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Section 1 - Paper1-General Knowledge and Current Affairs

1) Under Sultanate period, Qazi-ul-Quzat was the in charge of which of the following departments?

- A) Military
- B) Finance
- C) Judiciary
- D) Agriculture

2) Who became the oldest golfer to win an Asian Tour title when he won the Panasonic open in 2016?

- A) Jason Day
- B) Mukesh Kumar
- C) Vijay Singh
- D) Anirban Lahiri

3) Who among the following was the son-in-law of Qutubuddin Aibak?

- A) Ibrahim Lodi
- B) Muhammad bin Tughluq
- C) Iltutmish
- D) Ghiasuddin Balban

4) Who among the following Indian cricketers has been appointed as the first brand ambassador for the tech-based cab aggregator platform Uber (India)?

- A) Rohit Sharma
- B) Mahendra Singh Dhoni
- C) Virat Kohli
- D) Hardik Pandya

5) In which of the following states is the Velankanni Church located?

- A) Karnataka
- B) Tamil Nadu
- C) Maharashtra
- D) Goa

6) ICC World Cup 2019 will be held in which of the following countries?

- A) New Zealand
- B) Australia
- C) Sri Lanka
- D) England

7) Ramakrishna Mission was founded by:

- A) Dayanand Saraswati
- B) Annie Besant
- C) Raja Ram Mohan Roy
- D) Swami Vivekananda

8) Who among the following wrote the book 'Tujuk-i-Baburi'?

- A) Aurangzeb
- B) Akbar
- C) Babur
- D) Humayun

9) Which of the following mobile manufacturing companies has its headquarters in South Korea?

- A) Micromax
- B) Motorola
- C) Vivo
- D) Samsung

10) Who among the following is the brother of Razia Sultan who was elevated to the throne by nobles of Delhi Sultanate after the death of Iltutmish?

- A) Aaram Shah
- B) Altunia
- C) Ruknuddin Firoz Shah
- D) Kabir Khan

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11) With which of the following sports is Simone Biles, the Olympics gold medalist from USA associated with?

- A) Shooting
- B) Basketball
- C) Swimming
- D) Gymnastics

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12) Appam, a type of pancake made with fermented rice batter and coconut milk is a common food in which state of India?

- A) Maharashtra
- B) Kerala
- C) Odisha
- D) West Bengal

13) Who among the following will be benefitted by the 'Atal Bimit Vyakti Kalyan Yojna' launched by Santosh Kumar Gangwar, Union Minister of State for Labour & Employment in 2018?

- A) Senior Citizen
- B) Disabled Woman
- C) Insured Persons
- D) Blind People

14) Which of the following countries has developed world's first graphene electronic paper?

- A) Israel
- B) Australia
- C) China
- D) Japan

15) What is Solibacillus kalamii, named to honour the late president of India Dr. A P J Abdul Kalam?

- A) Robotic arm developed by ISRO to re-position satellite in the space
- B) New bacteria discovered by NASA on the filters of International Space Station
- C) Antibiotics developed by Haffkine Bio-pharmaceutical Corporation Ltd, Mumbai
- D) New vaccine developed by National Institute of Virology, Pune

16) Who defeated Alexander Zverev to win his ninth Halle Open title in 2017?

- A) Novak Djokovic
- B) Roger Federer
- C) Andy Murray
- D) Rafael Nadal

17) One of the three known manuscripts of 'Ziauddin Barani's Tarikh-i-Firoz Shahi' is available in which of the following libraries?

- A) The National Library of India
- B) Rampur Raza Library, Rampur
- C) Connemara Public Library, Chennai
- D) Sarasvati Mahal Library

18) What is PARAM-ISHAN?

- A) High mega pixel camera developed at IISc, Bengaluru
- B) Super computer jointly developed by C-DAC and IIT Guwahati
- C) Ultra storage device developed by CDAC and CSIR
- D) First laser monitored electric car invented at IIT New Delhi

19) World's lightest satellite weighing only 64 gms named as 'KalamSat' was launched by which of the following space organizations?

- A) National Aeronautics Space Administration
- B) Indian Satellite Research Organization
- C) European Space Agency
- D) Russian Federal Space Agency

20) Which of the following options is the name of the 2018 congregation of littoral navies conducted biennially by Indian Navy at the Andaman and Nicobar Islands, under the aegis of the Andaman and Nicobar Command?

