MATHEMATICS

Q. 81. For any complex number a, it is always true that |a| is equal to

A) |ā|　　　　B) |-a|　　　　C) |-ā|　　　　D) all are correct

Q. 82. If $A \subseteq B$ and $B \subseteq A$ then which is true

A) A = B　　　　B) A ≠ B　　　　C) A ∩ B = ∅　　　　D) A ∪ B = ∅

Q. 83. A rectangular array of numbers enclosed by a pair of brackets is called a

A) Matrix　　　　B) Row　　　　C) Column　　　　D) determinant

Q. 84. The equation $ax^2 + bx + c = 0$ will be quadratic if

A) a = 0, b ≠ 0　　　　B) a ≠ 0　　　　C) a = b = 0　　　　D) b = any real number

Q. 85. If an equation is true for all values of the variable, then it is

A) a conditional equation　　B) an identity　　C) proper rational fraction　　D) All are correct

Q. 86. The arithmetic mean between $\sqrt{2}$ and $3\sqrt{2}$ is

A) $4\sqrt{2}$　　　　B) $\frac{4}{\sqrt{2}}$　　　　C) $\sqrt{2}$　　　　D) none of all

Q. 87. 5 persons can be seated at a round table in ways

A) 120　　　　B) 24　　　　C) 720　　　　D) 12

Q. 88. 16°30′ is equal to

A) 16.5°　　　　B) $\frac{32°}{2}$　　　　C) 16.05°　　　　D) 16.2°

Q. 89. The statement $4^n > 3^n + 4$ is true when

A) n = 0　　　　B) n = 1　　　　C) n ≥ 2　　　　D) n is any positive integer

Q. 90. $\cos(\frac{\pi}{2} - \beta)$ is equal to

A) Cos β　　　　B) – Cos β　　　　C) sin β　　　　D) – sin β

Q. 91. The graph of trigonometric functions have

A) Breaks segments　　B) Sharp corners　　C) straight lines　　D) Smooth curves

Q. 92. In any triangle ABC, $\frac{b^2 + c^2 - a^2}{2bc} =$

A) Cos α　　　　B) Sin α　　　　C) Cos β　　　　D) Cos γ

Q. 93. If y = sin x, then Domain is

A) $\frac{-\pi}{2} \leq x \leq \frac{\pi}{2}$　　B) $0 \leq x \leq \pi$　　C) $[0, \pi], x \neq \frac{\pi}{2}$　　D) $\left[\frac{-\pi}{2}, \frac{\pi}{2}\right], x \neq 0$

Q. 94. Solution of $\sin x = \frac{1}{2}$ in $[0, \pi]$ is :

A) $\frac{\pi}{3}$　　　　B) $\frac{\pi}{4}$　　　　C) $\frac{\pi}{6}, \frac{5\pi}{6}$　　　　D) $\frac{-\pi}{6}$

Q. 95. $\tan^{-1}(\sqrt{3}) =$

A) $\frac{\pi}{6}$　　　　B) $\frac{-\pi}{6}$　　　　C) $\frac{-\pi}{3}$　　　　D) $\frac{\pi}{3}$

Q. 96. In any triangle ABC, with usual notations $r : R : r_1$

A) 1 : 2 : 3　　B) 3 : 2 : 1　　C) 1 : 3 : 2　　D) 1 : 1 : 1

Q. 97. $\frac{1 - \cos\alpha}{\sin\alpha} =$

A) $\tan\frac{\alpha}{2}$　　B) $\cos\frac{\alpha}{2}$　　C) $\sin\frac{\alpha}{2}$　　D) $\sec\frac{\alpha}{2}$

