Guru Nanak B) Maharaja Ranjit Singh

C) Guru Hargobind D) Guru Gobind Singh

47. The winner of FifaBallon d'Or 2015 was

A) Christiano Ronaldo B) Gareth Bale

C) Wayne Rooney D) Lionel Messi

48. In which country will the 2016 Olympics be held in

A) Spain B) Brazil C) China D) Greece

49. In which country is the Leaning Tower Of Pisa situated ?

A) France B) Germany C) Denmark D) Italy

50. Which Day is UNICEF Day ?

A) 12th January B) 8th November C) 5th May D) 11th December

Reasoning:

51. If you count 21 letters in the English alphabet from the end and 20 letters from the beginning which letter will appear exactly in the middle of the sequence thus formed ?

A) N B) L C) K D) M

52. If with the help of 2nd, 5th, 6th, 7th, 10th, 11th and 12th letters of the word 'BRAINWASHING', a word can be formed then write first letter of that word otherwise write X.

A) X B) R C) W D) G

53. If the letters of the word 'RUTHLESS' are arranged alphabetically, then which letter would be farthest from the first letter of the word?

A) H B) E C) U D) T

54. In a certain code 'CERTAIN' is coded as 'XVIGZRM'. How is 'MUNDANE' coded in that code ?

A) NFMWZMV B) VMZWMFN C) NFMWZMX D) NFMXZMV

55. In a certain code 'SEQUENCE' is coded as 'HVJFVMXV'. How is 'CHILDREN' coded in that code ?

A) XSRMWIVM B) XSROWIVM C) DSROWIUN D) MVIWORSX

56. Consider the following statements :

(1) M is the brother of N (2) K is the sister of M
(3) P is the brother of O (4) O is the daughter of N.

Who is the uncle of P ?

A) N B) K C) M D) O

57. Which statement in Q. 56 is superfluous ?

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

58. (A) Mahesh is taller than Suresh (B) Anil is taller than Mahesh (C) Ramesh is taller than Anil (D) Puneet is tallest of all. If they stand according to their height, who will be exactly in the middle ?

A) Mahesh B) Suresh C) Ramesh D) Anil

59. Five boys Rakesh, Anil, Mahesh, Suresh and Manjit are sitting in a circle. (A) Anil is sitting in between Rakesh and Suresh (B) To Manjit's right Suresh is seated. Who is seated to Mahesh's left ?

A) Anil B) Suresh C) Manjit D) Rakesh

Directions : Question **60 – 64** : In each of the following question four words have been given of which three are alike in some way and one is different. Choose out the ODD word.

60. A)Carrot B) Bean C) Grapes D) Banana

61. A)Leucoderma B) Rheumatism C) Dysentery D) Diabetes

62. A)Silver B) Zinc C) Gold D) Iron

63. A)Ring B) Bracelet C) Ornament D) Bangle

64. A)Logical B) Cognet C) Spurious D) Efficacious

65. If (A) 'Quo Cui Heer' means 'Boy is good' : (B) 'Lai Quo Mea' means 'Meena is fair'; (C) 'Ruo Lev Mea' means 'All are fair' ; (D) 'Si Hai Cui' means 'Dog was good'; then which of the following words stands for 'Boy' ?

A) Quo B) Cui C) Heer D) Lai

66. If (A) 'Buy good oranges' is coded as 'BDG'; (B) 'Distribute good oranges' is coded as 'BCD'; and (C) 'Oranges are red' is coded as 'BEF'; then what is the code for 'Red'?

A) B B) Either E or B

C) Either F or B D) Either E or F

67. If 'X' means '÷'; '-' means 'X'; '÷' means '+' and '+' means '-' then (3 – 15 ÷ 11) X 8 + 6 = ?

A) 0 B) 1 C) 4 D) 8

68. In the following sequence how many 3's are there which are preceded by 7 but not followed by 9 ?

247396573854367354193873964523973354

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

Directions : Question **69 – 75** : In each of the following questions there are two words on one side of the sign :: and one word with a sign (?) on the other side. The relationship which obtains between the two words on one side of the sign :: is to be found in the word and the missing word indicated by (?) on the other side. This missing word is given as one of the 4 alternatives. Select the best alternative.

