

## Genetic Engineering (Physical Sciences), Model Answers, CET-2018

### SECTION I- Chemistry

- The Osmotic pressure of a solution at  $0^{\circ}\text{C}$  is 4 atmospheres. What will be its Osmotic pressure of 546K under similar conditions?
  - 4 atm
  - 2 atm X
  - 8 atm
  - 1 atm
  - 10 atm
- 'Gold number' is minimum in case of:
  - Gelatin X
  - Egg albumin
  - Gum Arabic
  - Starch
  - No option is correct
- Camphor can be purified by
  - distillation
  - vacuum distillation
  - sublimation X
  - steam distillation
  - fractional distillation
- Which pair has both numbers from same period of periodic table?
  - Na, Ca
  - Na, Cl X
  - Ca, Cl
  - Cl, Br
  - No option is correct
- Haloform reaction is shown by-
  - Methyl alcohol
  - Acetone X
  - Formaldehyde
  - n-Propyl alcohol
  - Ethyl Alcohol

6. Isotopes have-

- A. Same number of protons X
- B. Same number of neutrons
- C. Different number of electrons
- D. Different atomic numbers
- E. No option is correct

7. Wave number is-

- A.  $\lambda$
- B.  $\frac{1}{\lambda}$  X
- C.  $\frac{c}{\lambda}$
- D.  $\lambda \nu$
- E.  $\lambda X$

8. Bohr theory is not applicable for-

- A.  $\text{He}^+$
- B.  $(\text{B})\text{Li}^{2+}$
- C.  $\text{Be}^+$  X
- D. H
- E. No option is correct

9. Element having no neutrons is-

- A. H X
- B. Mg
- C. He
- D. Ag
- E. Ar

10. Which of the following is transition element-

- A. P
- B. Zn
- C. Cu X
- D. Na
- E. No option is correct

11. The molecule that has linear structure is

- A.  $\text{CO}_2$  X
- B.  $\text{NO}_2$
- C.  $\text{SO}_2$
- D.  $\text{SiO}_2$
- E.  $\text{H}_2\text{O}$

12. A reversible chemical reaction is having two reactants in equilibrium. If the concentration of the reactants are doubled, then the equilibrium constant will-----.

- A. also be doubled
- B. be halved
- C. become one-fourth
- D. become one-third
- E. remain the same X

13. Cation and anion combines in a crystal to form following type of compound-

- A. Ionic X
- B. Metallic
- C. Covalent
- D. Dipole - Dipole
- E. No option is correct

14. Which one of the following molecule contains no  $\pi$  bond?

- A.  $\text{H}_2\text{O}$  X
- B.  $\text{SO}_2$
- C.  $\text{NO}_2$
- D.  $\text{CO}_2$
- E. No option is correct

15. Van der waal's constant 'a' has the dimensions of-

- A.  $\text{Mol L}^{-1}$
- B.  $\text{Atm L}^2 \text{Mole}^{-2}$  X
- C.  $\text{Litre Mole}^{-1}$
- D.  $\text{Atm L Mole}^{-2}$
- E. No option is correct

16. Which of the following relation is correct for an ideal gas?

A.  $\frac{V}{n} = \frac{P}{RT}$

B.  $\frac{MV}{m} = \frac{P}{RT}$

C.  $\frac{d}{M} = \frac{P}{RT}$  X

D. All options are correct

E. No option is correct

17. The specific heat of a gas is found to be 0.075 calories at constant volume and its formula wt is 40. The atomicity of the gas would be-

A. One

B. Two

C. Three

D. Four X

E. Five

18. Vapour density of a gas is 8. Its molecular mass will be-

A. 8

B. 16 X

C. 32

D. 64

E. 128

19. The pH of a solution is zero. The solution is

A. Neutral

B. Normal Acid X

C. Deci normal acid

D. strongly alkaline

E. Normal Alkaline

20. Which of the following is the most reactive metal?

A. K X

B. Zn

C. Ni

D. Ag

E. Cu

21. The process in which oxidation number increases-

- A. Reduction
- B. Hydrolysis
- C. Oxidation X
- D. Decomposition
- E. Condensation

22. Which compound acts as oxidising agent only-

- A.  $\text{SO}_2$
- B.  $\text{H}_2\text{S}$
- C.  $\text{H}_2\text{SO}_4$  X
- D.  $\text{HNO}_2$
- E.  $\text{Cl}_2$

23. Among the following compounds the one that is most reactive towards electrophilic nitration is-

- A. Toluene X
- B. Benzene
- C. Benzoic Acid
- D. Nitro benzene
- E. Di Nitro Benzene

24. Baeyer's reagent is-

- A. 1% Alkaline  $\text{KMnO}_4$  X
- B. Acidic  $\text{KMnO}_4$
- C. Neutral  $\text{KMnO}_4$
- D. Aq.  $\text{Br}_2$  Solution
- E. No option is correct

25. Gammexane is-

- A. Bromo benzene
- B. Benzyl Chloride
- C. Chloro benzene
- D. Benzene Hexachloride X
- E. Iodo Benzene

## SECTION II- Physical Sciences

Universal Constants:  $c = 3 \times 10^8$  m/s;  $h = 6.63 \times 10^{-34}$  Js;  $k_B = 1.38 \times 10^{-23}$  J/K;  $e = 1.6 \times 10^{-19}$  C;  $m_0 = 4\pi \times 10^{-7}$  Henry / m;  $\epsilon_0 = 8.85 \times 10^{-12}$  Farad/m.