Q. 98. $\sec\theta \, \csc\theta \, \sin\theta \cos\theta =$

A) 1　　　　B) $\sec^2\theta$　　　　C) $\tan^2\theta$　　　　D) $1 - 2\tan^2\theta$

Q. 99. Three dice are rolled simultaneously, then n(S) is equal to

A) 36　　　　B) 18　　　　C) 216　　　　D) 6

Q. 100. If α and β are the roots of $3x^2 - 2x + 4 = 0$, then value of $\alpha + \beta$

A) $\frac{2}{3}$　　　　B) $\frac{-2}{3}$　　　　C) $\frac{4}{3}$　　　　D) $\frac{-4}{3}$

Q. 55. When 1.0 mole of a certain compound is formed from its elements, 25 kJ of heat energy is released. If 2.0 moles of the compound is decomposed into the elements, what heat energy change takes place.
A) 25 kJ of heat energy is absorbed
B) 25 kJ of heat energy is released
C) 50 kJ of heat energy is absorbed
D) 50 kJ of heat energy is released

Q. 56. How many molecules are there in 3.00 moles of carbon dioxide
A) 2.00×10^{25} molecules
B) 5.55×10^{29} molecules
C) 1.81×10^{24} molecules
D) 8.76×10^{26} molecules

Q. 57. Which one of the following is not the name of an element
A) Neptunium
(B) Einsteinium
(C) Californium
(D) Xttrium

Q. 58. Success of the MO theory is exemplified by its correct prediction that
A) Diatomic oxygen molecule (O_2) is paramagnetic
B) Nitrogen is very reactive
C) All molecules having an even number of electrons will show diamagnetic behavior
D) Polyatomic molecules having more electrons than protons would be negatively charged

Q. 59. Which of the following orbital designations is incorrect?
A) 5s
B) 4p
C) 3d
D) 2f

Q. 60. The electronic configuration of the element whose atomic number is 26 is
A) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^0\ 3d^8$
B) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^7\ 4s^2$
C) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2\ 3d^6$
D) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2\ 3d^4\ 4p^2$

Q. 76. In order to increase the efficiency of a heat engine is obtained by :

A) increasing the temperature of the hot and cold simultaneously, keeping others factors constant.

B) decreasing the temperature of the sink and increasing the temperature of the source, keeping others factors constant.

C) decreasing the temperature simultaneously.

D) none of all.

Q. 77. The value of acceleration due to gravity at the centre of the earth is:

A) zero   B) 9.80 m/s^2 C) – 9.80 m/s^2 D) 4.9 m/s^2

Q. 78. To replace a bright fringe by the next bright fringe in a Michelson interferometer, the movable mirror is moved through a distance equal to :

A) λ B) 2 λ C) $\lambda / 2$ D) $\lambda / 4$

Q. 79. The core of transformer is laminated to reduce the loss of energy due to :

A) flux leakage   B) hysteresis loss   C) copper loss   D) Eddy current

Q. 80. A frame of reference is called inertial if it is :

A) rotating   B) accelerating   C) vibrating   D) moving with a uniform velocity

PHYSICS

Q. 61. If a body is moving in a circular path and it has both centripetal and tangential acceleration, then its speed :
- A) remains constant
- B) continuously decreasing
- C) continuously increasing
- D) either increasing or decreasing

Q. 62. Source An electric motor can lift a weight of 2000 N through a height of 10 m in 20 s. What is the power of the motor :
- A) 10 watts
- B) 1000 watts
- C) 2000 watts
- D) 40,000 watts

Q. 63. Two bodies are launched with different angles from a same point and they had same range. The angles would be :
- A) 45 ° and 30 °
- B) 30 ° and 70 °
- C) 70 ° and 20°
- D) 20 ° and 60°

Q. 64. The track formed in Wilson cloud chamber due to beta particles is :
- A) a thin and broken line
- B) a thick and continuous line
- C) scattered dots
- D) a thick and broken line

Q. 65. The speed of sound in air does not depend upon :
- A) density
- B) humidity
- C) temperature
- D) pressure

Q. 66. If a body of mass 'm' is suspended by a string and the string is not in motion, the magnitude of tension in the string is :
- A) ma
- B) mg
- C) m
- D) zero

Q. 67. The speed of sound at the temperature of 30 °C is approximately equal to :
- A) 332 ms^{-1}
- B) 335 ms^{-1}
- C) 340 ms^{-1}
- D) 350 ms^{-1}

Q. 68. The fringe spacing in a double slit experiment can be increased by decreasing:
- A) wavelength of light
- B) width of slit
- C) slit separation
- D) distance between the slits and the screen

Q. 69. According to the kinetic theory of gases the absolute temperature of a perfect gas is :
- A) directly proportional to the average translational kinetic energy of the molecules.
- B) equal to the kinetic energy of the molecules.
- C) inversely proportional to the kinetic energy of the molecules.
- D) independent of the kinetic energy of the molecules.

