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Section 1 - Paper I General Knowledge and Current Affairs

No. of Questions: 20

1) In July 2020, the retirement age of the medical officers employed under the Odisha Medical and Health Services Cadre and Allopathic Insurance Medical Officers under Labour and Employees' State Insurance Department has been increased to:

- A) 70 years
- B) 62 years
- C) 65 years
- D) 67 years

2) In November 2020, Quick Reaction Surface to Air Missile (QRSAM) was successfully flight-tested from the Integrated Test Range in Chandipur, Chandipur is located in which of the following districts of Odisha?

- A) Balasore
- B) Gajapati
- C) Malkangiri
- D) Sonepur

3) In 2020, the State Government of Odisha launched an online platform called "e-Gazette portal", a first-of-its-kind initiative in India designed and developed by:

- A) Centre for Development of Advanced Computing
- B) Indian Institute of Science
- C) National Informatics Centre
- D) Indian Institute of Science Education and Research

4) Read the following statements and choose the CORRECT answer.

(i) Gross Domestic Product is the total value of all final goods and services produced in a particular economy within a country's borders in a given year.

(ii) National Income is the total value of all income in a nation including wages and profits, interests, rents and pension payments during a given period.

- A) (i) is True and (ii) is False
- B) (i) is False and (ii) is True
- C) (i) is True and (ii) is True
- D) (i) is False and (ii) is False

5) Read the following statements and choose the CORRECT answer.

- (i) Purchasing Power Parity is an economic theory that measures the relative purchasing power of currencies of different countries.
- (ii) Purchasing Power Parity is a tool used to make multilateral comparisons between the national incomes and living standards of different countries.

- A) (i) is True and (ii) is False
 - B) (i) is False and (ii) is True
 - C) (i) is True and (ii) is True
 - D) (i) is False and (ii) is False
-

6) Which of the following are the constraint/s for spending on social development in India?

- A) Availability of skilled volunteers for social development
 - B) Current Account Deficit and high Fiscal Deficit
 - C) Lack of Technological Provisions
 - D) Identifying the beneficiaries for Social upliftment
-

7) Cochlea is a part of which of the following organs in a human body?

- A) Eyes
 - B) Tongue
 - C) Ear
 - D) Lungs
-

8) Which of the following is an INCORRECT option with reference to living organisms having blue blood?

- A) Spiders
 - B) Octopus
 - C) Peanut worms
 - D) Snails
-

9) Which of the following medical terms is used to refer to a specific situation in which a drug, procedure, or surgery should not be used because it may be harmful to the person?

- A) Contraindication
- B) Abrasion
- C) Prosthesis
- D) Exacerbation

10) Which of the following organisms generally excrete nitrogenous wastes as uric acid in the form of pellet or paste with a minimum loss of water and are called uricotelic animals?

- A) Birds
 - B) Fishes
 - C) Mammals
 - D) Amphibians
-

11) Smt. Rama Devi and Smt. Malati Devi of Odisha were prominent personalities associated with which of the following freedom movements?

- A) Salt Satyagraha
 - B) Chipko Movement
 - C) Kheda Movement
 - D) Khilafat Movement
-

12) On invitation of which of the following freedom fighters did Mahatma Gandhi visit Odisha for the first time in 1921, at Cuttack?

- A) Chandra Sekhar Behera
 - B) Laxmi Narayan Mishra
 - C) Gopabandhu Das
 - D) Biswaksen Mishra
-

13) Ramakrushna Samanta Singhara was the Zamindar in which of the following districts of Odisha who revolted against the 'Sunset Law' of Lord Cornwallis?

- A) Sambhalpur
 - B) Balasore
 - C) Puri
 - D) Cuttack
-

14) Choose the CORRECT option for the given statements.

(i) Trisul mountain peaks are located near the Nanda Devi sanctuary.

(ii) Chaukhamba summit is the highest peak in the group of the Gangotri located in the Garhwal Himalaya region.

- A) Statement (i) is True and (ii) is False
- B) Statement (i) is False and (ii) is True
- C) Both the statements (i) and (ii) are True
- D) Both the statements (i) and (ii) are False

15) Choose the CORRECT option for the given statements.

(i) The Greek astronomers two thousand years ago showed that the sun was at the centre of the solar system and planets revolve around it.

(ii) Johannes Kepler discovered the laws of planetary orbits.

- A) Statement (i) is True and (ii) is False
 - B) Statement (i) is False and (ii) is True
 - C) Both the statements (i) and (ii) are True
 - D) Both the statements (i) and (ii) are False
-

16) Which of the following river detaches the United States from Mexico?

- A) Ohio
 - B) Rio Grande
 - C) Colorado
 - D) Missouri
-

17) Choose the CORRECT option for the given statements.

(i) Thorny bushes, acacia, and Babul are found in Semi-deserts and Deserts vegetations.

(ii) Semi-desert and Desert vegetation areas usually receives a rainfall near to 300 cm.

- A) Statement (i) is True and (ii) is False
 - B) Statement (i) is False and (ii) is True
 - C) Both the statements (i) and (ii) are True
 - D) Both the statements (i) and (ii) are False
-

18) Which of the following questions during Question hour in the Parliament of India requires an oral answer and answer to such a question may be followed by supplementary questions?

- A) Solicited questions
 - B) Starred question
 - C) Surprise questions
 - D) Unstarred Question
-

19) The provisions related to 'Advocate General for the State' are enshrined in which of the following Articles of the Constitution of India?

- A) Article 152
- B) Article 165
- C) Article 221
- D) Article 226

20) Which of the following is an INCORRECT statement with respect to Public Accounts Committee amongst parliamentary committees in India?

