ENTRANCE EXAMINATIONS, QUESTION PAPER BOOKLET
MSc (Neural and Cognitive Sciences)

Marks: 100
Time: 2.00 hrs.

Hall Ticket No.

1. Write your Hall Ticket Number in the OMR Answer Sheet given to you. Also write the Hall Ticket Number in the space provided above.

2. Read carefully the following instructions:

a. This Question paper has Two Sections: Part- I and Part- II .

b. Part - I has 40 and Part - II has 60 objective type questions of one mark each.

c. There is negative marking for all the questions in parts I and II. Each wrong answer carries -0.33 mark

d. Answers are to be marked on the OMR answer sheet following the instructions provided there upon.

e. Hand over the OMR answer sheet at the end of the examination to the Invigilator.

f. No additional sheets will be provided. Rough work can be done in the question paper itself/space provided at the end of the booklet.

Part A

1. Arrange to make a meaningful sentence in English:

   <u>this are damning</u>   <u>ingrained in America and</u>   <u>inequality is</u>

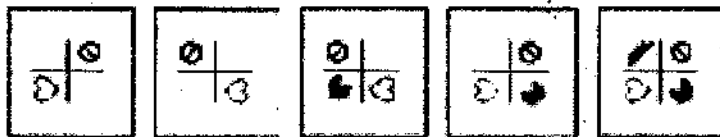   P   Q   R

   <u>the latest statistics concerning</u>

           S

   A. RQSP

   B. QRPS

   C. QPSR

   D. RQSP

2. Choose the most appropriate pair to fill in the blanks in the same order

   The most _____ magic, Jay believes, has a _____, improvisational vigor.

   A. invigorating, performing

   B. uplifting, spontaneous

   C. surprising, justifiable

   D. creative, challenging

3. Had he not been dead I would have gone into the little dark room behind the shop to find him sitting in his arm-chair by the fire, nearly smothered in his great-coat.
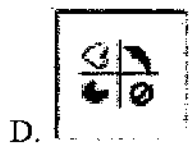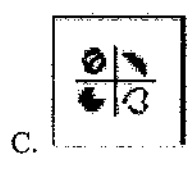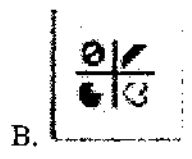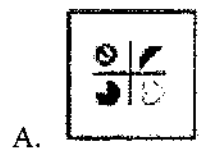
Perhaps my aunt would have given me a packet of High Toast for him and this present would have roused him from his stupefied doze.

Which of the following is true based on the passage above?

A. Somebody is sitting in his arm chair and the narrator's aunt usually gives High Toast to that person.

B. A person is sitting in his arm-chair in a dark room behind the shop, nearly smothered in his great-coat.

C. The narrator goes to a little dark room and roused a person from his stupefied doze.

D. Somebody is dead and the narrator's aunt unusually has a packet of High Toast handy.

4. Decimal system representation for the number 201 in base 4 system is:

A. 132

B. 19

C. 33

D. 12

5. Which point lies outside the triangle whose coordinates are (0, 0) and intercepts on the x and y axis by the line x+y=3?

A. (1,2)

B. (1.2,1.75)

C. (2,1)

D. (1.1,2.9)

6. By joining the vertices of an N-sided polygon we can form ____ mutually exclusive triangles and so the sum of the inside angles of the polygon is _____.

   A. N-1, (N-2) π/2

   B. N-2, (N-2) π

   C. N-2, (N-2) π/2

   D. N-1, (N-1) π.

7. What is the probability of getting only one head if you throw three fair coins?

   A. 1/3

   B. 3/8

   C. 1/8

   D. 7/8

8. What can be the antonym of 'break'

   A. cover

   B. mend

   C. disinter

   D. onward

9. Which of the pattern in the given choices will be the next in the sequence?

A.

B.

C.

D.

10. If A = 2, B = 3, C = 5 and D = 8, calculate the following:

$$\frac{(A \times C) + (B \times D)}{(A \times B) + (D - C)}$$

A. 3.77

B. 2.83

C. -2.71

5

D. 14.22

11. If the animals which can walk are called 'swimmers', animals who crawl are called 'flying', those living in water are called 'snakes' and those which fly in the sky are called 'hunters', then what will a lizard be called?