Q. 70. Two equal charges each of one coulomb are held 1 m apart in free space exert a force of magnitude:
- A) 1.0 N
- B) 8.85×10^{-12} N
- C) 9.0×10^9 N
- D) 6.67×10^{-11} N

Q. 71. If an Astronomical telescope has an objective of focal length 90 cm and the focal length of its eye-piece is 10 cm, the length of the telescope will be :
- A) 9cm
- B) 100 cm
- C) 80 cm
- D) 1/9 cm

Q. 72. The atomic number of a radioactive element is increased by the emission of:
- A) α-particle
- B) negative β-particle
- C) positive β-particle
- D) γ - rays

Q. 73. A body of mass 3kg lies on the surface of the table 2m high. It is moved along the table surface by 4m. The change in potential energy will be :
- A) 9.8 J
- B) 19.6 J
- C) 329.4 J
- D) Zero

Q. 74. If the current passing through a wire held in a uniform magnetic field is doubled, the force acting on the wire will become :
- A) double
- B) half
- C) six times
- D) four times

Q. 75. Which one of the following quantities of sound is affected by change in temperature of air:
- A) amplitude
- B) intensity
- C) frequency
- D) wavelength

CHEMISTRY

Q. 41. A solid object has a density of 8.44 g/cm^3 and a volume of 5.00 cm^3. What is its mass?
A) 42.2 g
B) 13.44g
C) 1.69 g
D) 0.592 g

Q. 42. The correct formula of Calcium phosphate is
A) $CaPO_4$
B) $Ca_2(PO_4)_3$
C) $Ca_3(PO_4)_2$
D) $CaPO_3$

Q. 43. Of the following, the compound in which oxygen is assigned an oxidation number of +2 is
A) Cl_2O
B) BrO_2
C) HIO_3
D) OF_2

Q. 44. Glycerol is an alcohol which is
A) monohydric
B) dihydric
C) trihydric
D) All are correct

Q. 45. What is the lowest-numbered principal shell in which *d* orbitals are found ?
A) 1
B) 2
C) 4
D) 3

Q. 46. Using VSPER (Valence Shell Electron Pair Repulsion) predict which of the following is NOT probable.
A) Trigonal planar BCl_3
B) T-shaped BrF_3 molecule
C) Tetrahedral $GeCl_4$ molecule
D) Bent HCN molecule

Q. 47. In the sequence: sodium, potassium, rubidium, cesium, one would expect that the metal with the lowest melting point would be:
A) Sodium
B) Cesium
C) Rubidium
D) Potassium

Q. 48. The IUPAC name for $(CH_3)_2CHCH(CH_3)CH_2CH=CH_2$ is
A) 4,5-dimethyl-1-hexene
B) 4,5,5-trimethyl-1-pentene
C) 2,3-dimethyl-5-hexene
D) 4-methyl-4-isopropyl-1-butene

Q. 49. What is the value of 89.0°C on the Kelvin scale?
A) 362 K
B) -184 K
C) 251 K
D) -89.0 K

Q. 50. The coordination number of the metal in the complex $[Fe(C_2O_4)_3]^{3-}$ is
A) Three
B) Four
C) Six
D) Zero

Q. 51. Rutherford's bombardment of gold foil with alpha particles helped to suggest the model of atom by
A) determining the mass of the atom
B) determining the charge on a single electron
C) demonstrating that the atom is largely empty space with a concentrated positive charge
D) determining the number of protons in the nucleus

Q. 52. In a reaction between A and B, the rate of reaction was doubled by doubling the initial concentration of A when B was fixed. If B concentration was doubled with A fixed, the rate increased by a factor of 4. The rate law expression is rate equals
A) k (A) (B)
B) k (B)²
C) k (A)² (B)
D) k (A) (B)²

Q. 53. IUPAC name of $Na_4[Fe(CN)_6]$ is
A) Sodium hexacyanoferrite(II)
B) Sodium hexacyanoferrite(III)
C) Sodium hexacyanoferrate(II)
D) Sodium hexacyanoferrate(III)

Q. 54. Which statement about an aldol reaction is incorrect?
A) An aldol reaction may occur between two aldehydes or ketones and one reactant (at least) must contain an α-H atom.
B) An aldol reaction is a C–C bond-forming reaction.
C) The first step in an aldol reaction is deprotonation at the α-H position.
D) The product of an aldol reaction between two aldehydes is a β-diketone.