69. Child : Father :: Book : ?

A) Author B) Publisher C) Editor D) Library

70. Pyorrhea : Teeth :: Trachoma : ?

A) Eye B) Skin C) Lungs D) Ear

71. Gun : Bullet :: Chimney : ?

A) House B) Ground C) Roof D) Smoke

72. Cells : Cytology :: Birds : ?

A) Mycology B) Odontology C) Gerontology D) Ornithology

73. Ancient : Modern :: Often : ?

A) Commonly B) Repeatedly C) New D) Seldom

74. Often : Always :: Seldom : ?

A) Rare B) Never C) Sometimes D) Ever

75. T.B. : Lungs :: Cataract : ?

A) Ear B) Eye C) Skin D) Nose

For the next five questions choose the appropriate antonym

76. Stubborn

A) Pliable B) Easy C) Consenting D) Willing

77. Affluence

A) Indigence B) Richness C) Pauper D) Begging

78. Able

A) Unable B) Enable C) Disable D) Clumsy

79. Visionary

A) Pragmatic B) Optimist C) Pessimist D) None of the above

80. Ignominious

A) Shameful B) Cowardly C) Humiliating D) Glorious

In the next five questions choose the option which is closest in meaning to the underlined phrase:

81. The incident was <u>blown up</u> and people were made to believe that there was large scale violence.

A) Exploded B) Flown up C) Made huge D) Exaggerated

82. There has been bad blood between the two communities even before the shooting

A) Impure blood B) Ill-feelings

C) Bloody fights D) Love

83. Looking at them now, who can imagine that they were a couple of babes in the wood in school

A) Children or babies in the forest B) Babies made of wood

C) Fearless people D) Innocent and inexperienced people

84. I hope to be full of beans tomorrow

A) Full of energy and good spirit B) Full of happiness

C) Full of lethargy D) none of the above

85. Debu had a chequered career since I first knew him as a clerk in the municipal office

A) Had a variety of job experiences

B) A career which helped him make a lot of money

C) A career where he signed a lot of cheques

D) Did odd jobs

Directions for the next five questions: fill in the blanks with the most suitable word(s) from the options given:

86. Freedom is not a _____ but our birth right.

A) Illusion B) Gift C) Drama D) Sin

87. The CRPF men swing into action and cordoned _____ the area.

A) out B) over C) of D) off

88. Alka was having a lot of trouble with her eyes, so she went to her doctor _____ it.

A) to B) over C) about D) for

89. He walked on and found an empty seat to sit _____.

A) on B) in C) up D) nil

90. The employees demanded pay parity _____ their counterparts in the Central Government.

A) like B) as C) with D) towards

Directions for the next five questions: Read each sentence to find out whether there is any error in it. The error, if any, will be in one part of the sentence. The alphabet (a,b,c,d) of that part will be the answer:

91. It was a/ a long day's b/ journeying c/ to Bhopal d/.
A) a B) b C) c D) d

92. Many a/ a man b/ have c/ done so d/.
A) a B) b C) c D) d

93. There is a/ really no b/ difference between c/ you and I d/.
A) a B) b C) c D) d

94. Neither of them a/ were b/ invited c/ to the party d/.
A) a B) b C) c D) d

95. Whom a/ did you b/say was c/there d?
A) a B) b C) c D) d

For the next 5 questions choose the synonym of the given word:

96. Exude
A) Discharge B) Crude C) Give D) Flow

97. Excursion
A) Vacation B) Holiday C) Tour D) Flight

98. Fiendish
A) Ghostly B) Horrible C) Diabolical D) Unkind

99. Punctilious
A) Careless B) Strictly C) Friendly D) Scrupulous

100. Innocuous
A) Virulent B) Harmful C) Inoffensive D) Vaccination

_____

SPACE FOR ROUGH WORK

SPACE FOR ROUGH WORK

PART – A

Questions **1 – 10** : Fill in the blanks with the most grammatically correct and meaningful option from those given.

