

X-94

ENTRANCE EXAMINATIONS, JUNE 2011
QUESTION PAPER BOOKLET
M. Phil. (Cognitive Science)
and
Ph.D. (Neural and Cognitive Sciences)

Marks: 75
Time: 2.00 hrs.

Hall Ticket No.

- I. Please enter your Hall Ticket Number on Page 1 as well as the OMR sheet without fail
- II. Read carefully the following instructions:

This Question paper has Two Sections: Section- A and Section- B

- 1. Section- A consists of 25 objective questions of one mark each. There is negative marking of 0.33 marks for every wrong answer. The marks obtained by the candidate in this part will be used for resolving tie cases.
- 2. Section- B consists of 50 objective type questions of one mark each. There is no negative marking in this section.
- 3. Answers are to be marked on the OMR answer sheet following the instructions provided there upon.

100. (A) (B) (C) ●

- 4. Calculators are permitted. Logarithmic tables are not allowed.
- 5. All questions are to be answered.
- 6. Hand over both question booklet and the OMR sheet at the end of the examination.

This booklet has 17 pages

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SECTION A

Directions: Each question below consists of four words. Three of them are related in meaning. Find the odd one out.

1.
 - A. duplicity
 - B. ascendancy
 - C. guile
 - D. chicanery

2.
 - A. contrition
 - B. remorse
 - C. credence
 - D. penitence

3.
 - A. temperance
 - B. sobriety
 - C. celibacy
 - D. oblivion

4.
 - A. whittle
 - B. wheedle
 - C. cajole
 - D. coax

5.
 - A. abracadabra
 - B. venal
 - C. voodoo
 - D. incantation

6.
 - A. choleric
 - B. querulous
 - C. petulant
 - D. equitable

7.
 - A. dormant
 - B. latent
 - C. nostalgic
 - D. inert

- 8.
- A. copious
 - B. profuse
 - C. myriad
 - D. gauche

A family consists of seven members P, Q, R, S, T, U, V. There are three married couples. Q is an engineer and father of T. U is grandfather of T and is a contractor. R is daughter-in-law of S who is a nurse by occupation. V is T's uncle who is a professor. There is one student, one home maker, and one doctor in the family. The student is unmarried and R is the sister-in-law of Q. Answer questions 9 to 13.

9. Who is R's husband?

- A. V
- B. Q
- C. T
- D. R

10. Who is T's aunt?

- A. S
- B. P
- C. U
- D. None of the above

11. What is the profession of P?

- A. Home maker
- B. Nurse
- C. Doctor
- D. either (A) or (C)

12. Which of the following are married couples?

- A. PV, QR, US
- B. VT, PQ, US
- C. PQ, RV, US
- D. None of the above

13. Which of the following is definitely a group of female members?

- A. PRST
- B. PRT
- C. PRS
- D. None of the above

14. In the correctly worked out multiplication problem below, each letter represents a different digit. What is the value of P?

$$P2Q \times Q = 212Q$$

- A. 3
 - B. 4
 - C. 5
 - D. None of the above
15. A box of twenty pens has an average cost of Rs. 22 per pen. There are eleven red pens having an average cost equal to the average cost of the pens in the box. There are seven blue pens having an average cost of Rs. 20 per pen. What is the average cost of the two green pens?
- A. Rs. 29
 - B. Rs. 25
 - C. Rs. 21
 - D. None of the above
16. Which among the following is the simplification of the expression $(a+b)(a-b)$?
- A. a^2-b^2
 - B. a^2+b^2
 - C. a^2+b^2-2ab
 - D. b^2-a^2
17. If REASON is coded as 5 and BELIEVED as 7, what is the code number for GOVERNMENT?
- A. 6
 - B. 8
 - C. 9
 - D. None of the above
18. Which is the main parameter of light rays of different colours that cause them to appear coloured to you?
- A. Wavelength
 - B. Intensity
 - C. Amplitude
 - D. Phase

19. Main energy processing centre of a living cell is

- A. Nucleus
- B. Mitochondria
- C. Ribosome
- D. Vesicles

20. Which of the following is wrong? Different isotopes of Fluorine have

- A. Same number of electrons
- B. Same number of neutrons
- C. Same number of protons
- D. Same atomic number

21. If 8Volts applied to a resistor caused a current flow of 2Ampere what will be the current when 4Volts is applied?

- A. 0.5Amp
- B. 2 Amp
- C. 8 Amp
- D. 1 Amp

22. According to the theory of evolution

- A. Humans evolved from chimpanzees
- B. Humans and chimpanzees have a common ancestor
- C. Humans are the ultimate evolved species
- D. Humans are superior to viruses

23. What is the main mode of information transfer between neurons?

- A. Chemical
- B. Electrical
- C. Mechanical
- D. Magnetic

24. Romeo has placed a ladder of length 5m to climb and reach the window of Juliet's room. The base of the ladder was placed against a stone 3m from the wall so as not to slip. How high is the window to Juliet's room.