Q. 91. An increase in blood sugar level triggers the release of the hormone insulin by the pancreas, the hormone insulin lowers blood sugar level restoring the body to its original blood glucose level by converting glucose to glycogen. This is an example of

A) positive feed back
B) negative feed back
C) homeostatic imbalance
D) none of all

Q. 92. Regarding skeletal system function,

A) bone often serves as a model for cartilage growth.
B) tendons connect bone to bone.
C) blood cells are produced in the marrow of many bones.
D) all are correct

Q. 93. Given these cells: 1. osteoblasts 2. osteocytes 3. osteoprogenitor cells Which of these sequences represents the order in which they are produced?

A) 1,2,3
B) 1,3,2
C) 2,1,3
D) 3,1,2

Q. 94. Arrange the following events in the correct order of occurrence after a bone is broken.

1. Osteoblasts produce ossification
2. Hematoma formation
3. Internal fibrocartilage callus and external bone-cartilage callus formation
4. Woven bone is remodeled to form compact bone

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

Q. 95. Bundles of neurofilaments extending into dendrites and axons to provide structural support are called

A) Nodes of Ranvier
B) Nerve fibers
C) Microtubules
D) Neurofibrils

Q. 96. Flower color is controlled by a single pair of alleles. The allele for red flowers is dominant to the allele for white flowers. A plant homozygous for red flowers is crossed with a plant homozygous for white flowers. All the resulting plants have red flowers (F1 generation). When the F1 generation are crossed with each other, 18 plants are obtained. 12 plants have red flowers and 16 have white flowers (F2 generation). What ratio is expected in the F2 generation and what ratio has been obtained?

	Expected ratio red to white	obtained ration red to white
A)	1:1	2:1
B)	1:1	3:1
C)	3:1	2:1
D)	3:1	3:1

Q. 97. Which of the following is suitable for experiment on linkage?

A) aaBB x aaBB
B) AABB x aabb
C) AaBb x AaBb
D) AAbb x AaBB

Q. 98. A geneticist isolates a gene for a specific trait under study. She also isolates the corresponding mRNA. Upon comparison, the mRNA is found to contain 1,000 fewer bases than the DNA sequence. Did the geneticist isolate the wrong DNA?

A) Yes, mRNA is made from a DNA template and should be the same length as the gene sequence
B) Yes, the mRNA should contain more bases than the DNA sequence because bases flanking the gene are also transcribed
C) No, the final mRNA contains only exons, the introns were removed
D) No, the mRNA was partially degraded after it was transcribed

Q. 99. A DNA strand with the sequence AACGTAACG is transcribed. What is the sequence of the mRNA molecule synthesized?

A) AACGTAACG
B) UUGCAUUGC
C) AACGUAACG
D) TTGCATTGC

Q. 100. If one ignores the effect of crossing over, then the possible number of different haploid cells which could arise by the miotic division of a diploid cell containing 10 chromosome (i.e. n=5) is

A) 2
B) 4
C) 8
D) 32

GENERAL KNOWLEDGE

Q. 21. The term 'white coal' is sometimes referred to which of the following?
A) Geothermal energy   B) Wind energy   C) Hydroelectricity   D) Biomass energy

Q. 22. Who is the Current Prime Minister of UK?
A) Rishi Sunak   B) Boris Johnson   C) Liz Truss   D) None of all

Q. 23. Cinnamon air is the airline of which country?
A) Somalia   B) Iran   C) Iraq   D) Srilanka

Q. 24. Which of the following is not the member of Schengen Area?
A) Spain   B) France   C) United kingdom   D) Germany

Q. 25. Who is the current Governor of State Bank of Pakistan?
A) Tariq Bajwa   B) Jameel Ahmed   C) Raza Baqer   D) Ishrat Hussain