1. I had sent the application five days _____

   A) ago B) before C) since D) hence

2. The maintenance _____ law and order is the state's responsibility.

   A) for B) of C) about D) for

3. It is a month since the holidays _____

   A) has begun B) may begin C) began D) have begin

4. Can you _____ all the questions ?

   A) solved B) solving C) able to solved D) solve

5. Great emphasis has to be _____ on the building of our student's character.

   A) lain B) laid C) lied D) layed

6. Hardly _____ I left the house, when it began to rain.

   A) did B) do C) had D) have

7. Your _____ in class is compulsory.

   A) presence B) presense C) present D) presenting

8. She is absolutely _____in our welfare.

   A) indifferent B) disinterested C) unattached D) reluctant

9. His parents will never give their _____ to such a proposal.

   A) evidence B) willingness C) consent D) agreement

10. Send in _____ is next in the queue.

A) whomever B) whichever C) who so ever D) whoever

11. Electricity is produced form dry cell through

A) Chemical Energy B) Thermal Energy

C) Mechanical Energy D) Nuclear Energy

12. Lift was invented by

A) J. J. Thompson B) Mavie Curie C) E.G. Otis D) Von-Kleef

13. The science of making maps is called

A) Morphography B) Cartography C) Calligraphy D) Geography

14. The temple of Buddhists is called

A) Madrasa B) Vihara C) Uplisa D) Naurau

15. Bodh Gaya is situated in

A) Nepal B) Bihar C) Rajasthan D) Sri Lanka

16. Chairperson of State Bank of India is

A) Arundhati Bhattacharya

B) Naina Lal Kidwai

C) Kiran Majumdar

D) Chanda Kocchar

17. Which of the following Sikh Gurus instituted the Khalsa Panth ?

A) Guru Gobind Singh B) Guru Teg Bahadur

C) Guru Arjun Dev D) Guru Nanak Dev

18. Which of the following is known as "Morning Star" ? A) Saturn B) Mars C) Mercury D) Venus

19. In a row of boys, A is tenth from the left and B is ninth from the right end. Now if they interchange their positions, A becomes fifteenth from left. The total number of boys in the row is

A) 23 B) 26 C) 27 D) 28

20. The Chairperson of National Human Rights Commission is

A) Mr. K.G. Balkrishnan B) Mr. H.L. Dathu

C) Mr. D.J. Pandian D) Mr. Ashok Chawle

21. The author of the book "The Turbulent Years 1980-1996" is

A) Mr. Kapil Sibal B) Mr. P.V. Narshimha Rao

C) Mr. Pranab Mukharjee D) Mr. Kaushik Besu

22. Which metal was first used by the Vedic people ?

A) Gold B) Silver C) Copper D) Iron

23. Find the next term of the series AOP, CQR, EST, GUV

A) JYZ B) HWX C) IWX D) JWX

24. Shyam started walking from point 'P' towards south. After walking 40 m he turned left, then walked 30 m and reached a point 'Q'. What will be the direction of 'Q' with respect to point 'P' ?

A) North-East B) South -West C) South-East D) North-West

25. A-B means A is the mother of B. A* B means A is father of B and A + B means A is the daughter of B. Now for M-N*T + Q, which of the relation is not true ?

A) T is N's daughter B) N is wife of Q C) M is mother in law of Q D) Q is wife of N

PART – B

Instructions: Part – B consists of four sections i.e. Physics, Chemistry, Mathematics and Biology comprising 25 questions each. A candidate must answer Section – I (Physics) and Section – II (Chemistry). From Section – III (Mathematics) and Section – IV (Biology) only one Section either Mathematics (Section – III) or Biology (Section – IV) should be attempted and answered. In case a candidate answers both Mathematics and Biology Sections, best of three Sections i.e. Section – I, II and either III or IV will be evaluated and considered for result preparation.

SECTION – I

PHYSICS

26. A meson is shot with constant speed 5.0×10^6 m/s in an electric field which produces on the meson an acceleration of 1.25×10^{14} m/s^2 directed opposite to the initial velocity. How far does the meson travel before coming to the rest ?

A) 100 cm B) 10 cm C) 5 cm D) 1 cm

27. A uniform chain is held on a frictionless table with one-fifth of its length hanging over the edge. If the chain has a length *l* and mass *m*, how much work is required to pull the hanging part back on the table ?

A) *mgl* B) *mgl*/5 C) *mgl*/10 D) *mgl*/50

28. The electric potential in a region of space is given by $V = (5x - 7x^2y + 8y^2 + 16yz - 4z)$ volt. The y-component of the electric field at the point (2, 4, -3) is

A) 7 volt/ m B) 12 volt/ m C) 16 volt/ m D) 31 volt/ m

29. A bullet of mass 10 g moving horizontally with speed of 500 m/s passes through a block wood of mass 1 kg, initially at rest on frictionless surface. The bullet comes out of the block with a speed of 200 m/s. The final speed of the block is

A) 500 m/s B) 300 m/s C) 200 m/s D) 3 m/s

30. Element from which group of periodic table is to be doped to intrinsic silicon to make it p-type

A) I B) III C) IV D) V

31. Bragg's diffraction condition is

A) 2dsin = 3n B) dsin = 2n C) 2dsin = n D) dsin = n

32. The value of the ratio of specific heats of a diatomic gas is

A) 1.66 B) 1.5 C) 1.4 D) 0.5

33. An athlete consumes 4000 kilocalories per day through his diet. His power in watt is
A) 4000 watt B) 768.56 watt C) 400 watt D) 193.5 watt