- A. 3.5
- B. 2
- C. 4
- D. None of the above

25. Which of the following statements are true about the graph of $y = x^2 + 3x + 4$?
- I. The graph does not cut the x -axis.
 - II. The graph is entirely above the x -axis.
 - III. The graph touches the x -axis.
 - IV. The y -axis is the line of symmetry for the graph.
 - V. The graph cuts the x -axis at two distinct points.
- A. I, II and V
 - B. I and II only
 - C. III alone
 - D. IV and V alone

SECTION B

Directions: In the following sentences a word is underlined. From the given alternatives choose the one which best substitutes the underlined word.

26. The piece is really a sonnet ridiculing the late Prime Minister.
- A. elegy
 - B. dirge
 - C. melodrama
 - D. burlesque
27. Although charging interest is contrary to the law, the landlords contravene this by accepting a compulsory donation.
- A. circumvent
 - B. escape
 - C. circumspect
 - D. prevent
28. Without that circumstance, he would have been jailed.
- A. happening
 - B. extenuation
 - C. expediency
 - D. emergency
29. The greatest of all the cities of the Ramayana was the famous Ayodhya.
- A. historical
 - B. fabled
 - C. fabulous
 - D. celestial

30. He was filled with terrific glee to see his students struggle with the questions he set them.
- A. great
 - B. abundant
 - C. fiendish
 - D. intense
31. It is more likely to be a momentous discovery than the result of a concerted effort to find it.
- A. casual
 - B. ordinary
 - C. consequential
 - D. fateful
32. I saw him as old, corrupt and irretrievably evil.
- A. inertly
 - B. irredcembably
 - C. irreproachably
 - D. irresolutely
33. The General Election gave the party no such authority.
- A. mandate
 - B. permission
 - C. power
 - D. clout

Directions: There are two gaps in each of the following sentences. From the pairs of words given, choose the one that fills the gaps most appropriately. The first word in the pair should fill the first gap.

34. The past visual experiences of looking at paintings can trigger a _____ of varied emotions intensified by the recognition of the _____ language, thus probably engaging both hemispheres of the brain.
- A. jet, aesthetic
 - B. multitude, graphic
 - C. cascade, pictorial
 - D. gush, realistic

35. Australia has a veneer of _____ on its edges – cities, rivers and beaches – but at heart it is _____.
- A. nonchalance, outlandish
 - B. familiarity, bizarre
 - C. impropriety, eccentric
 - D. hostility, friendly
36. Simon's _____ of the Brazilian forest is one of the best-known _____ in British history.
- A. invention, occurrences
 - B. discovery, episodes
 - C. fascination, fiction
 - D. creation, stories
37. A technology _____ has been established throughout the neighbouring territories to detect any attempts at _____.
- A. search, replication
 - B. watch, copying
 - C. link-up, malpractice
 - D. beacon, negligence
38. Students must make the _____ from writing for themselves to writing with others in mind for a college _____.
- A. transition, assignment
 - B. forbearance, debate
 - C. altercation, project
 - D. switch, entrustment
39. Understanding how data and research can _____ personal experience is the first step towards writing effective _____.
- A. diverge, content
 - B. complement, evidence
 - C. supplement, narratives
 - D. divulge, source materials
40. Within the limits of _____, the company claims that they can adapt _____ models to specific customer requirements.
- A. feasibility, standard
 - B. facility, stock
 - C. capability, atypical
 - D. chance, various

41. Gender is a _____ physical characteristic that has remained, by its very nature, a difference between humans living in almost any self-sustaining and _____ community.
- A. general, racial
 - B. ubiquitous, regenerative
 - C. invasive, stimulating
 - D. variable, humanising

Directions: Study the data and answer the following questions.