- A) At present, this committee consists of 22 members
- B) 15 members are elected by the Lok Sabha and 7 members of the Rajya Sabha are associated with this committee
- C) Members are elected with proportional representation by means of the single transferable vote to this committee
- D) Term of office of the members of this committee is five years



Section 2 - Paper I Reasoning Ability

No. of Questions: 20

21) The average of 21 scores is 19 and that of the remaining 61 scores is 29. What is the average of all the scores?

- A) 21.66
- B) 22.22
- C) 24.11
- D) 26.44

22) If $X : K = 2 : 3$, $M : K = 10 : 12$, $M : O = 10 : 16$ & $O : Z = 8 : 5$, then the ratio $X : K : M : O : Z$ is

- A) 3 : 6 : 5 : 5 : 5
- B) 3 : 6 : 5 : 8 : 5
- C) 4 : 6 : 5 : 5 : 5
- D) 4 : 6 : 5 : 8 : 5

23) The ratio of metal Y and Z in an alloy P is 23:27. How much metal Z will be there in 500 gram of alloy P?

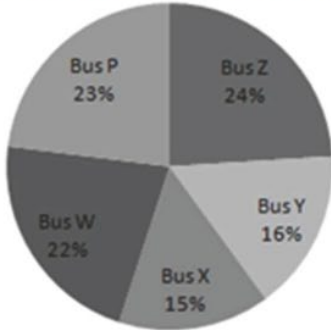
- A) 150 gram
- B) 180 gram
- C) 270 gram
- D) 360 gram

24) The marked price of a mug is ₹ 205. It is sold for ₹ 110. The rate of discount offered is

- A) 46.34%
- B) 48.34%
- C) 52.34%
- D) 54.34%

25) Study the following piechart carefully to answer the questions. The pie chart gives the percentage distribution of passengers travelling in different buses in city X. Total number of passengers in city X = 5500. The total number of passengers travelling by bus Z and P, together is

Percentage of passengers



- A) 2465
- B) 2475
- C) 2585
- D) 2595

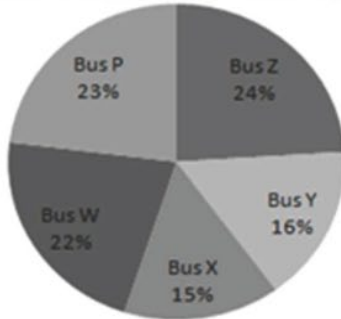
26) Study the following table carefully to answer the questions. Number of flights flying from Moscow airport by six different airlines in five different months is given. The total number of flights flying from Moscow in June and March together is:

	AA	BB	CC	DD	EE	FF
FEBRUARY	120	84	50	95	110	80
MARCH	110	240	90	200	80	72
APRIL	80	56	300	105	80	68
MAY	64	96	324	150	40	56
JUNE	60	64	56	44	200	104

- A) 1240
- B) 1320
- C) 1430
- D) 1560

27) Study the following piechart carefully to answer the questions. The pie chart gives the percentage distribution of passengers travelling in different buses in city X. Total number of passengers in city X = 5500. The average number of passengers travelling by bus Y , X and P is

Percentage of passengers



- A) 880
- B) 890
- C) 980
- D) 990

28) Study the following table carefully to answer the questions. The sum of the average number of flights of airlines FF and EE flying from Moscow airport is

	AA	BB	CC	DD	EE	FF
FEBRUARY	120	84	50	95	110	80
MARCH	110	240	90	200	80	72
APRIL	80	56	300	105	80	68
MAY	64	96	324	150	40	56
JUNE	60	64	56	44	200	104

- A) 176
- B) 178
- C) 182
- D) 184

29) Select one of the following four options that will make the 2nd pair analogous to the 1st pair given

101 : 1717 :: 304 : ?

- A) 5004
- B) 5016
- C) 5134
- D) 5168

30) Select one of the following four options that will make the 2nd pair analogous to the 1st pair given

CROW : DSNV :: DUCK : ?

- A) EVBJ
- B) EWBJ
- C) BVEJ
- D) BWEJ

31) Select one of the following four options that will make the 2nd pair analogous to the 1st pair given

942081 : 48 :: 77641 : ?

- A) 35
- B) 40
- C) 50
- D) 65

32) Read the instructions and answer the question that follows

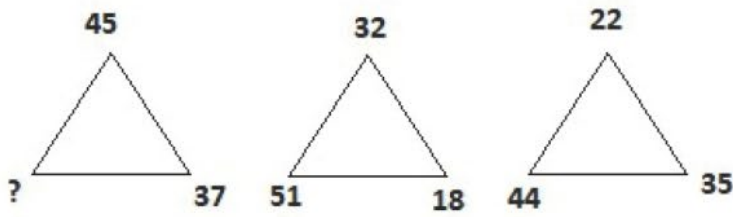
Joy, Tim, Lim, Kim, Sim, Ron, Wim and Nil are sitting around a round table, facing the center.

Each one of them has a different profession. Sim, who is a doctor sits third to the left of the Tailor and third to the right of Nil, who is neither a Teacher nor a chef. Ron, who is a designer, sits between a doctor and a chef. Kim sits to the immediate right of Sim. Joy isn't a Banker. Wim is a chef. Tim, who is a tailor, sits second to the right of the engineer. Wim isn't the neighbor of Tim. Ron is fifth to the right of Lim, who is a lawyer.

There is one banker and one teacher in the group. Who sits opposite to the Teacher in the group?