34. If E_1 and E_2 are the binding energy per nucleon for the parent nuclei and its daughter nuclei, then
A) $E_1 > E_2$ B) $E_1 = E_2$ C) $E_1 < E_2$ D) $E_1 = 3E_2$

35. An ideal gas used in Carnot engine has adiabatic expansion ratio 32. It's specific heat ratio is 1.40. The efficiency of the engine is
A) 0.99 B) 0.75 C) 0.5 D) 0.25

36. Light propagates in optical fibers with the optical phenomenon of
A) total internal reflection B) refraction
C) reflection D) diffraction

37. The surface of a metal is illuminated with the light of 400 nm wavelength. The kinetic energy of the ejected photoelectron is found to be 1.69 eV. The work function of the metal is
A) 1.41 eV B) 1.51 eV C) 1.68 eV D) 3.09 eV

38. A particle has an initial velocity of $(\hat{i} + \hat{j})$m/s and an acceleration of $(\hat{i} - 3\hat{j})$m/s^2. Its magnitude of velocity after 1 second is
A) $\sqrt{8}$ m/s B) $\sqrt{6}$ m/s C) $\sqrt{2}$ m/s D) 0

39. Bomb of mass 16 kg at rest explodes into two pieces of masses of 4 kg and 12 kg. The velocity of the 12 kg mass is 4 m/s. The kinetic energy of the 4 kg mass is
A) 144 J B) 188 J C) 256 J D) 288 J

40. The resistance of a bulb filament is 100 Ω at a temperature of 100°C. If its temperature coefficient of resistance be 0.005 per °C, its resistance will become 200 Ω at a temperature of
A) 200°C B) 300°C C) 400°C D) 500°C

41. The magnetic flux linked with a coil at any instant 't' is given by $\varphi = [t^2 - 10t + 50]$ Weber. The induced emfin coil at $t = 2$ second is
A) 50 V B) 34 V C) 6 V D) 2 V

42. An electric bulb is rated 200 volt –100 watt. The power consumed by it when operated on 100 volt will be
A) 25 watt B) 50 watt C) 75 watt D) 100 watt

43. Absolute zero temperature is taken as

A) 273°C B) – 273°C C) 237°C D) – 373°C.

44. The unit of energy in SI system is

A) Joule metre (Jm) B) Watt (W)

C) Joule/metre (J/m) D) Joule (J)

45. The electric field intensity at a point situated 4 meters from a point charge is 200 N/C. If the distance is reduced to 2 meters, the field intensity will be

A) 400 N/C B) 600 N/C C) 800 N/C D) 1200 N/C

46. When 4 volt e.m.f is applied across a 1 farad capacitor, it will store energy of

A) 2 joules B) 4 joules C) 6 joules D) 8 joules

47. Fleming's left hand rule is used to find

A) direction of magnetic field due to current carrying conductor

B) direction of flux in a solenoid

C) direction of force on a current carrying conductor in a magnetic field

D) polarity of a magnetic pole

48. Two long parallel conductors carry 100 A current. If the conductors are separated by 20 mm, the force per metre of length of each conductor will be

A) 100 N B) 10 N C) 1 N D) 0.1 N

49. A 2 meters long conductor moves at right angles to a magnetic field of flux density 1 tesla with a velocity of 12.5 m/s. The induced e.m.f. in the conductor will be

A) 10 V B) 15 V C) 25 V D) 50V

50. As per Bohr model, the minimum energy (in eV) required to remove an electron from the ground state of doubly ionized Li atom (Z = 3) is

A) 1.51 B) 13.6 C) 40.8 D) 122.4

SECTION – II
CHEMISTRY

51. When an element of very low ionization potential is reacted with an element of very high electron affinity:
    A) A weak ionic bond is formed
    B) A strong ionic bond is formed
    C) A polar covalent bond is formed
    D) A hydrogen bond is formed

52. Which of the following order is not correct ?
    A) Bond order: $O_2^+ > O_2 > O_2^- > O_2^{2-}$
    B) Boiling point: HF >HCl>HBr> HI
    C) Ionization energy: N > O and Be > B
    D) Electronegativity: N > C > P >Si

53. The complex with highest number of unpaired electrons is
    A) $K_4[Fe(CN)_6]$
    B) $K_4[FeF_6]$
    C) $[Ti(H_2O)_6]^{3+}$
    D) $[Cr(NH_3)_6]^{3+}$

54. The shape of SF_6 is same as that of
    A) IF_7
    B) IF_5
    C) CO_2
    D) $[FeF_6]^{3-}$

55. Which of the following is not correct ?
    A) The outermost electronic configuration of most electronegative elements is ns^2np^5
    B) Order of size: $O^{2-} > F^- > Na^+ > Mg^{2+} > Al^{3+}$
    C) Conjugate acid/base pair: HCO_3^-/CO_3^{2-}
    D) Inert pair effect causes increase in oxidation state of element