Four young girls Raji, Prema, Vaidehi and Arthi are friendly with four young boys Satish, Krish, Vimal and Prakash. Satish and Vimal are good friends. Vaidehi's boyfriend does not like Satish and Vimal. Prema's boyfriend is friendly with Satish. Satish does not like Raji. (Questions 42 – 45)

42. Who is Raji's boyfriend?
- A. Vimal
 - B. Satish
 - C. Prakash
 - D. Insufficient data
43. Satish's girlfriend is
- A. Vaidehi
 - B. Raji
 - C. Prema
 - D. Arthi
44. Which of the following is definitely false?
- A. Raji does not like Satish.
 - B. Vaidehi's boyfriend is Prakash.
 - C. Prema is not Vimal's girlfriend.
 - D. Prakash and Krish are very good friends.
45. If Vaidehi does not like Krish then who is Raji's boyfriend?
- A. Satish
 - B. Krish
 - C. Prakash
 - D. Vimal

46. If in a certain language, 943 is coded as BED and 12448 is coded as SWEET, how is 492311 coded in that language
- A. EBWDSS
 - B. EDSWBS
 - C. TSWBDD
 - D. None of the above

Geological Survey of India will send two teams of surveyors to the Himalayan Range. Each team will consist of at least three persons. The teams will be constituted from seven persons, Amla, Bharathi, Catherine, Devyani, Esther, Fathima, and Gargi. These persons are experts in one of the areas of Map Surveying, Data Interpretation, Paleontology and Seismology. Every group must have at least one Paleontologist and a Seismologist. Amla and Bharathi are Map Surveyors and they cannot be together. Devyani and Esther are Seismologists. Catherine and Devyani cannot be together and Gargi and Bharathi are always in the same group. Fathima is a Paleontologist.

Now answer the questions (47-51):

47. If Fathima is in the same group with Bharathi, then Catherine must be specialized in
- A. Data Interpretation
 - B. Paleontology
 - C. Seismology
 - D. None of the Above
48. If Fathima cannot go, then what must be the specialization of Gargi?
- A. Paleontology
 - B. Seismology
 - C. Data Interpretation
 - D. Map Surveying
49. If Devyani cannot be in the same group as Fathima, then who must always be in the group of Fathima?
- A. Amla
 - B. Bharathi
 - C. Catherine
 - D. Esther

50. If Catherine is in the area of Data Interpretation, then who must always be in the same group as Catherine?
- A. Bharathi
 - B. Devyani
 - C. Esther
 - D. Fathima
51. If Bharathi is not in any of the groups, then who can be in the same group as Amla?
- A. Gargi and Esther
 - B. Catherine and Esther
 - C. Catherine and Fathima
 - D. (A) or (B) or (C)
52. There is a five digit number. The fourth digit is 4 greater than the second digit, while the third digit is 3 less than the second digit. The first digit is thrice the last digit. There are three pairs whose sum is 11. Find the number.
- A. 35291
 - B. 63072
 - C. 95293
 - D. None of the above
53. A vessel contains five red balls and seven white balls, which are identical in size. One ball is drawn from the vessel each time and is not replaced. What is the probability that 2 white balls are drawn in succession?
- A. $\frac{2}{7}$
 - B. $\frac{1}{6}$
 - C. $\frac{7}{22}$
 - D. $\frac{49}{144}$
54. One-half of a number is 17 more than one-third of that number. What is the number?
- A. 52
 - B. 84
 - C. 102
 - D. 204

55. Given below are the percent increases in length and percent decrease in breadth respectively in a rectangle. Which of the combinations gives the least percentage of change in area?
- A. 10,10
 - B. 20,0
 - C. 15,45
 - D. 12,8
56. Two sides of a plot measure 32 metres and 24 metres and the angle between them is perfect right angle. The other two sides measure 25 metres each and the other three angles are not right angles. What is the area of the plot (in square metres)?
- A. 768
 - B. 534
 - C. 696.5
 - D. 684
57. Four straight lines are drawn at random in a plane, no two of which are parallel and no three of which intersect at a point. What is the maximum number of triangles formed?
- A. 2
 - B. 3
 - C. 4
 - D. 5
58. Which is the false statement about light and sound?
- A. Both light and sound require media to propagate
 - B. Both light and sound can diffract
 - C. Both light and sound can be reflected
 - D. Both light and sound can have different velocities in different media
59. The cell membrane of all organisms is made of
- A. Carbohydrate
 - B. Protein
 - C. Phospholipids
 - D. Polysaccharides
60. If an inorganic solution tastes very sour what is the likely status of its pH?
- A. Insufficient data
 - B. is high
 - C. is low
 - D. is 0