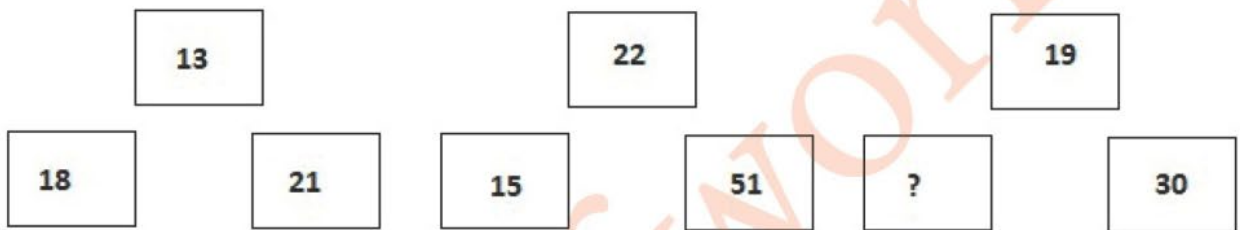
- A) Chef
- B) Engineer
- C) Lim
- D) Sim

33) Which is the missing number?



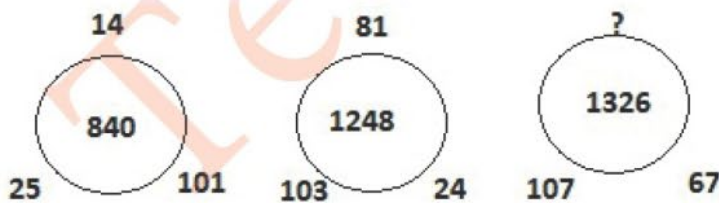
- A) 18
- B) 19
- C) 22
- D) 23

34) Which is the missing number?



- A) 21
- B) 25
- C) 27
- D) 29

35) Which is the missing number?



- A) 41
- B) 43
- C) 45
- D) 47

36) Which is the missing number?

21	360	9
20	X	19
16	60	14

- A) 28
- B) 39
- C) 91
- D) 120

37) In a certain code language, if ZIGZAG is coded as 36, then SOLUTIONS will be coded as

- A) 56
- B) 72
- C) 64
- D) 81

38) In a certain code language, if POLAND is coded as 151, then AUSTRIA will be coded as

- A) 12181
- B) 12191
- C) 12281
- D) 12291

39) In a certain code language, if MELODY is coded as 14221512232, then DOLPHIN will be coded as

- A) 23121511191813
- B) 23121511191812
- C) 23121511191713
- D) 23121511191712

40) In a certain code language, if SPANISH is coded as 49, then PERSIANS will be coded as

- A) 64
- B) 68
- C) 72
- D) 74



Section 3 - Paper I Computer Literacy

No. of Questions: 10

41) Which of following methods can be used to connect a mobile to a computer?

- i) Using WiFi
- ii) Using Bluetooth
- iii) Using data cable

- A) Only i and ii
 - B) Only ii and iii
 - C) Only i and iii
 - D) All i,ii and iii
-

42) The data flows or is transmitted between the system and peripheral devices in the following way(s)

- i) Serial
- ii) Parallel

- A) Only i
 - B) Only ii
 - C) Both i and ii
 - D) Neither i nor ii
-

43) Which statement is TRUE with respect to CMOS in Computer?

- A) It is an onboard, battery powered semiconductor chip inside computers that stores BIOS information
 - B) The information stored inside it will be lost once there is a power failure or system failure
 - C) The full form of CMOS is Complementary Model Operated Semiconductor
 - D) It is an external device that is always connected to a computer
-

44) Which of the following holds part of data or programs on temporary basis that are frequently used by the CPU?

- A) Arithmetic and Logic Unit
- B) Control Unit
- C) Cache Memory
- D) Processor

45) In Windows operating system, which of the following options is/are the use of sticky keys?

- i) Allows user to enter key combinations by pressing keys in sequence rather than simultaneously
- ii) It is a temporary workspace with all the shortcut keys available in one place

- A) Only i
- B) Only ii
- C) Both i and ii
- D) Neither i nor ii

46) A person wants to send an invitation to a extremely large group of people but he doesn't want to disclose email ids of recipients to others. Which option is the best in this regard?

- A) Mentioning email ids in the 'To' field
- B) Mentioning email ids in the 'CC' field
- C) Mentioning email ids in the 'BCC' field
- D) None of the options

47) Which of the following is example for Class A addressing?

- A) 121.255.255.255
- B) 192.255.255.0
- C) 200.12.127.15
- D) 192.168.255.255

48) An organization is having various departments. The manager of the organization wants to implement a network architecture that is capable of communicating each system with all the other systems. Which type of architecture would be a better solution to accomplish this requirement?

- A) Ring
- B) Bus
- C) Star
- D) Mesh

49) Which of the following is NOT a good idea to secure any user social network account?

- A) Use of multifactor authentication
- B) Avoid accessing social media accounts on public or other shared computers
- C) Maintain a copy of passwords in the mail
- D) Being careful about clicking on links sent to the user

50) Which of the following actions can a user perform using E-payments?

i) Electricity bill payment

ii) Provision Purchase

iii) Funds transfer

A) Only i and ii

B) Only ii and iii

C) Only i and iii

D) All i,ii and iii



Section 4 - Paper I Pedagogy Educational Management Policies and Evaluation

No. of Questions: 40

51) A teacher teaching decimals asks students to visit supermarkets and compare prices of household items. This is an example for

- A) Using alternative assessments to corroborate conclusions based on test scores
- B) Involving parents and community in learning
- C) Innovative adoption of a new topic to generate interest
- D) Making assessment more interesting than usual

52) Which of the following is a good strategic use of assessment in any form?