26. The dimensions for volume charge density are:

- A.  $[L^{-2}TA]$
- B.  $[L^{-3}TA]$  X
- C.  $[L^{-2}T^{-1}A]$
- D.  $[L^{-3}T^{-1}A]$
- E.  $[L^{-3}TA^{-1}]$

27. What will be the potential at a point P due to a charge of  $4 \times 10^{-7}$  C located 9 cm away [Given:  $(1/4\pi \epsilon_0) = 9 \times 10^9$  N-M<sup>2</sup>-C<sup>-2</sup>]:

- A.  $4 \times 10^2$  V
- B.  $4 \times 10^3$  V
- C.  $4 \times 10^4$  V X
- D.  $2.5 \times 10^2$  V
- E.  $2.5 \times 10^4$  V

28. Electric polarisation is defined as:

- A. Dipole moment per unit area
- B. Moment of inertia per unit area
- C. Moment of inertia per unit volume
- D. Dipole moment per unit volume X
- E. No option is correct

29. The purpose of Van De Graff generator is to build up voltages. The built-up voltage difference with respect to ground can be developed using this machine will be:

- A. 6 MV to 8 MV X
- B. 6 kV to 8 kV
- C. 6 V to 8 V
- D. 0.6 V to 0.8V
- E. 0.06 V to 0.08 V

30. Which of the following has an equivalent Ohm's law?

- A.  $E = \sigma J$
- B.  $J = \rho E$
- C.  $E = RJ$
- D.  $J = GE$
- E.  $J = \sigma E$  X

31. Which of the following statement is TRUE?
- A. Mobility is defined as magnitude of the drift velocity per unit electric field X
  - B. Mobility is defined as electric field per unit magnitude of the drift velocity
  - C. Mobility has unit of  $\text{Vs}^{-1}\text{m}^{-2}$
  - D. Mobility may have negative values
  - E. Mobility has unit of  $\text{V}^{-1}\text{s-m}^{-2}$
32. A solenoid of length 0.5m has a radius of 1.0 cm and is made up of 500 turns. It carries a current of 5A. What is the magnitude of the magnetic field inside the solenoid?
- A.  $6.28 \times 10^3 \text{ T}$
  - B.  $3.14 \times 10^3 \text{ T}$
  - C.  $3.14 \times 10^{-3} \text{ T}$
  - D.  $6.28 \times 10^{-3} \text{ T}$  X
  - E.  $6.28 \times 10^2 \text{ T}$
33. Bohr's quantisation condition states that:
- A. Angular momentum =  $nh/2\pi$ , where  $n = 0, 1, 2, 3, \dots$
  - B. Angular momentum =  $nh/2\pi$ , where  $n = \dots, -3, -2, -1, 0, 1, 2, 3, \dots$
  - C. Angular momentum =  $nh/2\pi$ , where  $n = 1, 2, 3, \dots$  X
  - D. Angular momentum =  $h/2n\pi$ , where  $n = 0, 1, 2, 3, \dots$
  - E. Angular momentum =  $h/2n\pi$ , where  $n = 1, 2, 3, \dots$
34. The strength of earth's magnetic field varies from place to place on the earth's surface. Its value being of the order of:
- A.  $10^{-3}\text{T}$
  - B.  $10^{-7}\text{T}$
  - C.  $10^{-2}\text{T}$
  - D.  $10^3\text{T}$
  - E.  $10^{-5}\text{T}$  X
35. If a substance has negative value of magnetic susceptibility, it will be:
- A. Ferromagnetic
  - B. Diamagnetic X
  - C. Paramagnetic
  - D. Ferrimagnetic
  - E. No option is correct
36. A pure inductor of 25.0 mH is connected to a source of 220V. What is the inductive reactance and rms current in the circuit if the frequency of the source is 50 Hz.
- A. 5.85 ohm and 14 Amp
  - B. 7.85 ohm and 14 Amp
  - C. 5.85 ohm and 28 Amp
  - D. 7.85 ohm and 28 Amp X
  - E. 5.85 ohm and 18 Amp