- A) IMDEX
- B) MILAN
- C) KRIDA
- D) JAL

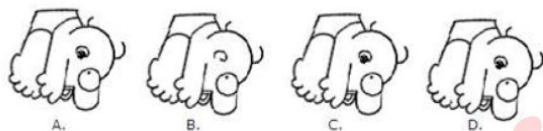
Section 2 - Paper I-Reasoning Ability

21) A man started to walk facing the West direction. After moving a certain distance he turns to his right. After moving some more distance he turns to his right again. After moving a little he turned in the end to his left. Which direction is he facing now?

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

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22) Which of the given image is similar to the problem figure?



- A) C
- B) D
- C) B
- D) A

23) G walks 20 km towards North. He turns left and walks 40 km. He again turns left and walks 20 km. Finally he moves 20 km after turning to the left. How far is he from his starting position?

- A) 30 km
- B) 20 km
- C) 50 km
- D) 60 km

24) 'P+K' means P is the sister of K. 'P*K' means P is the brother of K, 'P-K' means P is the father of K. Which of the following means A is the aunt of B?

- A) A-P+B
- B) A+P+B
- C) B-P+A
- D) A+P-B

25) In a certain code 'TEMPLE' is written as 'ETPMEL'. How would 'SUDDEN' be written in that code?

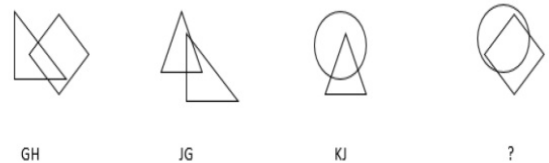
- A) UDSSNE
- B) UEDDSN
- C) USDDNE
- D) UDNESS

26) Which of the given image is similar to the problem figure?



- A) A
- B) C
- C) D
- D) B

27) Observe the figures below with their corresponding codes and find the correct code for the last figure.



- A) KH
- B) JH
- C) GJ
- D) KG

28) If South-East becomes East and North-West becomes West. South-West becomes south and all the rest of the directions are changed in the same manner, then North becomes

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

29) M is the brother of K. T is the only sister of M. R is the mother of M. J is the husband of R. How many sons does J have?

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

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30) In a fine morning Ravi and Surya were sitting in a park facing each other. Ravi's shadow was falling to his left. Which direction did Surya was facing?

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

31) Which of the given image is similar to the problem figure?



- A) A
- B) C
- C) B
- D) D

32) Read the information given below carefully and answer the question that follows.

There are three sisters A, G and S, they are married to R, P and K respectively. D is A's friend. A has two sons N and M, G has one son and one daughter, S has one son L. L has one daughter B and she is married to T.

How is K related to T?

- A) Father-in-law
- B) Father
- C) Uncle-in-law
- D) Grandfather-in-law

33) In a certain language "Houses are small" is coded as "Mig Fig Wig". "Small kitchen" is coded as "Mig Lig". "They are tall" is coded as "Wig Chig Mug". What is the code word for "Houses"?

- A) Fig
- B) Mug
- C) Lig
- D) Chig

34) The question consists of a series of figures followed by four alternative figures. Select a proper figure from the alternatives that will replace the question mark to continue the same series as established by some pattern in figures in the question.

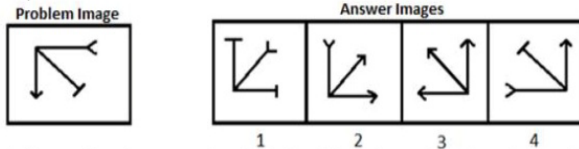


- A)
- B)
- C)
- D)

35) The number of terms in the series 201, 208, 215,, 369 is

- A) 23
- B) 24
- C) 25
- D) 26

36)



A figure is given on the left, inside a box. On the right of it, four images are given. Which of the four images on the right can be formed by rotating the Problem Image by 180 degrees in the clockwise direction?

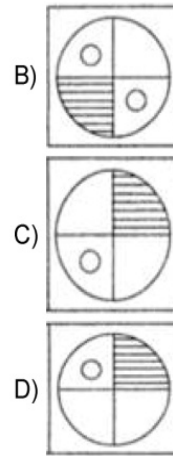
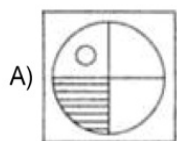
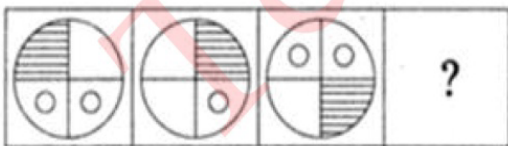
- A) 2
- B) 3
- C) 4
- D) 1

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37) In certain code language, BUTTER is coded as CWWXJX and BREAD is coded as CTHEI. How is COFFEE coded in that language?