A. Swimmers
B. Snakes
C. Flying
D. Hunters

12. In a certain code language, if the word 'DISTANCE' is coded as EDCINSAT, then how will you code 'ACQUIRE' in that language?

A. EACIQUR
B. EACRIUQ
C. ERCIAQU
D. EARCIQU

13. Find the word that best describes the relation as the first pair of words CUP : LIP :: BIRD : _?

A. GRASS
B. FOREST
C. BEAK
D. BUSH

14. Find the word that best describes the relation as the first pair of words Paw : Cat :: Hoof : _?
A. Lamb
B. Horse
C. Elephant
D. Tiger

15. 'Re-entry' occurs when a person leaves his or her social system for a period of time and then returns. Which situation below best describes 're-entry'?

A. When he is offered a better paying position, Javed leaves the hotel he manages to manage another one in a neighbouring city.

B. Charan is spending her final year of college studying abroad in China.

C. Manan is readjusting to civilian life after 2 years of overseas merchant navy service.

D. After 5 miserable months, Sneha decides that she can no longer share her room with roommate Hital.

16. What is next in the series AMB, CLB, BKC, DJC, __
    A. CID
    B. CJD
    C. EIF
    D. EID

17. Arrange the given statements in a logical order to form a meaningful sentence.
A. where to he was exiled
B. Napoleon Bonaparte escaped from Elba
C. after the signing of the Treaty of Fontainebleau
D. a remote island off the coast of Italy
E. one year earlier

The Proper sequence should be:
    A. EABCD
    B. ACEBD
    C. BCADE
    D. BDACE

18. Today it is Thursday. After 132 days, it will be:

A. Monday
B. Sunday
C. Wednesday
D. Thursday

19. Pointing to a photograph, a lady tells Soham, "I am the only daughter of this woman, and her son is your maternal uncle". How is the lady related to Soham's father?
    A. Daughter
    B. Sister-in-law
    C. Sister
    D. Wife

20. Choose the number which is different from the rest.
    A. 28
    B. 45
    C. 72
    D. 81

21. Arrange the following three-dimensional objects in the descending order of their volumes:
    (i) A cuboid with dimensions 10 cm, 8 cm and 6 cm
    (ii) A cube of side 8 cm
    (iii) A cylinder with base radius 7 cm and height 7 cm
    (iv) A sphere of radius 7 cm
    A.   (i), (ii), (iii), (iv)
    B.   (ii), (i), (iv), (iii)
    C.   (iii), (ii), (i), (iv)
    D.   (iv), (iii), (ii), (i)

22. Consider an unfair coin. The probability of getting heads is 0.6. If you toss this coin twice, what is the probability that the first or the second toss is heads?
    A.   0.56
    B.   0.64
    C.   0.84
    D.   0.96

23. Introducing a boy, a girl said, "He is the son of the daughter of the father of my uncle." How is the boy related to the girl?
    A. Brother

B. Nephew

C. Uncle

D. Son-in-law

Each of the following questions (Ques. No. 4-6) consists of a related pair of words, followed by four pairs of words. Choose the pair that best represents a similar relationship to the one expressed in the original pair of words.

24. EXPLORE : DISCOVER
    A. sleep : wake
    B. research : learn
    C. write : print
    D. think : relate

25. DEPRESSED : SAD
    A. towering : cringing
    B. progressive : regressive
    C. exhausted : tired
    D. progressive : regressive

26. FISH : SHOAL
    A. wolf : pack
    B. elephant : jungle
    C. beagle : clan
    D. cow : farm

Read the following paragraph carefully and answer the questions no. from 7 to 10.