Q. 26. What are the colors of Netherland's flag?
A) Red, white and blue   B) Orange, white and green
C) Red, white and orange   D) Red, blue and green

Q. 27. What is full form of ISPR?
A) Inter- Services Pakistan Reports   B) Inter-Services Public Relations
C) Inter-Services Public Reports   D) Inter-Services Press Relations

Q. 28. Who is the Current CEO of YouTube ?
A) Sundar Pichai   B) Parag Agrawal   C) Susan Wojcicki   D) None of all

Q. 29. What is full form of OPEC
A) Organization of petroleum exporting countries   B) Oil producing exporting countries
C) Organization of petroleum exporting companies   D) Oil producing exporting companies

Q. 30. Who is the Current Chief Minister of PUNJAB?
A) Chaudhry Parvez Elahi   B) Sardar Usman Buzdar
C) Hamza Shahbaz Sharif   D) None of all

Q. 31. What is the lower house of Parliament is called in Pakistan?
A) National Assembly   B) Senate   C) Steering Committee   D) Provincial Assembly

Q. 32. When the Constituent Assembly passed the Objective Resolution?
A) 14th February 1949   B) 12th March 1949   C) 9th June 1949   D) 15th August 1949

Q. 33. Mian Muhammad Shahbaz Sharif is the _____ prime minister of Pakistan.
A) 25th   B) 20th   C) 22nd   D) 23rd

Q. 34. Who is the Present Vice Chancellor of University of Karachi?
A) Prof. Dr. Nasira Khatoon   B) Prof. Dr. Khalid Mehmood Iraqi
C) Prof. Dr. Muhammad Qaiser   D) Prof. Dr. Ajmal Khan

Q. 35. Samsung Electronics Co. Ltd. is _____ Company.
A) South Korean   B) American   C) Japanese   D) Chinese

Q. 36. There are _____ numbers of districts in Karachi.
A) 5   B) 8   C) 7   D) 6

Q. 37. What is the national bird of Pakistan?
A) Chakur   B) Falcon   C) Eagle   D) Sparrow

Q. 38. Who is current Federal Education Minister?
A) Shafqat Mehmood   B) Rana Tanveer Hussain
C) Ahsan Iqbal   D) Sherry Rehman

Q. 39. Porali River is located at _____.
A) Punjab   B) Sindh   C) K.P.K   D) Balochistan

Q. 40. Who is not the Urdu poet of Pakistan?
A) Faiz Ahmed Faiz   B) Rahat Qureshi   C) Muneer Niazi   D) Amjad Islam Amjad

Q. 81. To produce Lactose
A) glucose and galactose must undergo a dehydration reaction
B) glucose and fructose must undergo hydrolysis reaction
C) two amino acids must form a peptide bond
D) pairing of nitrogenous bases must occur between nucleotides

Q. 82. Glyceraldehyde is one example of a group of sugars called
A) Pentose   B) Tetrose   C) Triose   D) Octose

Q. 83. Nucleoside contains
A) sugar and nitrogenous base
B) sugar, nitrogenous base and a phosphate group
C) monomer for fat and polysaccharide
D) sugar, glycerol and phosphate

Q. 84. In aqueous medium fibrous proteins are
A) soluble   B) least soluble   C) insoluble   D) readily soluble

Q. 85. The detachable co-factor of an enzyme if it is an organic ion is called as
A) Activator   B) Catalytic   C) Aqueous medium   D) Apoenzyme

Q. 86. Passage through pores in the nuclear envelope is restricted primarily to
A) proteins, RNA, and Protein-RNA complexes
B) lipids and glycolipids
C) DNA and RNA
D) RNA and protein-carbohydrate complexes