- A) GGDPFF
- B) GDPGFF
- C) DQIJJK
- D) FFDPGG

38) Which image replaces the question mark in the problem figure?



39) Find the missing term in the series given below:

62, 123, 214, 341, ____, 727.

- A) 510
- B) 505
- C) 512
- D) 501

40) P is the mother of Q who is the husband of R. S who is the sister of Q, is the daughter of T. Which one of the following relations is NOT true?

- A) T is the father of Q
- B) R is the daughter of T
- C) S is the daughter of P
- D) P is the wife of T

Section 3 - Paperl-Computer Literacy

41) Remote control to operate television is an example of which of the following transmission modes?

- A) Virtual duplex
- B) Simplex
- C) Full duplex
- D) Half duplex

42) Modem is the combination of which of the following devices?

- A) Transmitter and Antenna
- B) Transmitter and Receiver
- C) Receiver and Antenna
- D) Modulator and Demodulator

43) Which of the following is used to convert digital signal into analog and vice versa?

- A) Modem
- B) Antenna
- C) Transmitter
- D) Receiver

44) In MS Word 2016, which of the following group items will NOT come under page layout tabs?

- A) Page Setup
- B) Paragraph
- C) Arrange
- D) Charts

45) Which of the following components is a must to connect with wired Ethernet LANs?

- A) Router
- B) NIC
- C) Gateway
- D) Wi-Fi Card

46) Which of the following is/are TRUE about Coaxial cabling?

- i. Coaxial cabling is difficult to install, it is highly resistant to signal interference.
- ii. Coaxial cabling can support greater cable lengths between network devices than twisted pair cable.
- iii. The two types of coaxial cabling are thick coaxial and thin coaxial.

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

47) Encryption means

- A) Change of language settings in the system
- B) Converting data from readable to unreadable for unauthorized users
- C) Redirection of data from the hands of hackers
- D) Deletion of data by maintaining back up

48) What is the full form of NIC?

- A) Network International Circuit
- B) Network Integrated Circuit
- C) National Interface Circuit
- D) Network Interface Card

49) A tool which is used to trace the security breach in a network is

- A) Sniffer
- B) Vulnerability Scanner
- C) Anti virus
- D) Hacker

50) Which of the following is NOT a preventive measure to avoid worm attack?

- A) Do not open any attachment of an email from an unknown sender
- B) Avoid clicking unwanted links
- C) Take a regular backup of all the files
- D) Never install any antivirus in your system

Section 4 - Paper I- Pedagogy and Educational Management and Policy

51) The first condition for increasing emotional integration in the country is the development of

- A) One's own cultural understanding
- B) A regional Education Policy
- C) An All India language
- D) Solidarity with one's community

52) Which of the following schemes was initiated by the Government to enhance enrolment, retention and attendance in school?

- A) Kasturba Gandhi Balika Vidyalaya
- B) Indira Gandhi Matritva Sahyog Yojana
- C) Mid-day meal
- D) Integrated Child Development Services

53) Majority of the philosophers have accepted that the general aim of education is

- A) Procurement of money
- B) Successful communication
- C) All-round development
- D) Attaining good values

54) The concept of life space and conflict is associated with

- A) Rogers
- B) Pavlov
- C) Maslow
- D) Kurt Lewin

55) Henderson, Biddle, Herman and others are associated with

- A) English Models of teaching
- B) Science models of Teaching
- C) Mathematical Models of teaching
- D) Language Teaching

56) Effectiveness of teaching is more by using

- A) Projects or excursions
- B) Working models
- C) Words
- D) Coloured slides

57) Frustration and conflict are two forms of

- A) maladjustment
- B) resilience
- C) acceptance
- D) Weakness

58) In which of the following areas is AICTE working?

- A) Vocational Training
- B) Teachers Education
- C) Primary Education
- D) Technical Education

59) Setting goals and deciding strategies of teaching occurs in which phase of teaching?