Harish, a professional man who had worked in an office for many years, had a fearful dream. In it, he found himself in a land where small slug-like animals with slimy tentacles lived on people's bodies. The people tolerated the loathsome creatures because after many years they grew into elephants which then became the nation's system of transport, carrying everyone wherever he wanted to go. Harish suddenly realised that he himself was covered with these things, and he woke up screaming. In a vivid sequence of pictures, this dream dramatized for Harish what he had never been able to put in to words; he saw himself as letting society feed on his body in his early years so that it would carry him when he retired. He later threw off the "security bug" and took up freelance work.

27. In his dream, Harish found the loathsome creatures
    A. In his village
    B. In his own house
    C. In a different land

D. In his office

28. Which one of the following phrases best helps to bring out the precise meaning of 'loathsome creatures'?
    A. Security bug and slimy tentacles
    B. Fearful dream and slug-like animals
    C. Slimy tentacles and slug-like animals
    D. Slug-like animals and security bug

29. The statement that 'he later threw off the security bug' means that
    A. Harish succeeded in overcoming the need for security
    B. Harish stopped giving much importance to dreams
    C. Harish started tolerating social victimisation
    D. Harish killed all the bugs troubled him

30. Harish's dream was fearful because
    A. it brought him face to face with reality
    B. it was full of vivid pictures of snakes
    C. he saw huge elephant in it
    D. in it he saw slimy creatures feeding on people's bodies

31. Marathon is to race as hibernation is to

A. winter

B. bear

C. sleep

D. dream

32. People speculate when they consider a situation and assume something to be true based on inconclusive evidence. Which situation below is the best example of Speculation ?

A. Ananya decides that it would be appropriate to wear jeans to het new office on Friday after reading about "Casual Fridays" in her employee handbook.

B. Maya spends thirty minutes sitting in traffic and wishes that she took the train instead of driving.

C. After consulting several guidebooks and her travel agent, Jyoti feels confident that the hotel she has chosen is first-rate.

D. When Vidya opens the door in tears, Tilak guesses that she's had a death in her family.

33. Look at this series: 36, 34, 30, 28, 24, ... What number should come next?

A. 20

B. 22

C. 23

D. 18

34. Which word does NOT belong with the others?

A. tyre

B. steering wheel

C. car

D. engine

35. Esha is twelve years old. For three years, she has been asking her parents for a dog. Her parents have told her that they believe a dog would not be happy in an apartment, but they have given her permission to have a bird. Erin has not yet decided what kind of bird she would like to have.

Find the statement that must be true according to the given information.

A. Esha's parents like birds better than they like dogs.

B. Esha does not like birds

C. Esha and her parents live in an apartment

D. Esha and her parents would like to move

36. **Statement:** It is desirable to put the child in school at the age of 5 or so.

Assumptions:

I. At that age the child reaches appropriate level of development and is ready to learn.

II. The schools do not admit children after six years of age.

Consider the statement and the assumptions and decide which of the assumptions is implicit in the statement.

A. Only assumption I is implicit

B. Only assumption II is implicit

C. Both I and II are implicit

D. Neither I nor II is implicit

37. **Statement:** No women teacher can play. Some women teachers are athletes.

Conclusions:

I. Male athletes can play.

II. Some athletes can play.

Read the conclusion and then decide which of the given conclusions logically follows from the given statements.

A. Only conclusion I follows

B. Only conclusion II follows

C. Neither I nor II follow

D. Both I and II follow

38. A man standing at a point P is watching the top of a tower, which makes an angle of elevation of 30° with the man's eye. The man walks some distance towards the tower to watch its top and the angle of the elevation becomes 60°. What is the distance between the base of the tower and the point P?

A. 4 units

B. 8 units

C. 4/3 units

D. Data inadequate

39. A family consists of two grandparents, two parents and three grandchildren. The average age of the grandparents is 67 years, that of the parents is 36 years and that of the grandchildren is 6 years. What is the average age of the family?
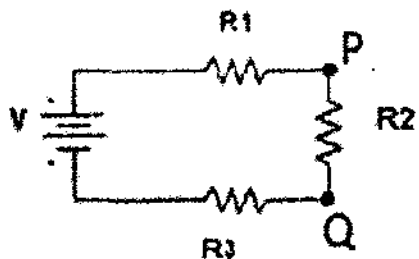
A. 28

B. 32

C. 38

D. 26

40. 1397 x 1397 = ?

