

Entrance Examinations, June 2012
M.Phil. (Cognitive Science) and
Ph.D. (Cognitive Science)

Marks: 75

Time : 2.00 hours

Hall Ticket No. _____

1. Please enter your Hall Ticket Number on Pages 1 and OMR Sheet without fail.
2. Read carefully the following instructions :
 - a. This Question Paper has Two Sections : Section - A and Section - B.
 - b. Section – A consists of 25 objective type questions of one mark each. There is a negative marking for this section. Each wrong answer carries -0.33 mark.
 - c. Section – B consists of 50 objective type questions of one mark each. There is no negative marking in this Section.
 - d. Answers are to be marked on the OMR answer sheet following the instructions provided there upon.
 - e. Calculators are permitted. Logarithmic tables are not allowed.
 - f. All questions are to be answered.
 - g. Hand over both question booklet and the OMR Sheet at the end of the examination.

SECTION A

Directions: Each question below (1-8) consists of four words. Choose the word that is closest in meaning to the phrase in italics:

1. *Ready to occur*

- A. Imminent
- B. Docent
- C. Reticent
- D. Adherent

2. *Cooperation between two different organisms*

- A. Surmise
- B. Heinous
- C. Motif
- D. Symbiosis

3. *Flexible; easily bent or twist*

- A. Pliant
- B. Decent
- C. Supplant
- D. Adamant

4. *The arrival or coming of*

- A. Adherent
- B. Advent
- C. Adept
- D. Assent

5. *Contradiction in terms; combination of two opposite words, such as "bittersweet"*

- A. Redeploy
- B. Accrue
- C. Oxymoron
- D. Motif

6. *injustice*

- A. Opaque
- B. Innuendo
- C. Pliant
- D. Iniquity

7. *To harm by adding impurities*

- A. Calibrate
- B. Adulterate
- C. Adumbrate
- D. Perpetrate

8. *A supporter of a cause*

- A. Serene
- B. Addle
- C. Adept
- D. Adherent

Five persons are sitting in a row. One of the two persons, at the farthest ends, is sharp, the other one is fair. An overweight person is sitting to the right of a feeble person. A tall person is to the left of the fair person and the feeble person is sitting between the sharp and overweight persons. Answer the question 9-13.

9. If people sitting in the row count their position from their right, at which position is the tall person?

- A. First
- B. Second
- C. Third
- D. Fourth

10. Which of the following depicts the person to the left of feeble person?

- A. Sharp
- B. Overweight
- C. Fair
- D. Tall

11. Which of the following persons is sitting in the middle?
- A. Fair
 - B. Feeble
 - C. Sharp
 - D. Overweight
12. To whose left is the overweight person sitting?
- A. Fair
 - B. Sharp
 - C. Tall
 - D. Feeble
13. If the fair person and overweight person swap positions, so also the tall and the feeble, then who will be sitting to the left of the feeble person?
- A. Tall
 - B. Fair
 - C. Overweight
 - D. Sharp
14. Leelavati had a triangle in mind. Its longest side has length 20 and another one of its sides has length 10. Its area is 80. What is the exact length of its third side?
- A. $\sqrt{270}$
 - B. $\sqrt{250}$
 - C. $\sqrt{240}$
 - D. $\sqrt{260}$
15. A red light flashes 3 times per minute and a green light flashes 5 times in two minutes at regular intervals. If both lights start flashing at the same time, how many times do they flash together in each hour?
- A. 30
 - B. 34
 - C. 20
 - D. 60
16. If $\frac{d-3n}{7n-d} = 1$, which of the following statements describes d in terms of n ?
- A. d is 5 times n .
 - B. d is 4 more than n .
 - C. d is $\frac{3}{7}$ of n .
 - D. d is 4 less than n .