56. The complex which would be colourless
    A) $[Ti(H_2O)_6]^{4+}$
    B) $[Cr(NH_3)_6]^{3+}$
    C) $[V(H_2O)_6]^{2+}$
    D) $[Mn(H_2O)_6]^{2+}$

57. Lunar caustic is

A) $CuSO_4$ B) $Ca(OH)_2$ C) $AgNO_3$ D) $Pb(OH)_2$

58. "Alums" are double sulphates of

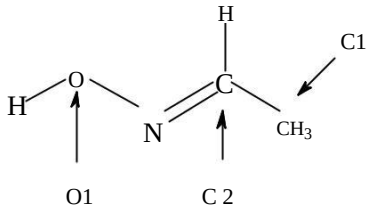
A) Univalent metal and univalent metal

B) Univalent metal and trivalent metal

C) Univalent metal and divalent metal

D) Divalent metal and univalent metal

59. The correct set of approximate bond angles at C1, C2 and O1 for an organic molecule given below is



A) C1-109.5°, C2-120°, O1-104°

B) C1-109.5°, C2-120°, O1-120°

C) C1-120°, C2-109.5°, O1-104°

D) C1-120°, C2-109.5°, O1-120°

60. The difference between a carbene and a carbanion is

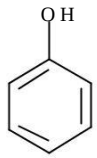
A) A carbene is a positively charged species while a carbanion is a neutral species

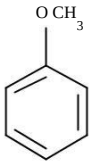
B) A carbene is an organic molecule used to power green cars while a carbanion is any organic molecule that will not split from its grouping

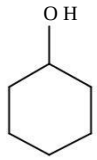
C) Although both have a lone pair of electrons, a carbene is neutral species while a carbanion has a negative charge

D) A carbene remains cohesive while a carbanion is constantly shifting (which is why soda tastes fizzy)

61. Which is the strongest acid amongst the compounds mentioned below ?

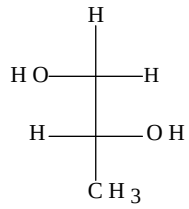
A) 

B) 

C) 

D) 

62. Correct IUPAC name of the following molecule is



A) (1*R*,2*R*)-Propanediol

B) (*R*)-1,2-Propanediol

C) (1*S*,2*S*)-Propanediol

D) (*S*)-1,2-Propanediol

63. In the nitration of benzene,which of the following statements is not true ?

A) Conc. H_2SO_4 helps in producing NO_2^+

B) A non-aromatic intermediate is formed

C) Benzene acts as an electrophile

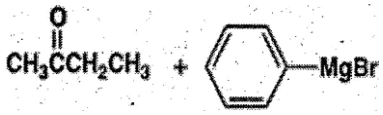
D) A proton is lost in the final step

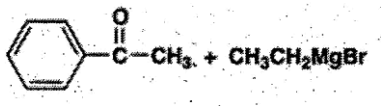
64. Reaction of acetamide with solution of bromine in sodium hydroxide to give methyl amine is known as

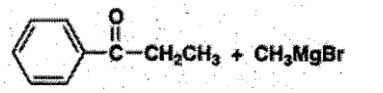
A) Gabrial Synthesis B) Hofmaan rearrangement

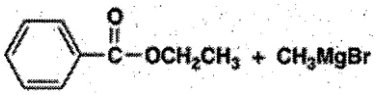
C) Curtius rearrangement D) Reductive amination

65. The pair of reactants for a Grignard reaction that does not give 2-phenylbutan-2-ol after an aqueous workup is

A) 

B) 

C) 

D) 

66. Reaction of dimethyl terephthalate (DMT) and ethylene glycol produces

A) Dacron B) PVC

C) polyester D) nylon-6

67. The standard equation of Van der Waals (real) gas is

A) $P + \frac{na}{v^2}(v - nb) = nRT$

B) $P + \frac{n^2a}{v^2}(v - b) = nRT$

C) $P + \frac{n^2a}{v}(v - nb) = nRT$

D) $P + \frac{n^2a}{v^2}(v - nb) = nRT$

68. Two moles of ideal gas expand in to vacuum; the work done is

A) 2J B) 4J C) zero D) 10J

69. A crystal with a = b ≠ c and = = γ = 90° is

A) cubic B) tetragonal C) monoclinic D) orthorhombic

70. If the activation energy for forward reaction is lower than for backward reaction, then the reaction is

A) Endothermic B) Exothermic

C) Chain D) Steady state

71. Number of translation, rotational and vibrational degrees of freedom for CO_2, respectively is

A) 3,3,3 B) 3,2,4 C) 3,3,6 D) 4,2,3

72. In metal and graphite, the conductance is due to the flow of

A) Cations B) Anions

C) Electrons D) Both A) and B)