- A) Teachers uses to group the class based on the individual scores of children
- B) The scores are compiled only for documentation necessities without using it
- C) Teacher compares class test scores with standard tests and observations to inform teaching
- D) the scores are compiled and neatly presented to the Principal and other authorities

53) Assessment findings could be beneficial to a student's learning if the

- A) Teacher generates right amount of seriousness and tension towards the tests
- B) Assessment scores are properly interpreted by statistical analysis
- C) Assessment activities are aligned with instructional objectives
- D) Tests are conducted in strict conditions and are uniform

54) The meaning of 'Measurement' can best be explained in which of the following terms?

- A) Measurement is a process of assigning numbers to individuals or their characteristics according to specific rules.
- B) Measurement is a process of assigning ranks to numbers or other characteristics according to random rules.
- C) Measurement is a process of gathering numbers or other characteristics according to the rules of the organisation
- D) Measurement is a process of distributing numbers to individuals according to the specific rules of the organisation

55) An example for an open-ended task in the teaching of a topic like 'asexual reproduction' would be to

- A) Prepare exhaustive notes on the topic by reading on the internet
- B) Visit a nursery and talking to the Gardner and the planting process of plants
- C) Taking notes during the class on the lesson and comparing it with the textual material
- D) Thoroughly examine the topic from all different angles

56) 'Curriculum backwash' can be defined as

- A) Uncovered curriculum due to loss of classes
- B) Curriculum that is shaped to perform well in tests
- C) Indications of unmet objectives in a curriculum
- D) Teaching backlog topics that are critical for the current topics

57) Choose the most appropriate strategy for implementing evaluation

- A) Plan for the whole year ahead exhaustively that include summary sheets, descriptions and objective scores
- B) Design a plan that allows for test preparation holidays and evaluations periods for the paper correction
- C) Create test logs, diary, reflection sheets along with student journals, parental observations and record of behavioural changes
- D) Have a list of student performances of the previous years and allocate them into separate groups

58) A question poses a problem of ascertaining an order to a group of numbers mentioned without an order or logic. Such question assess the alternative aspect of

- A) Logical thinking
- B) Gift of mathematical thinking
- C) Ordering chaos
- D) Being flexible

59) In assessing student's ability to apply Pythagoras Theorem, a teacher could construct

- A) An open-book test
- B) A project of estimating the altitude of a building
- C) A test that gets the fundamental aspects of the theorem
- D) An assignment to complete an exhaustive list of questions on the topic

60) 'Collaborative Testing' by Philip Zimbardo clearly shows that

- A) Testing has to be designed by an outside agency
- B) Testing is never valid as it will always have subjectivity
- C) No test can ever be relied and so separate entrance tests are to be conducted
- D) When partners take tests they not only study the whole but also experience less anxiety

61) While assessing the ability of writing paragraphs of students, the teacher strikes off the entire writing as it is filled with many spelling mistakes and marks it '0'. What is the problem with such testing?

- A) It lacks validity in assessment
 - B) It lacks compassion towards students
 - C) It doesn't consider that spellings are not important
 - D) It discourages students from initiatives
-

62) Which of the following rightly fits moral education?

- A) Reasoning on moral issues and deciding on moral issues
 - B) Teaching good behaviour by transmitting values
 - C) Reinforce through lecture and advocating good behaviour
 - D) Viewing young ones as unsocialised citizens
-

63) After finishing their field trip before time the 10th grade students suggest to the teacher that they can as well go to a nearby restaurant and have fun. The teacher counters the students by saying that they would have to return as soon as they finish as per their word. This is an example for

- A) Handling ethical dilemmas openly and firmly
 - B) Negotiating the behaviour with students by reasoning
 - C) Strict insistence on rules and enforce behaviour
 - D) Being flexible about certain rules and discussing it
-

64) Which of the following activities will you suggest young children, to support their gross motor skill development?

- A) Using scissors
 - B) Pouring water into container
 - C) Dancing/moving to music
 - D) Finger painting
-

65) Development strongly depends on language' - is one of the principles adopted in child development processes. This implies

- A) Language is a medium for thought and hence is very important
- B) Language is a vehicle for ideas and experiences and offers leverage to students
- C) Opportunities to express freely and exploring language is critical for schools
- D) Students should be exposed to grammar and vocabulary from early age

66) Development starts with pre-natal and ends with death follows the principle of

- A) Principle of individual differences
 - B) Principle of uniformity
 - C) Principle of integration
 - D) Principle of continuity
-

67) "The environment is everything that affects the individual except his genes" said

- A) Anastaxi
 - B) Douglas
 - C) Gilbert
 - D) Holland
-

68) All of the following major asanas control obesity EXCEPT

- A) Vajrasana
 - B) Trikonasana
 - C) Tadasana
 - D) Ardha Matsyendrasana.
-

69) Which one of the following concepts does NOT belong to the Baumrind model of parenting styles?

- A) Permissive parenting
 - B) Authoritative parenting
 - C) Authoritarian parenting
 - D) Over-involved parenting
-

70) One may find a notice on school gates prohibiting sales of tobacco related products in the vicinity of a school. Display of this notice is the responsibility of

- A) Parents committee
 - B) Shop keeper
 - C) School Management
 - D) Hospitals
-

71) Educational management is all about factual application of:

- A) personal intuitions
- B) management principles
- C) choices
- D) government policies

72) Which of the following indicates Democratic climate?