37. For series RLC circuit, the resonant frequency depends on:
- A. R, L and C
  - B. Only L
  - C. Only C
  - D. Both R and L
  - E. **Both L and C** X
38. Which of the Maxwell's equation includes the concept of displacement current?
- A. First
  - B. Second
  - C. Third
  - D. **Fourth** X
  - E. No option is correct
39. The magnitudes of the electric and magnetic fields in an electromagnetic wave are related as:
- A.  **$B_0 = E_0/c$**  X
  - B.  $E_0 = B_0/c$
  - C.  $B_0 E_0 = c$
  - D.  $B_0 = E_0/c^2$
  - E.  $B_0^2 = E_0/c$
40. An object is placed 10 cm in front of a concave mirror of radius of curvature 15 cm. The image of the object will be:
- A. Magnified, virtual and inverted
  - B. Not magnified, virtual and inverted
  - C. **Magnified, real and inverted** X
  - D. Magnified, virtual and erect
  - E. Not magnified, real and erect
41. A wave gets refracted into a denser medium. What will happen?
- A. Its wavelength and frequency changes but speed remains same
  - B. **Its wavelength and speed changes but frequency remains same** X
  - C. Its speed and frequency changes but wavelength remains same
  - D. Its wavelength, frequency and speed all changes
  - E. Its wavelength, frequency and speed all remains same
42. Two slits are made 1.0 mm apart and the screen is placed 1.0 m away. What is the fringe separation when blue light of wavelength 5000 Å is used?
- A. 50 nm
  - B. 50 mm
  - C. 50 μm
  - D. **0.5 mm** X

E. 5.0 mm

43. A metal has work function of  $h\nu_0$ . Photons of energy  $h\nu$  falls on such metal, the emission of energetic electrons is possible only if:

A.  $\nu_0 > \nu$

B.  $\nu_0 = \nu$

C.  $\lambda > \lambda_0$

D.  $\lambda = \lambda_0$

E.  $\nu > \nu_0$  X

44. The de Broglie wavelength associated with an electron, accelerated through a potential difference of 100 volts falls under:

A. Visible region

B. Microwave region

C. X-ray region X

D. IR region

E. Ultraviolet region

45. Which of the following series of hydrogen spectrum falls under visible region?

A. Balmer series X

B. Paschen series

C. Brackett series

D. Lyman series

E. Pfund series

46. The existence of discrete energy levels in an atom can be experimented by:

A. Davison and Gustav

B. Franck and Hertz X

C. Biot and Savart

D. Young and Fraunhofer

E. Yukawa and Phillip

47. The density of nucleus is of the order of:

A.  $10^{17} \text{ kg-m}^{-3}$  X

B.  $10^3 \text{ kg-m}^{-3}$

C.  $10^{17} \text{ g-cm}^{-3}$

D.  $10^{21} \text{ kg-m}^{-3}$

E.  $10^{21} \text{ g-cm}^{-3}$

48. The activity of radioactive materials can be given in the units of:

- A. Becquerel only
- B. Curie only
- C. Both Becquerel and Curie X
- D. Neither Becquerel nor Curie
- E. No option is correct

49. Semiconductor are the materials which has energy band gap ( $E_g$ ) of:

- A.  $E_g = 0$  eV
- B.  $1 \text{ keV} < E_g < 3.0 \text{ keV}$
- C.  $5.0 \text{ eV} < E_g < 10. \text{ eV}$
- D.  $0 \text{ eV} < E_g < 3.0 \text{ eV}$  X
- E.  $0 \text{ eV} > E_g > 3.0 \text{ eV}$

50. Which of the following device can be used as voltage regulator?

- A. Photodiode
- B. Light Emitting Diode (LED)
- C. Solar Cells
- D. Transistor
- E. Zener Diode X

51. If the  $x_1, x_2, \dots, x_n$  are distinct then for arbitrary real values  $y_1, y_2, \dots, y_n$  the degree  $d$  of the interpolating polynomial  $P(x)$  such that  $P(x_i) = y_i (1 \leq i \leq n)$  satisfies

- A.  $d = n$ .
- B.  $d = n - 1$ .
- C.  $0 \leq d \leq n - 1$ . X
- D.  $1 \leq d \leq n$ .
- E.  $d = n + 1$ .

52. The partial differential equation  $\frac{\partial^2 u}{\partial y^2} - y \frac{\partial^2 v}{\partial x^2} = 0$

- A. represents two families of real characteristic curve for  $y < 0$ .
- B. has no real characteristics for  $y > 0$ .
- C. represents vertical lines as a family of characterstic curve for  $y = 0$ . X
- D. represents branches of quadratic curve as characteristics for  $y \neq 0$ .
- E. represents horizontal lines as a family of characteristic for  $y = 0$ .