- A) Interactive phase
- B) Post active phase
- C) Exit Phase
- D) Pre active phase

60) The first school for the hearing impaired was established in India in

- A) Delhi
- B) Nagpur
- C) Chandigarh
- D) Bombay

61) According to Bruner which type of learning plays a crucial role in enhancing creativity of an individual?

- A) Child learning
- B) Active learning
- C) Service learning
- D) Discovery learning

62) The concept of anima and animus was given by

- A) Carl Jung
- B) Rogers
- C) Maslow
- D) Spencer

63) Which of the following DOES'NT belong to the group of merits of Community as an Agency of education?

- A) Community education is meaningful
- B) It emphasizes the principle of utility
- C) It imparts theoretical experiences of objects
- D) It lays emphasis on activity

64) Who gave the idea of archetypes which exist in collective consciousness and influence behaviour?

- A) Sigmund Freud
- B) Alfred Adler
- C) Carl Jung
- D) Erik Erikson

65) In which of the following areas 'National Literacy Mission Authority' works?

- A) Technical Education
- B) Elementary Education
- C) Adult Education and Skill Development
- D) Vocational Education

66) What would be the ideal suggestion to a teacher when the back-benchers are always talking in the classroom ?

- A) Allow them to do what they want.
- B) Make them sit on the front benches
- C) Give punishment to them
- D) Ask them to leave the class

67) Which of the following is an associative learning?

- A) Operant conditioning theory
- B) Multiple intelligence theory
- C) Social learning theory
- D) Montessori method

68) Determinating factors of individual differences in human beings are related to

- A) Differences in heredity
- B) Differences in environment
- C) Differences in assimilation and accommodation
- D) Interaction between heredity and environment

69) Which of the following is advised by the teacher in whose class there are a few gifted students?

- A) The students are treated equally along with the class
- B) The students will be asked to be in the higher classes
- C) Whenever the students want, they will be taught
- D) Special classes with enriched programmed can be conducted

70) Which of the following can be considered as a formal agency of education?

- A) News paper
- B) Cinema
- C) Radio
- D) Museum

71) In which of the following methods, to promote active learning, a teacher asks questions to students during the course of teaching?

- A) Playway method
- B) Scientific method
- C) Socratic method
- D) Lecture method

72) To which of the following agencies do the press, the radio, the television, the public library and the cinema belong?

- A) Active agencies of education
- B) Formal Agencies of Education
- C) Passive agencies of education
- D) Informal agencies of education

73) Which of the following is one of the objectives of STI Policy 2013?

- A) Free and compulsory education between the age group of 6 to 14 years
- B) To provide funds for basic education
- C) To promote Business Schools
- D) To attract talented and bright minds towards careers in science, research and innovation

74) Which of the following committees was established to review In-service Training of the IAS officers (September 2003)?

- A) Damodaran Committee
- B) Prof. N R Madhava Menon Committee
- C) Sarkar Committee
- D) Yugandhar Committee

75) The rise of Montessori-based education has led to the adoption of

- A) Problem solving method
- B) Hands-on instruction method
- C) Teacher centred method
- D) Collaboration method

76) Name the dimension of equality and social justice for which the school system will have to strive for.

- A) Economic disparity
- B) Moral difference
- C) Psychological disparity
- D) Social disturbance

77) Which of the following qualities would appropriately define 'learning'?

- A) Creativity, conviction and endurance
- B) Intuition, intelligence and Imagination
- C) Understanding, imagination and skills
- D) Change of behaviour, practice and experience

78) Under whose chairmanship did the National Advisory Committee in 1993 advise on improving the quality of learning while reducing the burden on school children?

- A) Prof. N R Madhava Menon
- B) Ramamurti
- C) Daulat Singh Kothari
- D) Prof. Yashpal

79) Mudaliar Commission Report is related to which of the following areas?

- A) Primary Education
- B) Higher Education
- C) Research and Development
- D) Secondary Education

80) The Persons with Disabilities (Equal opportunities, Protection Rights and full Participation) Act came into effect in

- A) 1995
- B) 2005
- C) 1990
- D) 2000

81) Which of the following reasons prompted the formation of National Literacy Mission?

- A) To provide support and technical assistance to universalization of elementary education
- B) To impart a new sense of urgency and seriousness to the adult education
- C) To fulfil the needs of the students of distance education
- D) To serve the educational needs of the uneducated women in the rural areas

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82) Which of the following is a source of physical discomfort which acts as a major deterrent in the secondary education, especially for girls?