73. Ten moles of ideal gas expand in to vacuum; the work done is

A) 1 J B) infinity C) zero D) 10 J

74. The unit of rate constant of a first order reaction is

A) mol L^{-1} s^{-1} B) s^{-1}

C) L mol^{-1} s^{-1} D) $mol^{-1/2}$ $L^{-1/2}$ s^{-1}

75. Mark the solution having highest specific conductance.

A) 1 M KCl B) 0.1 M KCl

C) 0.01 M KCl D) 0.001 M KCl

SECTION – III
MATHEMATICS

76. If A, B and C are sets and * stands for complementation then
{(A ∩ B) ∪ C}* =

A) A* ∩ (B* ∪ C*) B) A* ∩ (B ∪ C)*

C) (A* ∩ C*) ∪ (B* ∩ C*) D) (A* ∩ B*) ∪ (A* ∩ C*)

77. If the roots of the equation $ax^2 + bx + c = 0$ where $a \neq 0$ and $c \neq 0$ and α and β then the equation whose roots are $1/\alpha^2$ and $1/\beta^2$ is

A) $c^2x^2 - (b^2 - 2ac)x + a^2 = 0$
B) $c^2x^2 - (b^2 - 2ac)x - a^2 = 0$
C) $c^2x^2 + (b^2 + 2ac)x + a^2 = 0$
D) $c^2x^2 - (b^2 + 2ac)x - a^2 = 0$

78. The equations $3x - 7y + k = 0$ and $12x - ly + 36 = 0$ have infinitely many solutions if

A) $l = 28, k \neq 9$ B) $l = 28, k = 9$

C) $l \neq 28, k = 9$ D) $l \neq 28, k \neq 9$

79. If $p = 10.235235235\ldots\ldots$ then p =

A) $\frac{10,235}{1000}$ B) $\frac{10,235}{999}$

C) $\frac{10,225}{1000}$ D) $\frac{10,225}{999}$

80. Which of the following sets of ordered pairs is a function from *A* onto *B* where
A = {2, 4, 6, 8}, B = {1, 3, 5}

A) {(2, 1), (4, 5), (6, 3), (8, 1)}

B) {(2, 1), (6, 5), (6, 3), (4, 3)}

C) {(2, 1), (4, 3), (4, 8), (8, 5)}

D) {(8, 1), (6, 3), (2, 3), (6, 5)}

81. A cube root of i is

A) $\frac{1+\sqrt{3}i}{2}$ B) $\frac{1+i}{\sqrt{2}}$ C) $\frac{\sqrt{3}+i}{2}$ D) $\frac{\sqrt{3}}{2}+i$

82. The coefficient of x^4 in the series expansion of e^{1-2x} is

A) $\frac{-2e}{3}$ B) $\frac{2e}{3}$ C) $4e$ D) $-4e$

83. The solution (x, y, z) of the system $3x - 2y + z = 2$, $2x - y + 3z = 9$, $5x - 3y + 4z = 10$ is

A) (2, 2, 0) B) (1, 2, 0)
C) (1, 2, 3) D) non existent

84. $A = \begin{bmatrix} 5 & 0 & 0 & 1 \\ 0 & 2 & 4 & 3 \\ 6 & 1 & 0 & 0 \end{bmatrix}$ $B = \begin{bmatrix} 1 & 3 \\ 0 & 4 \\ 2 & 0 \\ 1 & 2 \end{bmatrix}$ and $AB = C = (c_{ij})$ then the second row of C is

A) 14, 11 B) 17, 6 C) 22, 6 D) 11, 14

85. If $A = \begin{bmatrix} 3 & 1 & 2 \\ 4 & 0 & 5 \\ -1 & 3 & -4 \end{bmatrix}$, $A^{-1} = B = (b_{ij})$ then b_{32} is

A) 2/5 B) 7/10 C) 1 D) – 6/5

86. From a box containing three pink, four orange and two blue marbles, two marbles are picked at random. Then the probability that one is pink and the other blue is