17. If q and r are positive integers which of the following is assured to be a positive odd integer?
- A. $2q+1$
 - B. $2r+q$
 - C. $q-r$
 - D. $q+r+1$
18. Louder sound has
- A. Larger wavelength
 - B. Larger amplitude
 - C. Higher frequency
 - D. Larger phase shift
19. The following statement about energy production in living cells is **false**
- A. Yeast can produce energy without oxygen
 - B. Glucose is the main source of energy present in the blood.
 - C. Human muscles can produce energy without oxygen
 - D. Oxygen is required for producing energy in living cells
20. An iron nail is dipped in a solution of copper sulphate in water. This solution is blue in color. The chemical reaction that takes place is, $\text{Fe}(\text{solid}) + \text{CuSO}_4(\text{aqueous}) \rightarrow \text{FeSO}_4(\text{aqueous}) + \text{Cu}(\text{solid})$. After some time the solution loses its blue color. What is the color of the nail at this time?
- A. Green tinged blue
 - B. Blue tinged Black
 - C. Reddish brown
 - D. Shiny steel color
21. An electric bulb is rated 220 V and 200 W. When it is operated on 110 V, the power consumed will be -
- A. 100W
 - B. 75W
 - C. 50W
 - D. 25W

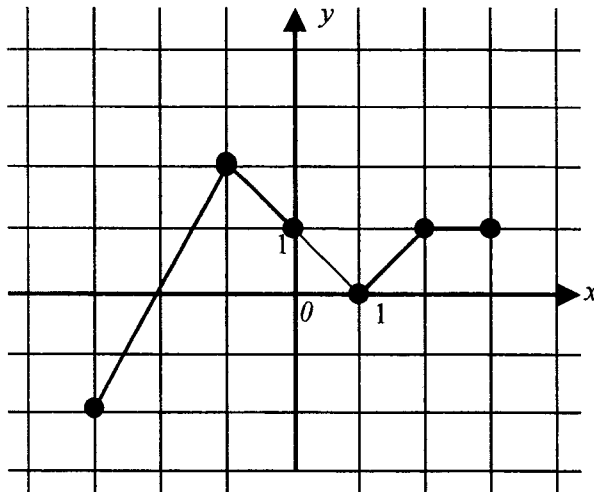
22. A gene whose specific mutation can cause a genetic disease that is fatal in the childhood is X-linked and recessive. If the gene follows Mendelian pattern of inheritance then

- A. Mother can be carrier
- B. Father can be carrier
- C. Father and Mother can be carrier
- D. Carriers cannot exist

23. Solution of an alkali in water is conductive because

- A. Water is conductive
- B. Alkali produces H^+ ions in water
- C. Alkali is hydrophobic
- D. Alkali produces OH^- ions in water

24. The figure below shows the graph of the function f in the xy -plane. What is the value of $f(f(-1))$?



- A. -2
- B. -1
- C. 0
- D. 1

A-100

25. You want to add a strip of copper on the circular wall of your experimental setup such that it fits the field of view of the subject at the centre of the room. The field of view of the subject is 45 degrees and radius of the room is 4m. What should be the length of the strip you should use?
- A. π
 - B. 2π
 - C. 2
 - D. 1

SECTION B

In each of the following sets of sentences (questions 26-27) choose the one that is ungrammatical.

26.

- A. My friend is having a lot of money.
- B. You had better leave as soon as possible.
- C. Who do you think will win the race?
- D. This is the kind of English that I will not put up with.

27.

- A. Every boy in the neighbourhood, except John, goes to school every day.
- B. All the girls in the neighbourhood, except Savita, goes to school every day.
- C. The literati assembled at the reception.
- D. The elephant is a very intelligent animal.

Choose the most appropriate filler for the gaps for questions 28-31:

28. Dark : light :: voluble : __

- A. Docile
- B. Perturbed
- C. Small
- D. Reticent

29. Muscle : tendon :: neuron : __

- A. Nucleus
- B. Nerve
- C. Axon
- D. Cellulose

A-100

30. Light : levity : : sorry : _

- A. Pain
- B. Sorrow
- C. Malady
- D. Pain

31. Justice : equity : : scruple : ___

- A. Compunction
- B. Inability
- C. Abstraction
- D. Unwillingness

32. The nursing shortage in this country is a fake one, caused by the concentration of nurses in the geographical regions with the highest paid and most generous fringe benefits for nurses. In addition, the Indian Nursing Association has artificially worsened the shortage by encouraging nursing colleges to keep enrolments low in order to boost nurses' salaries to even higher levels.