- A) Corporal Punishment
 - B) Poor communication skills
 - C) Long school hours
 - D) Absence of toilets and sanitary requirements
-

83) The Concept attainment model was given by

- A) Maslow
 - B) Skinner
 - C) Bruner
 - D) Piaget
-

84) Team teaching is also called as

- A) Micro teaching
 - B) Macro teaching
 - C) Parallel teaching
 - D) Co-teaching
-

85) Who spoke about the inheritance of acquired traits from parents to offsprings?

- A) Lamarck
 - B) Galton
 - C) Skinner
 - D) Pavlov
-

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86) Compensation and sublimation are two forms of

- A) Defence mechanism
 - B) Conflict mechanism
 - C) Personality enhancement
 - D) Intelligence tests
-

87) What does UGC stand for?

- A) University Governance Commission
- B) Universal Grants Commission
- C) University Grants Commission
- D) University Governing Council

88) Which among the following is one of the qualities of a good teacher?

- A) Being hysterical
 - B) Making preconceived assumptions
 - C) Being obdurate
 - D) Being competent
-

89) Which of the following resolutions were passed at Wardha Education conference 1937?

- A) Increase funds to all rural schools
 - B) English medium in selected schools
 - C) Free and Compulsory Education
 - D) Develop only social skills
-

90) The Classical Humanistic model of teaching was given by

- A) Broudy
- B) Gandhi
- C) Dewey
- D) Skinner

Section 5 - PaperII-Physics

91) Two ends of a rod are kept at 27°C and 37°C . When 1000 cal of heat flows in this rod, the change in entropy is

- A) 20 cal/K
- B) 10 cal/K
- C) 0 cal/K
- D) 100 cal/K

92) The amplitude of vibrations remain constant in case of

- A) Free vibrations
- B) Damped vibrations
- C) Forced vibrations
- D) Critically damped vibrations

93) What is velocity of object at $t = 2.0$ s when the position of an object moving along x-axis is given by $x = a + bt^2$, where $a = 8$ m and $b = 2$ ms^{-2} ?

- A) 32 m/s
- B) 0 m/s
- C) 4 m/s
- D) 8 m/s

94) Find the K.E. of hydrogen per g-mol at 0°C . (Symbols/notations assume their usual meaning)

- A) 5.1×10^{10} erg
- B) 1.7×10^8 erg
- C) 3.4×10^{10} erg
- D) 3.4×10^8 erg

95) For an ideal gas, potential energy of the molecules is equal to

- A) total energy of an ideal gas
- B) 0
- C) their K.E.
- D) internal energy

96) In a spherical capacitor, the inner diameter of the sphere is 0.6 m and outer diameter is 0.8 m. The space between them is filled with material or liquid with dielectric constant of 25. The capacitance of capacitor is

- A) 6.22×10^{-9} F
- B) 6.11×10^{-9} F
- C) 6.66×10^{-9} F
- D) 3.33×10^{-9} F

97) Which of the following is one of Kepler's laws of planetary motion?

- A) Inner planets orbit in a different direction than outer ones
- B) Planets move on elliptical orbits with the sun at one focus
- C) An object in motion remains in motion
- D) Gravitational force between two objects decreases as the distance squared

98) An object in uniform circular motion has a/an

- A) acceleration vector towards the centre of the circle only
- B) velocity tangent to the circle only
- C) net force towards the centre of the circle only
- D) net force, acceleration vector and velocity tangent towards the centre of circle

99) If a vector gets multiplied by a negative number then its direction

- A) gets reversed and magnitude remains the same
- B) remains same and magnitude reduces
- C) remains same and magnitude remains the same
- D) remains same and magnitude increases

100) What is the linear momentum of 25 GeV proton assuming that rest mass energy of the proton is 1 GeV?

- A) 0.442×10^{-8} Newton Sec
- B) 2.667×10^{-8} Newton Sec
- C) 13.3×10^{-18} Newton Sec
- D) 25.98 Newton Sec

101) The number of degrees of freedom associated with 1 g of helium at S.T.P. is
(Atomic weight of helium = 4 g)

- A) 6.023×10^{23}
- B) 0
- C) 4.5×10^{23}
- D) 1.505×10^{23}

102) Light year is a unit of

- A) time
- B) intensity of light
- C) mass
- D) distance

103) Which of the following is correct for an ideal gas that undergoes isothermal process from initial state I to final state F?