- A) Teachers contribution towards the betterment of the student is ignored
- B) Teachers are forced to complete their work before the allotted time
- C) Principal decides how a lesson has to be taught
- D) Teachers perform their job with pleasure and satisfaction

73) Effective decentralisation is reflected in the structure of

- A) Educational officers reporting to the Municipal Commissioner
- B) Panchayat members participate in school management
- C) Cluster resource centre ensures supply for resources to schools
- D) A strict accountability system with clear hierarchy

74) With reference to the emphasis on digital transformation and initiation of courses like coding, the main issue with NEP, 2020 would be to manage

- A) Creating a legal framework for the syllabus on IT
- B) A network of schools that can interact and excel
- C) Developing a unique curriculum suitable to India
- D) The extent of digital divide that exists in India

75) All of the following are features of Samagra Shiksha EXCEPT

- A) Holistic approach to education
- B) Administrative reforms
- C) Increase focus on gifted children
- D) Focus on quality education

76) Which National Educational policy decided to facilitate the education for socioeconomically disadvantaged groups (SEDGs) to expand the National Institute of Open Schooling (NIOS) and State Institutions of Open Schooling (SIOS) ?

- A) National Education Policy 1968
- B) National Educational Policy 2020
- C) National Education Policy 1986
- D) National Education Policy 1992

77) During which five year plans recommendations included opening of Ashram Schools, pre- and post-metric scholarship, grants ?

- A) Second and ninth plan
 - B) First and eighth five year plan
 - C) Second and eighth plan
 - D) First and ninth plan
-

78) While teaching reptiles a teacher uses a variety of examples - snakes curled on tree, and hanging from trees, crocodiles in water and sunning on sand, variety of lizards etc. - and it is useful in

- A) Under generalisation of a concept because of too broad a variety
 - B) Being practically valuable for exams in terms of exposure to facts
 - C) Broadening and deepening of the concept with real world examples
 - D) Helping students gather information within a short span of a period
-

79) Children exposed to words like 'shop'. 'shut' etc. decode words like 'ship' by themselves. This phenomenon reflects

- A) Experiential components of Sternberg's theory
 - B) Linguistic intelligence of Howard Gardner
 - C) Auditory style of learning based on inputs
 - D) Adaptation to a new environment
-

80) In teaching 'Solar system' which method is best suited for linguistic intelligence?

- A) Read Roman and Greek myths pertaining to the planets
 - B) Talk to seniors and other teachers and tabulate information on the solar system
 - C) Sit quietly and contemplate a poem on the beauty of the solar system
 - D) Collect stones of varied sizes to create a model of the solar system
-

81) Who among the following expanded the conception of project method?

- A) Rousseau
- B) Plato
- C) Thorndike
- D) Kilpatrick

82) Due to the current COVID-19 pandemic, certain solutions for students returning to classes are being advised in many parts of the world. Identify the method which isn't feasible.

- A) Face-to-face education, including strict reduction protocols
 - B) Distance education
 - C) Hybrid education (at home and school, face-to-face and distance)
 - D) Appointing home tutor to every student
-

83) An example for innate form of learning is demonstrated by

- A) A child cries when someone unfamiliar takes the child in arms
 - B) A student solves a complex math problem after one instruction
 - C) The photographic memory of some prodigies
 - D) Customs and practices of a culture
-

84) A middle school student concludes that smaller numbers in the numerator makes smaller fractions. This is an example for

- A) Schema representing size of fraction by independent numbers
 - B) Assimilation of knowledge of numbers in a new context
 - C) A conceptual change that the child is advantageous to the child
 - D) Adaptation of the knowledge of number system in fractions
-

85) Schools today are increasingly under pressure to include more and more activities - including the more advanced coding, robotics, sports coaching, preparation for entrance tests etc. What is the implication of such a development on learning?

- A) Issues with school budgets and the complexity of academic scheduling
 - B) Increased instances of absenteeism, independence and mechanical learning
 - C) Issues with assessment, reporting and communication with parents
 - D) Increased stress, indifference and isolation due to over scheduling
-

86) While brainstorming about digestive system, the teacher accepts all answers and notes it on the board and offers corrective clarification in the end. Such an approach reflects

- A) Reflection of Malsow's needs based hierarchy
- B) Kohlberg's theory of intelligence
- C) Gardner's inter-personal skills
- D) Carl Rogers unconditional positive regard

87) If three different kinds of meat, cheese, and bread are given, a student can determine the many different sandwiches that could be cooked. This capacity relates to

- A) Thinking combinatorially in solving abstract, hypothetical problems
 - B) Operating logically with concrete material and concluding
 - C) Goal-oriented behaviour based on memory
 - D) thinking symbolically dominated by perception
-

88) An older child is capable of lifting heavier objects than what a younger child can do. This is called 'maturation'. Which of the following refers to that concept

- A) When asked 'what is 7×8 ' one immediately responds 56
 - B) Learning to be punctual because delay results in punishment
 - C) An adult transacts comfortably with different instruments in a bank
 - D) Someone adept in driving a car also drives a mini-truck
-

89) Identify the advantage of the Observation method in education from the following options.

- A) Problems of the past can be studied
 - B) One can study opinions
 - C) Sampling cannot be brought into use
 - D) Best for the study of human behavior
-

90) Identify the English philosopher who suggested the concept of tabula rasa, or the idea that the mind is essentially a blank slate at birth that knowledge is then developed through experience and learning.