A. 1951609

B. 1951601

C. 1991501

D. 1981609

Part B

41. If $y^2(x-2) = z$ then $x =$:

A. z/y^2+2

B. $(z+2)/y^2$

C. $(z/y+2)^{1/2}$

D. $(z-y^2)+2$

42. What is the power dissipated in R2 if R1=R3=100ohm, R2=200ohm and V=10V ?

A. 1/2 W

B. 1/16 W

C. 1/8 W

D. 1/5 W

43. Our eye is looking at an object 1m away. The object moves to a point 2m away. What should happen to keep the object in clear view

A. The lens of the eye should increase its focal length

B. The lens of the eye should decrease its focal length

C. The pupil should contract

D. The pupil should dialate

44. 20 is the mean of a set of 8 observations and four more observations are added and the mean becomes 25. What is the mean of the four new observations added?

A. 5

B. 28

C. 35

D. 30

45. Which are the frequencies present in the function, $2\sin(200\pi t) - 3\cos(100\pi t)$:

    A. 2, 3 Hz

    B. 200, 100 Hz

    C. 100, 50 Hz

    D. 2,1 Hz

46. If the position of the particle at time t is described by coordinates $(\cos(\omega t), \cos(\omega t - \pi/2))$ for some non-zero ω, what is the shape of the trajectory?

    A. Straight line

    B. Circle

    C. Parabola

    D. A point

47. Sound in a medium has a frequency of 1Hz and a wavelength of 200m. How long does it take for it to travel 100m?

    A. 1 sec

    B. 2sec

    C. 0.5 sec

    D. 0.33 sec

48. What is the result of product of the vectors $\begin{bmatrix} 2 \\ 3 \\ 2 \end{bmatrix} \cdot \begin{bmatrix} 1 & -1 & -1 \end{bmatrix}$:

A. 0

B. -2

C. $\begin{bmatrix} 2 & -2 & -2 \\ 3 & -3 & -3 \\ 2 & -2 & -2 \end{bmatrix}$

D. 3

49. If $h(x) = 3x^2 - 7x - 5$, what is $h(x-2)$?

A. $3x^2-19x+21$

B. $3x^2-19x+7$

C. $3x^2-7x-3$

D. $3x^2-7x+9$

50. What are the solutions for x in the equation $x-xe^{5x+2}=0$?

A. 0, -3/5

B. 0, -2/5

C. 1, -2/5

D. 1, -3/5

51. What is 'Metacognition'?
A. A critical awareness of one's community
B. A deep understanding of your actions
C. A deep understanding of your community's actions

D. A critical awareness on one's awareness.

52. Who proposed the Attenuation model of selective attention?

A. Anne Treisman
B. Donald Broadbent
C. Deutsch & Deutsch
D. Alan Baddeley

53. The Binding problem leads to?
A. Illusory Conjunctions
B. Imagery Conjunctions
C. Illusory Confusions
D. Imagery Confusions

54. Which paradigm is commonly used to study feature-based selective attention?
A. Visual world paradigm
B. Posner cueing paradigm
C. Visual search paradigm
D. Probability cueing paradigm

55. The Baddeley & Hitch model of working memory comprises of the visuo-spatial sketch-pad and?
A. Perceptual loop
B. Phonological loop
C. Phonemic loop
D. Phenomenological loop

56. Eye tracking technique often relies on
A. Pupil reflection
B. Corneal reflection
C. Both a) and b)
D. Corneal transparency

57. The negative compatibility effect leads to
A. More accurate performance on congruent cue trials compared to incongruent cue trials
B. Less accurate performance on incongruent cue trials compared to congruent cue trials
C. Faster RTs on congruent cue trials compared to incongruent cue trials
D. Faster RTs on incongruent cue trials compared to congruent cue trials

58. Mirror neuros were originally discovered in the_____ region of the monkey brain.
A. Hippocampus
B. Premotor cortex
C. Both a) and b)
D. Temporal lobule