All of the following statements, if true, would tend to **weaken** the argument above **except**:

- A. Although nurses are paid less in Uttar Pradesh than in Kerala, there are 35% more nurses in Uttar Pradesh than in Kerala.
 - B. Nationwide, the salaries of nurses have risen at a slower rate than inflation over the last ten years.
 - C. The number of students who earned degrees in nursing last year was almost double the number six years ago.
 - D. Those areas of the country with the highest pay for nurses also have correspondingly higher living costs.
33. It is important to teach students to use computers effectively. Therefore, students should be taught computer programming in school.

Which of the following, if **true**, most **weakens** the above argument.

- A. Only people who use computers effectively are skilled at computer programming.
- B. Only people skilled at computer programming use computers effectively.
- C. Some people who use computers effectively cannot write computer programs.
- D. Most people who are able to program computers use computers effectively.

A-100

For the following questions 34-41 fill all blanks in the way that best completes the text.

34. Dominant interests often benefit most from _____ of governmental interference in business, since they are able to take care of themselves if left alone.
- A. Intensification
 - B. Authorization
 - C. Centralization
 - D. Elimination
35. Kagan maintains that an infant's reactions to its first stressful experiences are part of a natural process of development, not harbingers of childhood unhappiness or _____ signs of adolescent anxiety.
- A. Prophetic
 - B. Normal
 - C. Virtual
 - D. Typical
36. An investigation that is _____ can occasionally yield new facts, even notable ones, but typically the appearance of such facts is the result of a search in a definite direction.
- A. Timely
 - B. Unguided
 - C. Consistent
 - D. Uncomplicated
37. As my eyesight began to _____, I spent a lot of time writing about it — both poems and "eye journals" — describing what I saw as I looked out through damaged eyes.
- A. Deteriorate
 - B. Decline
 - C. Recover
 - D. Adjust
38. The judge's standing in the legal community, though shaken by phony allegations of wrong doing, emerged, at long last, _____.
- A. Unqualified
 - B. Undiminished
 - C. Undamaged
 - D. Unprincipled

A-100

39. Modern agricultural practices have been extremely successful in increasing the productivity of major food crops, yet despite heavy use of pesticides, _____ losses to diseases and insect pests are sustained each year.
- A. Incongruous
 - B. Significant
 - C. Considerable
 - D. Fortuitous
40. Ever a demanding reader of the fiction of others, the novelist Chase was likewise often the object of _____ analyses by his contemporaries.
- A. Exacting
 - B. Respectful
 - C. Scathing
 - D. Meticulous
41. Her _____ should not be confused with miserliness; as long as I have known her, she has always been willing to assist those who are in need.
- A. Diffidence
 - B. Frugality
 - C. Intolerance
 - D. Thrift

Directions: Study the data and answer the questions 42-44.

Six sculptures -- C, D, E, F, G, and H -- are to be exhibited in rooms 1, 2, and 3 of an art gallery. Sculptures C and E may not be exhibited in the same room. Sculptures D and G must be exhibited in the same room. If sculptures E and F are exhibited in the same room, no other sculpture may be exhibited in that room. At least one sculpture must be exhibited in each room, and no more than three sculptures may be exhibited in any room.

42. If sculpture D is exhibited in room 1 and sculptures E and F are exhibited in room 2, which of the following must be true?
- A. Sculpture C must be exhibited in room 1
 - B. Sculpture H must be exhibited in room 3
 - C. Sculpture G must be exhibited in room 1
 - D. Sculpture H must be exhibited in room 2
43. If sculptures C and G are exhibited in room 1, which of the following may NOT be a complete list of the sculpture(s) exhibited in room 2?
- A. Sculpture D
 - B. Sculpture E
 - C. Sculpture F
 - D. Sculptures E and H

44. If sculpture D is exhibited in room 3 and sculptures E and F are exhibited in room 1, which of the following may be true?
- A. Sculpture C is exhibited in room 1
 - B. Sculpture H is exhibited in room 1
 - C. Sculpture G is exhibited in room 2
 - D. Sculptures C and H are exhibited in the same room
45. In a certain language, SIKKIM is written as THLJLJL how is TRAINING written in that code?
- A. SQBHOHOH
 - B. UQBHOHOF
 - C. UQBJOHHO
 - D. UQBJOHOH
46. Sound in a medium has a frequency of 2Hz and a wavelength of 100m. How long does it take for it to travel 200m?
- A. 40sec
 - B. 1/4sec
 - C. 1sec
 - D. 4sec
47. We cannot see infrared electromagnetic radiation because
- A. It does not have color
 - B. Our eyes do not have appropriate sensors
 - C. Infrared is heat
 - D. None of the above
48. In a myopic eye the image is formed
- A. on the retina but is dim
 - B. in front of the retina
 - C. behind the retina
 - D. in front of the iris
49. A single celled organism does not have nervous system and liver because
- A. The whole cell is in contact with its environment
 - B. The single celled organisms are not sophisticated enough to requires such functions
 - C. They depend on other organisms to do these functions
 - D. The single cell organisms live within other organisms