- A) John Locke
- B) Bertrand Russell
- C) Roger Bacon
- D) John Dewey

Section 5 - Paper II Physics

No. of Questions: 20

91) How can a voltmeter which gives full deflection at 1 V and has a resistance $R = 50$ Ohms be converted into a milliammeter that can measure up to 120 mA?

- A) By connecting 6 Ohms in series
 - B) By connecting 10 Ohms in parallel
 - C) By connecting 44 ohms in series
 - D) By connecting 12.5 Ohms in parallel
-

92) A copper wire is stretched to make it longer by 0.5%. Find the percentage change in its resistance?

- A) 0.0%
 - B) 0.005%
 - C) 0.50%
 - D) 1.0%
-

93) Two electric bulbs A and B are connected in series and ratio of their resistances is 1:2. What is the ratio of the power dissipated in these bulbs?

- A) 4 : 1
 - B) 1 : 4
 - C) 2 : 1
 - D) 1 : 2
-

94) A square metal wire loop of side 20 cm and resistance 2 Ohm is connected to a 3 ohm resistor. The loop is moved into a uniform magnetic field of induction, $B = 2$ Wb/m² with a uniform velocity such that a steady current of 2 mA is maintained in the circuit. If the magnetic field is perpendicular to the plane of the loop, find the velocity with which the loop is introduced into the field.

- A) 1.0 cm/s
- B) 1.5 cm/s
- C) 2.0 cm/s
- D) 2.5 cm/s

95) A solid cylindrical conductor having radius R has a uniform current density. How the magnetic field intensity H varies both inside and outside the conductor as a function of its distance r from the centre of the wire?

- A) Inside: $H \propto r$; Outside: $H \propto 1/r$
- B) Inside: $H = 0$, Outside: $H \propto 1/r$
- C) Inside: $H = 0$, Outside: $H \propto 1/r^2$
- D) Inside: $H \propto r$, Outside: $H \propto 1/r^2$

96) Two similar capacitors of capacitance C charged differently with charges Q_1 and Q_2 . The amount of energy lost when these charged capacitors are connected in parallel is directly proportional to

- A) $(Q_1 - Q_2)^2/2C$
- B) $(Q_1 - Q_2)/4C$
- C) $(Q_1 - Q_2)^2/4C$
- D) $(Q_1 - Q_2)/2C$

97) An electron and a proton are each placed at rest in an electric field of 520 N/C . Calculate the speed of electron particle 48 ns after being released.

- A) $4.4 \times 10^3 \text{ m/s}$
- B) $2.4 \times 10^6 \text{ m/s}$
- C) $2.4 \times 10^3 \text{ m/s}$
- D) $4.4 \times 10^6 \text{ m/s}$

98) The year on Saturn is 29.5 times that on Earth. If the Earth is 1.50×10^8 kilometres from the Sun, how far is the Saturn from the Sun?

- A) $2.86 \times 10^6 \text{ m}$
- B) $1.43 \times 10^6 \text{ m}$
- C) $2.86 \times 10^{12} \text{ m}$
- D) $1.43 \times 10^{12} \text{ m}$

99) Kinetic energy of a satellite is proportional to which of the following, if the time period of the satellite is $T/2$?

- A) T^{-2}
- B) T^2
- C) $T^{-2/3}$
- D) $T^{-1/3}$

100) In still water, a man can swim at a speed of 4.0 km/h. How long does it take him to cross a 1.0 km wide river if the river runs at a constant 3.0 km/h and he makes his strokes normal to the river current?

- A) 0.33 hr
- B) 0.14 hr
- C) 0.25 hr
- D) 1 hr

101) A body weighs 8 grams. What will be the velocity of the body if force of 160 dynes acts on the body for 20 seconds?

- A) 4 cm/s
- B) 40 cm/s
- C) 400 cm/s
- D) 4000 cm/s

102) When a bullet of mass 6 grams moving with velocity 120 m/s penetrates a wooden block upto 5 cm, then what will be the average force imposed by the bullet on the block?

- A) 178.2 N
- B) 1728 N
- C) 2748 N
- D) 274.8 N

103) Which of the following phenomenon is responsible for soap bubble to appear coloured when white light falls on it?

- A) Interference due to division of wavefront
- B) Interference due to division of amplitude
- C) Polarization
- D) Diffraction

104) What will be the angle of minimum deviation of a prism that has refractive index $\sqrt{2}$ and has refracting angle 60° ?

- A) 30°
- B) 60°
- C) 15°
- D) 90°

105) Electro-optic shutter used in high speed camera works on the principle of

- A) Barkhausen effect
 - B) Kerr effect
 - C) Faraday effect
 - D) Doppler effect
-

106) Which of the following long and straight columns show the highest strength? Rest of the material parameters is same for the columns mentioned in the options.

- A) Column with both ends hinged.
 - B) Column with one end fixed and the other hinged.
 - C) Column with both ends fixed.
 - D) Column with one end fixed and the other free.
-

107) Ability of a material to absorb energy when deformed elastically and to return it when unloaded is called

- A) Yield strength
 - B) Resilience
 - C) Toughness
 - D) Ultimate tensile strength
-

108) Two beams A and B are made up of same material and have the same mass, length and density. Beam A has a square cross-section while beam B has a circular cross-section. Find the ratio of depression in the beams A and B under equal loading conditions.

- A) 1 : 1
 - B) 3 : π
 - C) π : 3
 - D) 1 : 3π
-

109) Which of the following organ pipes is more musical?

- A) Open organ pipe
- B) Closed organ pipe
- C) Neither open nor closed organ pipe
- D) Both open and closed organ pipes

110) Two waves of wavelength 55 cm and 55.5 cm produces 5 beats per second in a gaseous medium. Which of the following closely resembles the velocity of sound in the medium?