(Symbols/notations assume their usual meaning)

- A) $dU > 0$
- B) $dQ = 0$
- C) $dQ = dU$
- D) $dQ = dW$

104) What is the surface tension in the soap film if a soap bubble 40 mm in diameter contains a pressure (in excess of atmospheric) of 2 bar?

- A) 4000 N/m
- B) 2×10^{-4} N/m
- C) 1000 N/m
- D) 10 N/m

105) Two containers A and B have identical gases at same pressure, volume and temperature. The gas in container A is compressed to half of its original volume isothermally while the gas in container B is compressed to half of its original value adiabatically. The ratio of final pressure of gas B to that of gas in A is (Symbols/notations assume their usual meaning)

- A) $(1/\gamma)^2$
- B) $2^{\gamma-1}$
- C) 2
- D) $(1/2)^{\gamma-1}$

106) The temperature required to have 25% of H atoms in the first excited state and 75% in the ground state considering $k_B = 8.6 \times 10^{-5}$ eV/K, $E_2 - E_1 = 10.2$ eV and $\log_e(3) = 1.0986$ is (Symbols/notations assume their usual meaning)

- A) ≈ 10 K
- B) $\approx 10^6$ K
- C) $\approx 10^{10}$ K
- D) $\approx 10^5$ K

107) A sphere of radius 10 cm, has a point charge $q = 7.6$ μC located at its centre. The electric flux through it is

- A) 8.59×10^5 Nm^2/C
- B) 5.89×10^6 Nm^2/C
- C) 9.59×10^5 Nm^2/C
- D) 7.89×10^6 Nm^2/C

108) Find the heat transferred to the engine by the reservoirs, if carnot cycle operates between $T_1 = 500$ K and $T_2 = 300$ K producing 1 kJ of mechanical work per cycle

- A) 1500 J
- B) 0
- C) 2500 J
- D) 2000 J

109) The rms speed for the molecules of velocities v , $2v$, $3v$, $4v$ & $5v$ are

- A) $v(11)^{1/2}$
- B) v
- C) $3v$
- D) $1.73v$

110) The vibration of strings fixed at its both ends has 3 loops. The number of Antinodes A and number of Nodes N respectively are

- A) $A = 3$ and $N = 4$
- B) $A = 3$ and $N = 2$
- C) $A = 3$ and $N = 3$
- D) $A = 2$ and $N = 3$

Section 6 - PaperII-Chemistry

111) "No two electrons in an atom can have identical set of four quantum numbers" is a statement of:

- A) Heisenberg's uncertainty principle
- B) Pauli's exclusion principle
- C) Aufbau principle
- D) Hund's rule of maximum multiplicity

112) Which one of the following is the CORRECT statement according to Werner's Theory?

- A) Both Primary and Secondary valencies cannot be ionised
- B) Primary valency can be ionised
- C) Secondary valency can be ionised
- D) Both Primary and Secondary valencies can be ionised

113) The colour restoration of paintings by H_2O_2 is the process of

- A) reduction of colours
- B) oxidation of lead to lead dioxide
- C) bleaching of colours
- D) oxidation of lead sulphide into lead sulphate

114) Which of the following pair represents INCORRECT first ionization potential?

- A) $Li > Be$
- B) $Mg > Ca$
- C) $Li > Na$
- D) $Mg > Na$

115) According to HSAB theory a hard acid

- A) shows a preference for soft bases
- B) shows a preference for donor atoms of low electronegative
- C) is not very polarizable
- D) has a low charge density

116) In which of the following reactions hydrazine acts as a reducing agent?

- A) Clemmensen reduction
- B) Birch reduction
- C) Wolff-Kishner reduction
- D) Meerwein ponndorf verley reduction

117) The bleaching action of ozone is because of its

- A) ionisation property
- B) reduction property
- C) oxidation property
- D) polarity property

118) The CORRECT order of electron affinity of halogens is

- A) $F > Cl > Br > I$
- B) $F < Cl < Br > I$
- C) $F < Cl < Br < I$
- D) $F < Cl > Br > I$

119) On moving from left to right in a period the atomic size

- A) decreases due to increase in effective nuclear charge
- B) decreases due to decrease in effective nuclear charge
- C) increases due to increase in effective nuclear charge
- D) increases due to decrease in effective nuclear charge

120) Read the following statements and choose the CORRECT option.