Q. 87. Select the correct alphabetical order of the organelles in the diagram correlating with given options
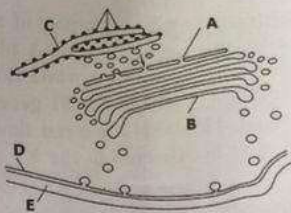
	A	B	C	D	E
A	Golgi bodies	Cis face	Mitochondria	Cell membrane	Cell wall
B	Cis face	Trans face	GER	Cell membrane	Cell wall
C	SER	Golgi bodies	Cell wall	Cell membrane	mitochondria
D	Endoplasmic reticulum	Mitochondria	Ribosomes	Cell wall	Cell membrane

Q. 88. Which of the following is the correct sequence for the movement of electrons during the light-dependent reactions of plants?
A) P_{680} à P_{700} à water à $NADP^+$
B) water à P_{700} à $NADP^+$ à P_{680}
C) P_{700} à P_{680} à $NADP^+$ à water
D) water à P_{680} à P_{700} à $NADP^+$

Q. 89. Which of the following is mismatched?
A) photosystem I ---------- uses the P700 molecule in its photocenter
B) PGA---------- a 3-carbon compound
C) antenna complex ---------- contains hundreds of pigment molecules
D) CAM plants ---------- open their stomata during the day and close them at night to avoid photorespiration

Q. 90. Which of the following statements accurately describes the relationship between photosynthesis and cellular respiration?
A) Photosynthesis occurs only in autotrophs; cellular respiration occurs only in heterotrophs
B) Photosynthesis uses solar energy to convert inorganics to energy-rich organics; respiration breaks down energy-rich organics to synthesize ATP
C) Photosynthesis involves the oxidation of glucose; respiration involves the reduction of CO_2
D) The primary function of photosynthesis is to use solar energy to synthesize ATP; the primary function of cellular respiration is to break down ATP and release energy.

Q. 4. Tears do not contain _____.
    A) water   B) acids   C) carbohydrates   D) proteins

Q. 5. Physiological tears _____.
    A) have an adverse effect on eye sight   B) damage the mucous membrane
    C) moisten and clean eyes   D) help release emotional stress

Q. 6. The article highlights _____ major advantages pf crying for children.
    A) two   B) three   C) four   D) five

Q. 7. Men associate crying with _____.
    A) weakness   B) fear   C) hypertension   D) anxiety

Q. 8. Paragraph _____ focuses on gender differences in the frequency of crying.
    A) four   B) five   C) six   D) seven

Q. 9. Women cry more than men because of the secretion of a hormone called _____.
    A) testosterone   B) somatotropin   C) prolactin   D) melatonin

Q. 10. The word 'brackish' used in the second last paragraph means _____.
    A) pungent   B) bitter   C) sour   D) salty

Q. 11. The bold underlined pronoun 'them' in the last paragraph of the article refers to _____.
    A) men   B) women   C) children   D) tears

Q. 12. The major aim of the article is to focus on _____.
    A) the benefits of crying on one' health   B) the types of tears and their function
    C) gender differences in crying   D) the composition of tear glands

Q. 13. Tear glands contain _____ substances which alleviate feelings of anxiety.
    A) psychosomatic   B) psychotropic   C) psychoacoustic   D) psychodermatologic

Q. 14. _____ can lead to hypertension.
    A) Excessive crying   B) Shedding of tears
    C) Outlet of emotions   D) Suppression of emotions

Q. 15. The article ends with an advice to _____.
    A) avoid suppressing one's tears   B) conceal one's emotions
    C) shed tears everyday   D) hide one's tears

SECTION B (GRAMMAR & VOCABULARY)

Q. 16. Majority of the flood victims in different parts of the country are _____ deprived of food and shelter.
    A) still   B) yet   C) just   D) so

Q. 17. The conference has to be _____ because of the natural disaster. The new date will be announced later.
    A) put out   B) put on   C) put off   D) put down

Q. 18. Although my friend shares the office with me, we _____ get to see each other because of our consecutive classes.
    A) often   B) usually   C) rarely   D) always

Q. 19. Would you mind bringing me a cup of hot coffee, please? The one you have brought is _____.
    A) not cold enough   B) not hot enough   C) too hot   D) barely cold

Q. 20. _____ of being proficient in English, she scored very low marks in IELTS.
    A) In spite   B) Despite   C) Instead   D) Because