- A) 303 ms^{-1}
- B) 304 ms^{-1}
- C) 305 ms^{-1}
- D) 306 ms^{-1}

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Section 6 - Paper II Chemistry

No. of Questions: 20

111) An object measures a size of 6 inches. Calculate its length in 'm'?

- A) 15.24m
 - B) 1.524m
 - C) 0.1524m
 - D) 0.01524m
-

112) What is numerical value of 1 zepto meter?

- A) 10^{-15}m
 - B) 10^{-18}m
 - C) 10^{-21}m
 - D) 10^{-24}m
-

113) Identify the correct statement?

- A) Density of ice is higher than that of water.
 - B) Boiling point of phosphine is high when compared to that of ammonia.
 - C) Alcohol is a better drying agent when compared to acetone.
 - D) Boiling point of nitrobenzene is high when compared to that of nitrophenol.
-

114) Identify the molecule formed by the overlap of $3p_z$ atomic orbitals of 2 atoms?

- A) Bromine
 - B) Fluorine
 - C) Chlorine
 - D) Oxygen
-

115) Which among the following is a Lewis base?

- A) NaOH
- B) BF_3
- C) AlCl_3
- D) Methylamine

116) Calculate the hydroxyl ion concentration of a caffeine base in an aqueous solution of concentration 0.00004M. The ionization constant K_b value was found to be 9×10^{-7} at 298K.

- A) 6×10^{-6} moles/lit
- B) 2.52×10^{-2} moles/lit
- C) 36×10^{-12} moles/lit
- D) 3×10^{-8} moles/lit

117) What is the weight of 'MgO' formed when 6g of Magnesium is burnt in oxygen?

- A) 40g of MgO
- B) 24g of MgO
- C) 12g of MgO
- D) 10g of MgO

118) What is the oxidation state of Zinc in the product formed when dil. Sulphuric acid is added to zinc granules?

(Note each and every option is preceded by a '+' sign)

- A) 1
- B) 2
- C) 4
- D) 6

119) Among the following elements, which element has more electropositive character?

- A) Na
- B) S
- C) Al
- D) Rb

120) Identify the incorrect statement?

- A) Atomic size of cesium atom is greater than atomic size of Potassium.
- B) Nuclear charge on carbon atom is greater than nuclear charge on oxygen atom.
- C) Atomic size of carbon atom is greater than atomic size of oxygen.
- D) Bragg Slater radius of carbon is greater than fluorine.

121) Which ore exists as carbonate ore?

- A) Siferite
 - B) Iron Pyrite
 - C) Anglesite
 - D) Rutile
-

122) Cassiterite is an ore of

- A) Zinc
 - B) Lead
 - C) Tin
 - D) Silver
-

123) A saturated hydrocarbon is having a molecular weight of 58. What is the molecular formula of next hydrocarbon in that homologous series?

- A) C_4H_{10}
 - B) C_6H_{12}
 - C) C_5H_{12}
 - D) C_6H_{14}
-

124) Which among the following Hydrocarbons possess high boiling point?

- A) n-pentane
 - B) Isopentane
 - C) 2,2-Dimethyl propane
 - D) Isobutane
-

125) Methoxy butane and ethoxy propane are examples of the following type of isomerism;

- A) Position isomerism
- B) Functional isomerism
- C) Tautomerism
- D) Metamerism

126) In which of the following compounds, the hybridised orbitals of a compound are having less s-character?

- A) HCONH_2
- B) CH_3Cl
- C) HCN
- D) HCHO

127) Calculate boiling point of CCl_4 if its molar enthalpy of vaporization is 29.75 kJ/mol?

- A) 350K
- B) 300K
- C) 298K
- D) 325K

128) Calculate number of formula units KCl present in a unit cell if its density is $2 \times 10^3 \text{ kg/m}^3$ and its edge length is $5 \times 10^{-5} \text{ m}$? (Consider atomic weight of chlorine as 36 gm/mol and Avogadro number as $6 \times 10^{23} / \text{mol}$)

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

129) A particle is having a mass of $1 \times 10^{-24} \text{ g}$. Calculate its minimum uncertainty in velocity if uncertainty in its position is $6.625 \times 10^{-10} \text{ cm}$? (Take pi value as '3')

- A) $8.33 \times 10^5 \text{ cm/s}$
- B) $8.33 \times 10^5 \text{ m/s}$
- C) $8.33 \times 10^7 \text{ cm/s}$
- D) $8.33 \times 10^7 \text{ m/s}$

130) A particle is having a momentum of $6.625 \times 10^{-24} \text{ kg-m/s}$. Calculate its wavelength?

- A) $0.1 \times 10^{-9} \text{ m}$
- B) $0.1 \times 10^{-8} \text{ m}$
- C) $0.1 \times 10^{-10} \text{ m}$
- D) $0.1 \times 10^{-7} \text{ m}$

Section 7 - Paper II Mathematics

No. of Questions: 20

131) The radius of the sphere $x^2 + y^2 + z^2 - 6x + 8y - 10z + 25 = 0$ is

- A) 4
 - B) 2
 - C) 5
 - D) 6
-

132) If $x = 3 \cos t - 2 \cos^3 t$ and $y = 3 \sin t - 2 \sin^3 t$, then $dy/dx =$

- A) $\sin 2t$
 - B) $\cos t$
 - C) $\cot t$
 - D) $\tan t$
-

133) If $x = a(\sin^2 t - \cos t)$ and $y = a(\cos^2 t + \sin t)$, then dy/dx at $t = \pi/4$ is