(i) The full form of VSEPR Theory which is used for the determination of the shape of molecules, anions and cations is "valence-shell electron-pair refractive theory".

(ii) VSEPR theory clearly explains about the transition metal compounds and their shapes.

- A) (i) is TRUE and (ii) is TRUE
- B) (i) is FALSE and (ii) is FALSE
- C) (i) is TRUE and (ii) is FALSE
- D) (i) is FALSE and (ii) is TRUE

121) Allyl lithium on reaction with ethyl alcohol produces

- A) propene
- B) methanol
- C) propane
- D) ethanol

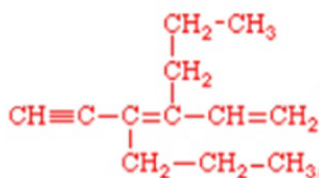
122) Which one of the following has intramolecular hydrogen bonding?

- A) Salicylaldehyde
- B) m-nitrophenol
- C) Benzophenone
- D) Hydrochloric acid

123) Which one of the following statements is INCORRECT for H_2O_2 ?

- A) It can reduce ozone to oxygen
- B) It is diamagnetic in nature
- C) It is most powerful oxidant in acidic medium than in alkali medium
- D) It can be prepared by the hydrolysis of $\text{H}_2\text{S}_2\text{O}_8$

124) Select the CORRECT, IUPAC nomenclature for the compound given below.



- A) 3, 4-tripropyl-1, 3-pentadien-5-yne
- B) 5, 5-dimethyl-3-heptanone
- C) 2,6-dimethyl-3-heptanone
- D) 3, 4-dipropyl-1, 3-hexadien-5-yne

125) What is the hybridisation of Ni in the complex ion $[\text{NiX}_4]^{2-}$ if the magnetic moment is zero and X is monodentate anionic ligand?

- A) sp^2
- B) d^2sp
- C) sp^3
- D) dsp^2

126) Hydroxylamine on reaction with cyclohexanone produces A. A on treatment with H_2SO_4 gives B. What is B and the name of the reaction for the conversion of A to B respectively?

- A) Caprolactam and Fries rearrangement
- B) Caprolactam and Beckmann rearrangement
- C) Cyclohexanone oxime and Beckmann rearrangement
- D) Cyclohexanone oxime and Fries rearrangement

127) The 1st, 2nd, 3rd and 4th ionization potential values of the element X are 7.64624, 15.03528, 80.1437 and 109.2655 respectively. X belongs to

- A) Group IIA
- B) Group IA
- C) Group IVA
- D) Group IIIA

128) The decreasing order of acid strengths of various phenols is

- A) p-nitrophenol > phenol > p-cresol
- B) phenol > p-nitrophenol > p-cresol
- C) phenol > p-cresol > p-nitrophenol
- D) p-cresol > p-nitrophenol > phenol

129) The conversion of phenol to salicylic acid in presence of NaOH and CO_2 is

- A) Cannizzaro reaction
- B) Reimer-Tiemann reaction
- C) Etard reaction
- D) Kolbe-Schmitt reaction

130) The CORRECT increasing order of lewis acidity of boron trihalides is

- A) $\text{BCl}_3 < \text{BBr}_3 < \text{BF}_3$
- B) $\text{BBr}_3 < \text{BCl}_3 < \text{BF}_3$
- C) $\text{BF}_3 < \text{BCl}_3 < \text{BBr}_3$
- D) $\text{BCl}_3 < \text{BF}_3 < \text{BBr}_3$

Section 7 - PaperII-Mathematics

131) The equation of the tangent to the curve $(x/a)^n + (y/b)^n = 2$, ($a \neq 0$, $b \neq 0$), at the point (a, b) is

- A) $x/a - y/b = 1$
- B) $x + y = a + b$
- C) $x/a + y/b = 2$
- D) $x/a - y/b = 2$

132) What will be the argument of the complex number $z = (i - 1)/(e^{i\pi/3})$?