61. If a mass of 1 kg falls from a height in 9.8 sec. How long will it take for a mass of 2 kg fall from the same height?
- A. 19.6sec
 - B. 9.8sec
 - C. 4.9sec
 - D. 11.8sec
62. Which are the main elements that make up living cells?
- A. Carbon, Nitrogen, Oxygen, Hydrogen, Silicon
 - B. Carbon, Nitrogen, Oxygen, Hydrogen, Phosphorous
 - C. Carbon, Sulphur, Oxygen, Hydrogen, Phosphorous
 - D. Carbon, Sulphur, Oxygen, Hydrogen, Silicon
63. Which among the following is the differentiation of the function e^x ?
- A. $\ln(x)$
 - B. x
 - C. 1
 - D. e^x
64. Ends of a conducting wire are connected to a voltmeter. It is initially in a position away from a magnetic field. Now you move the conductor directly into a magnetic field and keep it there. You will observe the following in the volt meter during the process.
- A. The voltage reading gradually increases in magnitude and then reaches a steady non zero value and stays at that value
 - B. The voltage reading, which was initially zero increases in magnitude and then goes back to zero
 - C. There is no change in the voltage reading during the process
 - D. Voltage reading keeps oscillating between positive and negative values while the conductor is in the magnetic field
65. Equal mass of two liquids A and B are heated for the same duration under similar conditions. Temperature of A is double that of B at the end of the treatment.
- A. We can say nothing about the specific heat capacity
 - B. A has higher specific heat capacity than B
 - C. B has higher specific heat capacity than A
 - D. Specific heat capacity of A and B depends on the time for which the heating was done
66. Two strands of DNA are held together by
- A. Covalent bond
 - B. Ionic bond
 - C. Hydrogen bond
 - D. Van der Waals force

67. If a bee is travelling straight from its hive to a cluster of flowers with velocity v m/sec for half the total time to reach the flowers, $2v$ m/sec for quarter of the time and $v/2$ m/sec for the rest to the time, what is bee's average velocity?
- A. v m/sec
 B. $7v/8$ m/sec
 C. $5v/9$ m/sec
 D. $9v/8$ m/sec
68. If in a series the p^{th} term divided by the $(p-1)^{\text{th}}$ term yields the same ratio as the q^{th} term divided by the $(q-1)^{\text{th}}$ term, then the series is in:
- A. Arithmetic Progression (AP)
 B. Geometric Progression (GP)
 C. Both AP and GP
 D. None of the above
69. What does the number 1000 in binary system (in base 2) stand for in the decimal system?
- A. 2000
 B. 500
 C. 8
 D. 4
70. If $B^2 = C^3 = A$ for some integers A, B and C then the value of the smallest positive integer $A > 1$ must be:
- A. 64
 B. 81
 C. 36
 D. 8
71. If $x > 1$, then which of the following decreases as x increases?
- A. $(x-1)/x$
 B. $(x^2-1)/x^2$
 C. $1/(x^2-x)$
 D. x^3-x^2
72. The number of oscillations made by a simple pendulum is inversely proportional to the square root of its length. A pendulum makes 80 oscillations per minute. How many oscillations will it make, if its length is made 4 times the original?
- A. 40
 B. 18
 C. 20
 D. 57

73. If velocity of sound is 400m/sec in a medium and the frequency is 100 Hz. What is the wavelength?
- A. 2m
 - B. 4m
 - C. 40,000m
 - D. 20m
74. If the mother and the father of an offspring have different traits because of different versions of a gene (alleles) then the offspring
- A. will exhibit traits of both alleles
 - B. is not affected by the alleles of the parents
 - C. need not exhibit traits of both the alleles
 - D. will exhibit mothers allele
75. Solution A contains 20% (by volume) of an acid and another solution B has 55% (by volume) of the same acid. How much of each (A and B) in litres must be taken to obtain 100 liters of a 48% solution of the acid?
- A. 20:80
 - B. 25:75
 - C. 24:76
 - D. 30:70