A) 1/3 B) 1/2
C) 1/6 D) 2/3

$2\,cis\,30^o$ 2

87. $\overline{4\,cis\,60^o}$ 3 is equal to

A) $\frac{1-\sqrt{3}i}{32}$ B) $\frac{-1-\sqrt{3}i}{32}$

C) $\frac{1+\sqrt{3}i}{32}$ D) $\frac{-1+\sqrt{3}i}{32}$

88. If $1 + 5 + 9 + \ldots . x = 780$ then x is

A) 20 B) 77

C) 78 D) 39

89. The length of a tangent drawn from the point $(-2, -4)$ to the circle $x^2 + y^2 - 4x - 6y - 3 = 0$ is

A) 7 B) 5

C) 4 D) 2

90. For the ellipse $9x^2 + 36y^2 = 324$ the eccentricity, length of the major and minor axes are respectively

A) $\frac{\sqrt{3}}{4}; 12, 2$ B) $\frac{\sqrt{3}}{2}; 6, 3$

C) $\frac{\sqrt{3}}{2}; 12, 6$ D) $\frac{\sqrt{3}}{4}; 6, 3$

91. $\lim \frac{|x|}{x}$ as $x \to 0$ is

A) 1 B) – 1

C) 0 D) non existent

92. The value of c and k that make the function

$$f(x) = \begin{cases} x & 2c, \quad x \quad -2 \\ 3cx & k, \quad -2 \quad x \quad 1 \\ 3x - 2k, & 1 \quad x \end{cases}$$

Continuous on $(-\infty, \infty)$ are respectively

A) $\frac{1}{3}, \frac{2}{3}$ B) $\frac{1}{3}, \frac{-2}{3}$

C) $\frac{1}{3}, \frac{2}{3}$ D) 0, 0

93. A ball is thrown vertically from the top of a house 112 ft high. Its equation of motions is $s = -16t^2 + 96t$ where s ft. is the directed distance of the ball from the starting point at $t$secs. Then the maximum height in feet attained by the ball and the time in seconds it takes to hit the ground are respectively

A) 128, 7 B) 144, 7

C) 144, 3 D) 128, 3

94. If $f(x) = (x-4)^2 (x+2)$, then which only one of the following statements is true ?
A) $f(x)$ is decreasing if $x < 0$
B) $f(x)$ is increasing for $0 < x < 4$
C) $f(x)$ has a relative maximum at $x = 0$
D) The graph of $f(x)$ has a horizontal tangent at $x = 2$

95. The volume of the solid obtained by revolving the curve $y = x^3$ about x – axis between the lines $x = 0$ and $x = 2$ is

A) $\frac{64\pi}{7}$ B) $\frac{128\pi}{7}$ C) $\frac{256\pi}{7}$ D) $\frac{320\pi}{7}$

96. The center of mass of three particles having masses of 1, 2 and 3 units located at points (– 1, 3), (2, 1) and (3, – 1) respectively is located at

A) $\frac{7}{3}, \frac{4}{3}$ B) $1, \frac{4}{3}$ C) $2, \frac{1}{3}$ D) $2, \frac{-1}{3}$

97. The volume of the parallelepiped having vertices at P (5, 4, 5), Q (4, 10, 6), R (1, 8, 7) and S (2, 6, 9) and edges PQ, PR and PS is

A) 52 unit B) 60 units C) 100 units D) 108 units

98. A particle is moving along the curve $\vec{r}(t) = \cos t\, \vec{i} + \sin t\, \vec{j} + t\vec{k}$, starting at $t = 0$. Then its velocity and speed at time $t =$ are given by

A) $\vec{j}, \sqrt{2}$ B) [illegible] C) $-\vec{j} + \vec{k}, \sqrt{2}$ D) $\vec{j} + \vec{k}, \sqrt{2}$

99. If $\frac{dy}{dx} = x^2 - 2x - 4$, $y(3) = -6$, then $3y$ is equal to

A) $x^3 + 3x^2 + 12x - 18$ B) $x^3 - 3x^2 + 12x + 18$
C) $x^3 + 3x^2 + 12x + 18$ D) $x^3 - 3x^2 - 12x + 18$

100. A unit vector parallel to the xz– plane and perpendicular to the vector $4\vec{i} + \vec{j} - 3\vec{k}$ is

A) $\frac{-3\vec{i}}{5} + \frac{4}{3}\vec{k}$ B) $\frac{3}{5}\vec{i} + \frac{4}{5}\vec{k}$

C) $\frac{4}{5}\vec{i} + \frac{3}{5}\vec{k}$ D) $\frac{4}{5}\vec{i} - \frac{3}{5}\vec{k}$

SECTION – IV
BIOLOGY

101. The triplet codons UGA, UAG and UAA are termed as termination codons because they
A) Do not allow ribosomes to bind with mRNA
B) Do not specify any amino acid
C) Prevent binding of tRNA anticodons with mRNA
D) Stop mRNA synthesis