- A) $\pi/4$
- B) $5\pi/12$
- C) $\pi/3$
- D) $3\pi/8$

133) If 2 is the root of the equation $x^3 - 6x^2 + 3x + 10 = 0$, then the other roots are

- A) 3, 6
- B) -1, 5
- C) -2, 5
- D) 1/2, 3

134) If $f: \mathbb{R} \rightarrow \mathbb{R}$, $g: \mathbb{R} \rightarrow \mathbb{R}$ are defined by $f(x) = 4x - 1$ and $g(x) = x^2 + 2$, then $f \circ g(x) =$

- A) $16x - 5$
- B) 27
- C) $a^2 + 2$
- D) $16x^2 - 8x + 3$

135) If $\alpha_1, \alpha_2, \dots, \alpha_n$ are the roots of an equation $f(x) = 0$, then $-\alpha_1, -\alpha_2, \dots, -\alpha_n$ are the roots of

- A) $-f(x) = 0$
- B) $f(-x) = 0$
- C) $f(-1/x) = 0$
- D) $f(1/x) = 0$

136) If $y = \log(\sin(\log x))$, then $dy/dx =$

- A) $(1/x) \cos(\log x)$
- B) $(1/x) \cot(\log x)$
- C) $\log(\cot x)$
- D) $\log(\sin x)$

137) A set S has 3 elements. The number of elements in power set of S is

- A) 64
- B) 8
- C) 24
- D) 256

138) The diagonal elements of a Skew-Hermitian matrix are

- A) real numbers or zero
- B) imaginary numbers or zero
- C) real numbers
- D) zero only

139) The product of the values of $(\cos \pi/6 + i \sin \pi/6)^{3/2}$ is

- A) i
- B) 1
- C) $-i$
- D) -1

140) The mean and variance of a random variable X having a binomial distribution are 4 and 2 respectively. What is the value of $P(X = 1)$?

- A) 1/16
- B) 1/8
- C) 1/32
- D) 1/4

141) From the focus of the parabola $y^2 = 32x$, a line of slope 1 is drawn. The equation of the line is

- A) $y = x-4$
- B) $y = x-8$
- C) $y = x$
- D) $y = x+8$

142) The distance between the centers of two circles of radii r_1 and r_2 is d . They will touch each other internally if

- A) $d = r_1 / r_2$
- B) $d = r_1 r_2$
- C) $d = r_1 + r_2$
- D) $d = r_1 - r_2$

143) The probability that A speaks the truth is $3/5$ and probability that B speaks the truth is $3/4$. What is the probability that they contradict each other when they are asked to speak a fact?

- A) $4/5$
- B) $7/20$
- C) $3/20$
- D) $9/20$

144) If A and B are countable sets, then $A \times B$ is

- A) Uncountable
- B) Infinite
- C) Finite
- D) Countable

145) Let $x = \cos t$ and $y = \sin pt$, where p is a constant, then $(1 - x^2) y^{(n+2)} - (2n+1) xy^{(n+1)} =$

- A) 0
- B) $(n^2 - p^2) y_n$
- C) $n(n+p) y_n$
- D) 1

146) If $u = \log v$ and $v(x, y)$ is a homogenous function of degree n , then $xu_x + yu_y =$

- A) $n(x+y)$
- B) n
- C) n^2
- D) xy

147) The sum value of the series $\sin p + x \sin (p+q) + [(x^2)/2!] \sin (p+2q) + \dots$ is

- A) $e^{(x \cos q)} [\sin (p + x \sin q)]$
- B) $e^{(x \cos q)}$
- C) 0
- D) $e^{(x \cos q)} [\cos (p + x \sin q)]$

148) If p, q and r are the roots of the equation $x^3 - 9x^2 + 26x - 24 = 0$, then the value of sum of squares of p, q and r is

- A) 23
- B) 29
- C) 37
- D) 55

149) Let $f(x)$ be a polynomial of degree $n > 0$ and $a \in \mathbb{C}$, then $(x - a)$ is a factor of $f(x)$ if there exists a polynomial $q(x)$ such that $f(x) =$

- A) $(x-a)q(x)$
- B) $aq(x)$
- C) $f(a)q(x)$
- D) $xq(x)$

150) What is the surface area of the ice cream cone whose lower portion is the right circular cone with radius as 5 cm and height 12 cm and the top of the cone is covered by hemispherical ice cream of radius 5 cm?

- A) $135\pi \text{ cm}^2$
- B) $115\pi \text{ cm}^2$
- C) $145\pi \text{ cm}^2$
- D) $125\pi \text{ cm}^2$

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Answer Key

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