59. A bilingual speaker necessarily
A. Has lived in multiple countries
B. Has a high IQ
C. Can speak two languages fluently
D. Is a student of linguistics

60. A Stroop task is predominantly used to measure
A. Inhibitory control
B. Task switching
C. Spatial attention
D. Attentional blink

61. What does the term 'cross-modal' refer to in cognitive psychology?
A. Modulation of chromosomes in the DNA
B. A comparative model of the brain
C. A highly unstable state of mind
D. A combination of two or more sensory modalities

62. In response to threatening stimuli, the pupil
A. ontracts
B. Dilates
C. Deforms
D. Rotates

63. Which region in the human brain is responsible for face perception
A. Fusiform gyrus
B. Hippocampus
C. Hypothalamus
D. Frontal lobule

64. Which of the following is not a component of the model of executive functions proposed by Norman and Shallice (1980)?
A. Contention scheduling
B. Schemas

C. Central filter

D. Supervisory attentional system

65. Which component must be brought to '0' to obtain high amplitude EEG (electroencephalography) signals from the scalp?

A. Resistance

B. Capacitance

C. Inductance

D. Impedance

66. Who conducted the first human EEG recording?

A. Walter Freeman

B. Hans Berger

C. Robert Resnick

D. Howard Dully

67. Which one of the disciplines mentioned below did not contribute to the emergence of Cognitive Science as a field?

A. Anthropology

B. Linguistics

C. Numerology

D. Psychology

68. Who is known as the father of cognitive psychology?

A. Ulric Neisser

B. Hermann Van Helmholtz

C. William James

D. Noam Chomsky

69. In mid 1970s the cognitive science society started the journal

A. Journal of Experimental Cognitive Psychology

B. Cognitive Science

C. Trends in Cognitive Science

D. Frontiers in Cognitive Science

70. The connectionist model comprises of the input units, output units and the_____

A. Processing units

B. Intermediate units

C. Middle units

D. Hidden units

71. Who made the proposition "I think therefore I am"?
A. John Searle
B. William James
C. Rene Descartes
D. Thomas Nagel

72. The theory of 'Universal grammar' suggests that
A. All life forms possess an innate capacity to acquire language
B. There are categories, operations, and principles shared by all human languages which are innate
C. Humans can learn the grammatical rules of any language
D. Grammar is the most fundamental component of any language

73. Phrenologists tried to find out about personality by:
A. Reading a person's horoscope
B. Feeling a person's skull
C. Looking at a person's hands
D. Asking people questions

74. Psycholinguistics is a discipline that
A. Studies the psychological processes related to language use
B. Deals with the subjective experience of having language
C. Studies language abilities of psychopaths
D. Qualitative analysis of languages

75. The Chinese room argument was used to refute
A. The theory of evolution
B. The theory of general relativity
C. Capitalism
D. The computational theory of mind

76. The influence of parents on the personality of their children is:
A. Non-existent
B. Weakest in early childhood
C. Strongest in early childhood
D. Consistent throughout life

77. Smooth pursuit eye movements are executed in response to

A. Stimuli with smooth surfaces

B. Stimuli at rest

C. Stimuli in motion

D. Abrupt onset stimulus

78. An overwhelming sensitive to stimuli in Schizophrenics has been linked to the impairment of which cognitive mechanism

A. Distractor inhibition

B. Selective attention

C. Conflict monitoring

D. Implicit learning

79. Failed inhibitory control is not observed in which of the following disorders

A. Parkinson's disease

B. Clinical depression

C. Bipolar disorder

D. Blindsight

80. In Posner cueing tasks, facilitatory effects/positive cueing effects are commonly observed at short SOA. This means:

A. Faster responses when target appears at the cued location

B. Faster responses when the target appears at the uncured location

C. No difference in responses as a function of cue

D. Lower accuracy when target appears at the cued location

81. The minimum distance at which a microscope is capable of distinguishing two points as separate is its:

A. Magnification

B. Illumination

C. Resolving power

D. Fluorescence

82. During photosynthesis, the source of oxygen is:

A. Water

B. Carbon dioxide

C. Glucose

D. Chlorophyll

83. The relative percentage of oxygen in the air remains constant at 21% — from sea level to the peak of Mt. Everest. Why then do humans suffer from altitude sickness?