- A) $(2+\sqrt{2})/(2-\sqrt{2})$
 - B) $(1-\sqrt{2})/(1+\sqrt{2})$
 - C) $(1+\sqrt{2})/(1-\sqrt{2})$
 - D) $(\sqrt{2})/(1-\sqrt{2})$
-

134) The distance of the point (1,2) from the line joining the points (-1,3) and (4,2) is

- A) $3/\sqrt{19}$
 - B) $3/\sqrt{26}$
 - C) $5/\sqrt{26}$
 - D) $3/\sqrt{29}$
-

135) If the perimeter of an isosceles right-angled triangle is 10 cm, then its area is approximately

- A) 5.69cm^2
- B) 3.54cm^2
- C) 4.29cm^2
- D) 6.35cm^2

136) How many rectangular tiles are needed for tiling a floor 20 meters long and 1.5 meters wide if the size of the rectangular tile is 30cms X 10cms?

- A) 1500
- B) 1000
- C) 1200
- D) 500

137) A farmer has two plots, one rectangular plot and one square plot. The rectangular plot is 200 meters wide, and the length of the rectangular plot is equal to the side of the square plot. Further the area of the rectangular plot is 4 times the area of the square plot. The length of the rectangular plot is

- A) 65 meters
- B) 50 meters
- C) 55 meters
- D) 60 meters

138) A rectangular plot has length and breadth in the ratio 7:3. The area of the plot is 2100 mt². The perimeter of the plot is

- A) 100 metre
- B) 150 metre
- C) 200 metre
- D) 220 metre

139) We can express $0.\overline{54}$ as rational number as

- A) 6/11
- B) 9/11
- C) 15/11
- D) 17/11

140) The letter of the word 'BALENCOR' are placed in a line at random. What is the probability that all the vowels are together?

- A) 5/28
- B) 7/28
- C) 3/28
- D) 1/28

147) If A and B are two non-empty sets having 5 elements in common, then $A \times B$ and $B \times A$ will have how many elements in common?

- A) 5
 - B) 10
 - C) 20
 - D) 25
-

148) The mean of first 12 terms of fibonacci series is

- A) 19.33
 - B) 25.7
 - C) 21.09
 - D) 28.06
-

149) If $\sin A = 3/5$, $\cos B = 9/41$, where A and B are acute angles, then $\sin (A+B) =$

- A) 187/205
 - B) 156/205
 - C) 165/205
 - D) 185/214
-

150) If $m = \tan t + \sin t$ and $n = \tan t - \sin t$ then the value of $m^2 - n^2$ is

- A) $4 \tan t \sin t$
- B) $\tan t \sin t$
- C) $3 \tan t \sin t$
- D) $2 \tan t \sin t$

141) If the equation $9x^2 + 6kx + 4 = 0$ has equal roots, then the value of k must be

- A) 0 or -2
 - B) 2 or 0
 - C) 2
 - D) 2 or -2
-

142) If α and β are roots of the equation $3x^2 - 6x + 4 = 0$, then the value of $(\alpha/\beta) + (\beta/\alpha)$ is

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

143) The domain of the function $f(x) = \sqrt{x^2 - 5x - 6}$ is

- A) $(-\infty, 1] \cup [6, \infty)$
 - B) $(-\infty, -3] \cup [2, \infty)$
 - C) $(-\infty, 3] \cup [6, \infty)$
 - D) $(-\infty, -1] \cup [6, \infty)$
-

144) If $f(x) = x^2$ and $g(x) = 2x + 1$ be two real functions, then $(f + g)(x) =$

- A) $(x+1)^2$
 - B) $x-1$
 - C) $x+1$
 - D) $(x-1)^2$
-

145) The 15th term from the end of the sequence 7, 10, 13, 130 is

- A) 88
 - B) 49
 - C) 56
 - D) 85
-

146) p , q and s are in geometric progression. x is the arithmetic mean of p and q , and y is the arithmetic mean of q and s , then $(p/x) + (s/y) =$

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

Question Paper No:

72621_5

Answer Key

1	C	31	C	61	A	91	B	121	A
2	A	32	D	62	A	92	D	122	C
3	C	33	B	63	A	93	D	123	C
4	C	34	C	64	C	94	D	124	A
5	C	35	D	65	C	95	A	125	D
6	B	36	B	66	D	96	C	126	B
7	C	37	D	67	A	97	D	127	A
8	C	38	B	68	C	98	D	128	A
9	A	39	A	69	D	99	C	129	A
10	A	40	A	70	C	100	C	130	A
11	A	41	D	71	B	101	C	131	C
12	C	42	C	72	D	102	B	132	C
13	D	43	A	73	B	103	A	133	B
14	C	44	C	74	D	104	A	134	B
15	B	45	A	75	C	105	B	135	C
16	B	46	C	76	B	106	C	136	B
17	A	47	A	77	B	107	B	137	B
18	B	48	D	78	C	108	B	138	C
19	B	49	C	79	A	109	A	139	A
20	D	50	D	80	A	110	C	140	C
21	D	51	A	81	D	111	C	141	D
22	D	52	C	82	D	112	C	142	A
23	C	53	C	83	A	113	C	143	D
24	A	54	A	84	A	114	C	144	A
25	C	55	B	85	D	115	D	145	A
26	B	56	B	86	D	116	A	146	D
27	D	57	C	87	A	117	D	147	D
28	B	58	C	88	C	118	B	148	A
29	D	59	B	89	D	119	D	149	A
30	A	60	D	90	A	120	B	150	A