53. Let  $n$  be an odd positive integer. The real valued function of real variables  $f(x) = \sqrt[n]{x}$  is

- A. not continuous.
- B. continuous everywhere and strictly incresing only for  $x \geq 0$ .
- C. continuous everywhere and strictly increasing only for  $x \geq 1$ .
- D. continuous everywhere and strictly increasing only for  $x \in \mathbb{R}$ . X
- E. continuous only for  $x \geq 0$  and strictly increasing every where.

54. The smallest order of an abelian group which is not cyclic is

- A. 1.
- B. 2.
- C. 6.
- D. 8.
- E. 4. X

55. The differential equation  $(x^3 + xy^4)dx + 2y^3dy = 0$  become exact on multiplication by :

- A.  $e^{x^2}$ . X
- B.  $e^x$ .
- C.  $e^{-x}$ .
- D.  $e^{x^2+x}$ .
- E.  $ce^x$ .

56. A wire of resistance  $20 \Omega$  is bent to form a complete circle. The resistance between two points tapped at one fourth of the circumference is

- A.  $2.5 \Omega$
- B.  $3.75 \Omega$  X
- C.  $5 \Omega$
- D.  $4.2 \Omega$
- E.  $8.25 \Omega$

57. Susceptibility is positive and small for a

- A. Paramagnetic Substance X
- B. Ferromagnetic Substance
- C. Diamagnetic Substance
- D. Non-magnetic substance
- E. No option is correct

58. In a step-up transformer the current in the secondary coil is

- A. more than current in the primary
- B. equal to current in the primary
- C. of opposite polarity than in the primary X
- D. is of the same polarity as in the primary
- E. No option is correct

59. An a.c. circuit, using an inductor and a capacitor in series has a maximum current. If  $L=0.5$  H and  $C= 8 \mu\text{F}$ , then the angular frequency of input ac Voltage will be
- A. 5000
  - B.  $5 \times 10^5$
  - C. 4000
  - D. 500 X
  - E. 400
60. If an electron and a proton have the same de Broglie wavelength then
- A. the proton has greater momentum
  - B. the electron has a greater momentum
  - C. both have equal momentum X
  - D. both have zero momentum
  - E. No option is correct
61. In biostatistics, group of individuals taken for study is called as
- A. block
  - B. population X
  - C. group
  - D. flock
  - E. No option is correct
62. The branch of biostatistics that deals with methods of organization and presentation of data is called as
- A. Inferential biostatistics
  - B. Descriptive biostatistics X
  - C. Both Inferential and Descriptive biostatistics
  - D. Comparative biostatistics
  - E. No option is correct
63. The branch of biostatistics that deals with testing of hypothesis, and making predictions using data is called as
- A. Inferential biostatistics X
  - B. Descriptive biostatistics
  - C. both Inferential and Descriptive biostatistics
  - D. Comparative biostatistics
  - E. No option is correct

64. Variables whose values can be expressed numerically are called

- A. quantitative variables X
- B. qualitative variables
- C. absolute variables
- D. Continuous variables
- E. No option is correct

65. The statistical test can be utilized to validate the statement “peoples having high cholesterol suffer more from hypertension”

- A. Student test
- B. Regression analysis
- C. Pearson correlation coefficient X
- D. ANOVA
- E. No option is correct

66. Which is pure object oriented language?

- A. Eiffel
- B. c++
- C. object pascal
- D. Small talk X
- E. No option is correct

67. The 4NF is for

- A. Related to Multi-Value Dependency X
- B. Related to transitive dependency
- C. Functional dependency
- D. Non trivial function
- E. No option is correct

68. Redundancy is dangerous as it is a potential threat to data

- A. Integrity X
- B. Validity
- C. Sufficiency
- D. Consistency
- E. No option is correct

69. What is the name of the network topology in which there are bi-directional links between each possible node?

- A. Ring
- B. Star
- C. Tree
- D. Mesh X
- E. No option is correct

70. The Java Virtual machine performs

- A. Loading X
- B. Linking
- C. Initialization
- D. Compilation
- E. No option is correct

71. Which of the following is a nucleotide sequence database:

- A. EMBL X
- B. SWISSPROT
- C. PROSITE
- D. TREMBL
- E. No option is correct

72. BLAST programme is used in

- A. DNA sequencing
- B. Amino acid Sequencing
- C. DNA barcoding
- D. Sequence Alignment X
- E. No option is correct

73. The alignment procedure that tries to align the entire sequence is:

- A. Multiple sequence alignment
- B. Pair wise alignment
- C. Global alignment X
- D. Local alignment
- E. No option is correct

74. All are sequence alignment tools except

- A. Rasmol X
- B. BLAST
- C. FASTA
- D. Clustal W
- E. No option is correct

75. SCOP is

- A. a primary database
- B. a nucleotide sequence database
- C. a hierarachial classification of protein 2D domain structures
- D. a structural database, which identify structural and evolutionary relationships X
- E. No option is correct