A. Due to the ozone layer.

B. Due to the increased percentage of nitrogen in the air.

C. Due to the reduced air pressure at higher altitudes.

D. Due to the increased exposure to ultra-violet light.

84. When antibiotic-sensitive bacteria are spread on a nutrient agar plate containing antibiotic, colonies of resistant bacteria grow. The most plausible explanation for this is:

A. The antibiotic is mutagenic

B. The antibiotic induces resistance through epigenetic effects

C. Cells only become resistant once they sense the antibiotic

D. Some cells in the original population were already resistant

85. Wings of insects and the wings of bats represent a case of:

A. Divergent evolution

B. Convergent evolution

C. Allopatric evolution

D. Neutral evolution

86. Which metal is present in chlorophyll?

A. Calcium

B. Aluminium

C. Zinc

D. Magnesium

87. What is the pH of human blood?

A. 7.4

B. 8.4

C. 5.4

D. 6.5

88. Deficiency of vitamin B$_{12}$ causes:

A. Rickets

B. Scurvy

C. Pernicious anemia

D. Pellagra
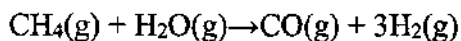
89. Archaeopteryx is considered as a connecting link between:

A. Birds and mammals

B. Reptiles and birds

C. Dinosaur and bird

D. Crocodile and salamander

90. Presence of amyloid plaques is a neuropathological hallmark of:

A. Sensory aphasia

B. Wernicke's aphasia

C. Parkinson's disease

D. Alzheimer's disease

91.   Methane gas reacts with water vapor to produce a mixture of carbon monoxide and hydrogen according to the balanced equation below.

$$CH_4(g) + H_2O(g) \rightarrow CO(g) + 3H_2(g)$$

The ΔH· for the reaction is +206.1 kJ/mol, while the ΔS· is +215 J/K • mol. Calculate the ΔG· at 25°C.

A.   142 KJ/mol

B.   206 KJ/mol

C.   -142 KJ/mol

D.   -206 KJ/mol

92.   The end replication problem in chromosomes in eukaryotic cells is handled by

A.   Methylase

B.   Phosphorylase

C.   Amylase

D.   Telomerase

93.   Which of the following statement is true for Echinoderms?

A.   They have well developed brain and sensory organs

B. They have sensory organs, but lacks a central brain

C. They have a tetraneural nervous system or four main neural strands

D. They have complete absence of nervous system

94.   Identify the following carbohydrate.

$$
\begin{array}{c}
\text{CHO} \\
\text{HO} \!-\!\!|\!-\! \text{H} \\
\text{HO} \!-\!\!|\!-\! \text{H} \\
\text{HO} \!-\!\!|\!-\! \text{H} \\
\text{CH}_2\text{OH}
\end{array}
$$

A.   L-aldopentose

B.   D-ketohexose

C.   2-Deoxy-*erythro*-pentose

D.   Fructose

95. Following statements were made about the nucleosides and nucleotides. Which one is the correct?

I) A nucleoside consists of a nitrogenous base, a sugar (ribose or deoxyribose) and one to three phosphate groups.

II) Several nucleoside analogues are used as antiviral or anticancer agents.

III) Examples of nucleosides include cytidine, uridine, adenosine, guanosine, thymidine and inosine.

IV) Malfunctioning nucleotides are one of the main causes of all cancers known of today.

A. Only I and II

B. I, III and IV

C. II, III and IV

D. I, II, III and IV

96. Axon hillock or the initial segment is rich in

A. Voltage gated K^+ channels

B. Voltage gated Na^+ channels

C. Voltage gated Ca^{2+} channels

D. Sodium-potassium ion pump

97. The pituitary gland is a pea-sized gland situated in the brain and releases:

A. Cortisol

B. Testosterone

C. Thyroid stimulating hormone

D. Melatonin

98. The cleavage type for human egg is:

A. Holoblastic