50. You apply the same force on a knife and it cuts through some material while a thick rod does not. This is because
- A. Knife applies greater pressure compared to the rod
 - B. Knife is meant for cutting
 - C. Knife applies greater total force
 - D. Knife is narrower on one side compared to the other side
51. What is the value of the constant ϕ in degrees such that the (x,y) pair $(\sin(\omega), \sin(\omega+\phi))$ plotted on X-Y graph by varying ω from 0 through 360 degrees produces a circle?
- A. 180
 - B. 90
 - C. 0
 - D. 45
52. Which of the following is equal to $(a+b)(a^2 - b^2)$?
- A. $a^3 - b^3$
 - B. $a^3 - b^3 + 2ab$
 - C. $(a^2 + 2ab + b^2)(a-b)$
 - D. $a^3 - 2ab + b^3$
53. When an electrical current moves through a straight conductor, it produces
- A. A magnetic field around the conductor
 - B. An electric field around the conductor
 - C. Both electric and magnetic fields around the conductor
 - D. No field of any kind around the conductor
54. A rainbow is formed because the sunlight
- A. is reflected from dust particles in the atmosphere
 - B. is reflected from rain drops suspended in the atmosphere
 - C. is refracted from rain drops suspended in the atmosphere
 - D. both refracted and internally reflected from rain drops

Answer questions 55-58 are based on the information contained in the following passage.

After months of talent searching for an administrative assistant to the president of the college the field of applicants has been narrowed down to five (A, B, C, D, and E). It was announced that the finalist would be chosen after a series of all-day group personal interviews were held. The examining committee agreed upon the following procedure:

1. The interviews will be held once a week.
2. Three candidates will appear at any all-day interview session.
3. Each candidate will appear at least once.
4. If it becomes necessary to call applicants for additional interviews, no more than one such applicant should be asked to appear the next week.
5. Because of a detail in the written applications, it was agreed that whenever candidate B appears, A should also be present.
6. Because of travel difficulties, it was agreed that C will appear for only one interview.

55. At the first interview, the following candidates appear: A, B, and D. Which of the following combinations can be called for the interview to be held the next week?

- A. BCD
- B. CDE
- C. ABE
- D. ABC

56. Which of the following is a possible sequence of combinations for interviews in two successive weeks?

- A. ABC, BDE
- B. ABD, ABE
- C. BDE, ACD
- D. ADE, ABC

57. If A, B, and D appear at the interview and D is called for an additional interview the following week, which two candidates may be asked to appear with D?

I. A

II. B

III. C

IV. E

A. I and II

B. I and III only

C. II and IV only

D. III and IV only

58. Which of the following statement(s) is/are in agreement with the procedure followed by the search committee?

I. After the second interview, all applicants have appeared at least once.

II. The committee sees each applicant a second time.

III. If a third session is held it is possible for all applicants to appear at least twice.

A. I only

B. II only

C. III only

D. I and III only

59. Those who oppose the new water project claim to have the best interests of this community at heart. Yet they are the same people who, only three years ago, opposed the building of the new outer ring road, which now provides five lakh commuters with fast, easy motoring every day. What could be a better argument in favour of the water project?

Which of the following statements is **most like** the argument above?

A. Those who oppose nuclear power are unable or simply unwilling to recognise the fact that the nuclear energy industry has a safety record unparalleled by that of any other industry.

B. We must fight the proposed antipornography law, for its principal sponsors have voted against every major piece of women's rights legislation introduced in the last ten years.

C. The so-called tax reform bill now before the parliament must be opposed; its only beneficiaries would be the wealthy corporations, which already pay too little in taxes.