102. Segment of single-stranded RNA(<1500 nts) that remain associated with other virus for its replication and causes various diseases are commonly known as
A) Satellite RNA
B) Helper retrovirus
C) Micro RNA
D) Heterogeneous RNA

103. Which of the following ecological pyramids will be inverted in shape ?
A) Ecological pyramids of number in a parasitic food chain of a tree ecosystem
B) Ecological pyramids of biomass in a parasitic food chain of a tree ecosystem
C) Ecological pyramids of number of a pond ecosystem
D) Ecological pyramids of number of a grassland ecosystem

104. When the enzyme Ribulose-1,5-bisphosphate carboxylase/oxygenase(RuBisCO) fails to distinguish its substrates CO_2 and O_2, the condition is often refereed as
A) Cellular oxidation
B) C3 Photosynthesis
C) C4 Photosynthesis
D) Photorespiration

105. Fetal hemoglobin consist of
A) One chain and twoβ chains
B) Two chain and twoβ chains
C) Two chain and two chains
D) Twoβ chain and two chains

106. The Bursa of Fabricius serves as site of hematopoiesis in

A) Bats B) Crow

C) Starfish D) Lizards

107. Red Data Book was prepared to essentially list some animals, plants and fungi, which are

A) Most abundant of a given area

B) Less abundant plants of a given area

C) Endangered species

D) Already Extinct

108. Which of the following activities will be severally affected if a patient has injury in abducens nerves ?

A) Swallowing for food and water

B) Movement of eye balls

C) Movement of jaws

D) Movement of tong

109. The number of Barr Body in a human female with 46, XX karyotype can be _____ per somatic cells.

A) 22 B) 4 C) 2 D) 1

110. Animals can be categorized into different species, if they

A) Differ in food habits

B) Fail to inter breed naturally

C) Differ in eye, hair and skin color

D) Are geographically isolated

111. Which of the following may not play crucial role in the process of evolution ?

A) Mutation

B) Genetic drift

C) Genetic recombination

D) Somatic adaptation

112. What would the probability of getting a normal son from hemophilic mother and hemophilic father ?

A) 2.5% B) 50%

C) 75% D) 0.0%

113. The food materials in *Chlorophycean* algea usually stored in the form of

A) Starch B) Cellulose

C) Oil droplets D) Glycogen

114. A DNA consists of 35% of adenine what would be the percentage of cytosine

A) 35% B) 25%

C) 65% D) 15%

115. The major function of macula densa in nephron is

A) To regulate blood pressure for optimum filtration

B) Selective absorption of water

C) Selective absorption of proteins and monosaccharides

D) All of the above

116. Which of the following features is predominantly responsible for widespread distribution of angiospermic plants ?

A) Well-developed vascular system

B) Presence of fruit

C) Presence of seed

D) Presence of leaves

117. Select the statement which is not correct for family Asteraceae

A) Ray florets are zygomorphic

B) Usually disk florets are incomplete flowers

C) Only ray florets are ligulated

D) Disc florets are actinomorphic

118. Casparian strips are present in the cells of

A) Exodermis

B) Pericycle

C) Endodermis

D) Cortex

119. The major function of hydathodes is

A) Oil secretion

B) Water secretion

C) Mucilage secretion

D) All of the above

120. Which of the following is an important function of velamen tissue ?

A) Absorption of CO_2

B) Absorption of O_2

C) Absorption of atmospheric moisture

D) Respiration

121. Amphivasal vascular bundles are present in

A) *Dracaena marginata*

B) *Oryza sativa*

C) *Hibiscus sps*

D) All of the above

122. Which of the following display negative geotropism ?

A) Fibrous root of *Cynodondactylon*

B) Aerating roots of *Sonneratiacaseolaris*

C) Crown roots of *Zea mays*

D) Areal root of *Ficusbenghalensis*

123. Stimulus in *Mimosa pudica* generally transduce due to

A) Hormones

B) cAMP

C) Change in turgor pressure

D) Signal transduction

124. Hemoglobin differs from myoglobin in terms of

A) O_2 binding is more tightly in hemoglobin than myoglobin

B) Myoglobin possesses quaternary structure whereas hemoglobin possesses tertiary structure

C) Hemoglobin display allosteric effect during O_2 binding and myoglobin does not

D) Myoglobin can bind with CO_2 more efficiently than hemoglobin

125. Which of the following is not an essential function of human skin ?

A) Regulation of body temperature

B) Absorption of atmospheric O_2

C) Immunity

D) Excretion

SPACE FOR ROUGH WORK