D. The new Lokpal bill introduced in the parliament is a misguided and dangerous proposal, which has been denounced by every politician, government official and industry leaders in the country

60. Three labelled boxes containing red and white cricket balls are **all** mislabelled. It is known that one of the boxes contains only white balls and one only red balls. The third contains a mixture of red and white balls. You are required to correctly label the boxes with the labels *red*, *white*, and *red and white* by picking a sample of one ball from **only** one box. What is the label on the box you should sample?
- A. White
 - B. Red
 - C. Red and White
 - D. Not possible to determine from a sample of one ball
61. The image we see in a mirror is formed
- A. in front of the mirror and is real
 - B. behind the mirror and is real
 - C. in front of the mirror but is virtual
 - D. behind the mirror and is virtual
62. A train was moving at a constant velocity of x m/s for 2 hours from its start. Then it starts accelerating at y m/sec² for 2 hrs. What is the final velocity?
- A. $2x+4y$ m/sec
 - B. $2+2y$ m/sec
 - C. $x+2y$ m/sec
 - D. $x+4y$ m/sec
63. Which value will the series $\frac{1}{2} + \frac{1}{4} - \frac{1}{8} + \frac{1}{16} - \frac{1}{32} + \dots$ converge to?
- A. $\frac{3}{4}$
 - B. $\frac{5}{4}$
 - C. $\frac{1}{2}$
 - D. $\frac{2}{3}$
64. What does the number 0100 in binary system (a number system in base 2) stand for in the decimal system?
- A. 2000
 - B. 500
 - C. 8
 - D. 4

65. If you draw a card randomly from a full deck of 52 cards what is the probability that you will not draw a queen?

A. $\frac{12}{13}$

B. $\frac{3}{4}$

C. $\frac{4}{52}$

D. $\frac{1}{52}$

66. If $\frac{x}{y}$ is greater than $\frac{y}{z}$, then $\frac{y}{x}$ is

A. greater than $\frac{z}{y}$

B. lesser than $\frac{z}{y}$

C. equal to $\frac{z}{y}$

D. indeterminate

67. The highest common factor (HCF) of 6, 72, and 120 is,

A. 360

B. 6

C. 120

D. 12

68. A weight of 13kg is to be broken into three parts such that using these, all the weights from 1kg to 13kg can be measured. What can be the values of the three weights?

A. 2kg, 3kg, 8kg

B. 1kg, 3kg, 9kg

C. 2kg, 5kg, 6kg

D. 1kg, 4kg, 8kg

69. Consider the following multiplication:

$$\left(\left(\frac{X}{A}\right) - 1\right)\left(\left(\frac{X}{B}\right) - 1\right)\left(\left(\frac{X}{C}\right) - 1\right)\left(\left(\frac{X}{D}\right) - 1\right) \dots \left(\left(\frac{X}{Z}\right) - 1\right)$$

The result of the multiplication

A. is equal to 0

B. has at least one term whose denominator is ABCD...Z

C. has at least one term which is equal to 1.

D. cannot be determined.

A-100

70. At $x = -1$ and $x = 4$ the polynomial $y = x^2 - 3x - 4$ has
- Maxima
 - Minima
 - Zeros
 - Both zeros and minima
71. The length of a ladder exactly equals the height of a wall. If the ladder is placed on a 2 feet tall stool placed 10 feet away from the wall then its tip can just touch the top of the wall. What is the height of the wall (in feet)?
- 15
 - 26
 - 28
 - 32
72. Which of the following is proportional to the force exerted by an egg of mass z kg on earth if the mass of earth is M kg.
- zM
 - zM^2
 - z^2M
 - z^2
73. In the correctly worked out multiplication problem below, each letter represents a different digit. What is the value of M ?

$$\begin{array}{r}
 LL \\
 \times LM \\
 \hline
 MM \\
 LL \\
 \hline
 L3M
 \end{array}$$

- 1
- 2
- 4
- 5

A-100

74. Consider the five points comprising the vertices of a square and the intersection point of its diagonals. How many triangles can be formed using these points (choose the best answer)?
- A. 4
 - B. 6
 - C. 8
 - D. 10
75. By weight, liquid A makes up 8 percent of solution R and 18 percent of solution S . If 3 grams of solution R are mixed with 7 grams of solution S , then liquid A accounts for what percent of the weight of the resulting solution?
- A. 10%
 - B. 13%
 - C. 15%
 - D. 19%