MOCK TEST 17, 2024(HS 2ND YEAR SCIENCE)

TIME : 1 HOUR **MARKS: 120(JEE), 200(NEET)**

BIOLOGY

1. Polymerase Chain Reaction is not used in:
a. Confirming presence of a pathogen during early infection
b. Identifying the mutated genes in suspected cancer patients
c. Isolating the gene of interest from host DNA to be cloned by recombinant procedures
d. Detection of the presence of HIV in suspected AIDS patient
2. Which kind of therapy was given in 1990 to a four-year-old girl with Adenosine Deaminase (ADA) deficiency?
a. Gene therapy b. Chemotherapy c. Immunotherapy d. Radiation therapy
3. Which part of the tobacco plant is infected by Meloidegyne incognitia?
a. Leaf b. Stem c. Root d. Flower
4. Golden rice is a genetically modified crop plant where the incorporated gene is meant for biosynthesis of
a. vitamin-B b. omega 3 c. vitamin-C d. vitamin-A
5. In Bt cotton, the Bt toxin present in plant tissue as pro-toxin is converted into active toxin due to
a) Alkaline pH of the insect gut b) acidic pH of the insect gut
c) action of gut microorganisms d) presence of conversion factors in insect gut
6. Which one is released from the ovary ?
a. Primary oocyte b.Secondary oocyte c.Graafian follicle d.Oogonium
7. During oogenesis, each diploid cell produces
a. four functional eggs b. two functional eggs and two polar bodies
c.one functional egg and two polar bodies d.four functional polar bodies.
8. In oogenesis haploid egg is fertilised by sperm at which stage ?
a. Primary oocyte b.Secondary oocyte c.Oogonium d.Ovum
9. Layers of an ovum from outside to inside is
a. corona radiata, zona pellucida and vitelline membrane b. zona pellucida, corona rodiata and vitelline membrane
c.vitelline membrane, zona pellucida and corona radiate d.zona pellucida, vitelline membrane and corona radiata.
10. Which part of ovary in mammals acts as an endocrine gland after ovulation?
a. Stroma b.Germinal epithelium c.Vitelline membrane d.Graafian follicle
11. The outermost and innermost wall layers of microsporangium in an anther are respectively
a. Endothecium and tapetum b. Epidermis and endodermis
c. Epidermis and middle layers d. Epidermis and tapetum
12. Vulture is
a. Scavenger b. Detrivore c. Decomposers d. Mineraliser
13. Total organic matter stored in producers is
a. Gross primary productivity b. Net primary Productivity c. Secondary productivity d. Net production efficiency
14. The first stage or pioneer colonisers of bare rock are-
a. Mosses b. Foliose lichens c. Crustose lichen d. Fructicise lichen
15. Which one is inverted pyramid?
a. Pyramids of biomass in grassland b. Pyramids of biomass in pond ecosystem
c. Pyramid of numbers in grassland ecosystem d. Pyramid of energy in a pond ecosystem
16. The logistic growth curve of animal population growth is more realistic than J shaped curve because:
a) Asexual mode of reproduction is rare in higher animals
b) Resources are finite and become limiting sooner or later.
c)Most animals are conformers rather than regulators d) Abiotic factors affect animals more than plants
17.When the population density reaches the carrying capacity, the logistic growth curve is said to be in:
(a) Lag phase (b) A phase of acceleration (c)A phase of deceleration (d) Asymptote
18. In a growing population of a country:
(a)pre-reproductive individuals are more than reproductive individuals.
(b)reproductive individuals are less than post-reproductive individuals.

(c)reproductive and pre- reproductive individuals are equal in number.
(d)pre-reproductive individuals are 4. less than reproductive individuals.

19. Which of the following is a S-shaped growth curve?
a) Exponential growth b) Logistic growth curve c) J-shaped curve d) Geometric curve

20. Which is the second phase of the sigmoidal growth curve?
a) Deceleration phase b) Log phase c) Exponential phase d) Stationary phase

21. Who proposed the "Primordial Soup" hypothesis for the origin of life?
a) Stanley Miller b) Charles Darwin c) Oparin d) Lamarck

22. The building blocks of life, such as amino acids, nucleotides, and lipids, are thought to have originated through
a) Spontaneous generatio b) Biogenesis c) Abiogenic synthesis d) Photosynthesis

23. The Miller-Urey experiment (1953) demonstrated the possibility of:
a) Spontaneous generation of life b) Synthesis of organic molecules from inorganic substances
c) Origin of DNA d) Evolution of complex organisms

24. Which of the following is NOT a characteristic of the primitive atmosphere on Earth?
a) Reducing environment b) High temperature c) Presence of oxygen d) Absence of water

25. The theory of "Panspermia" suggests that life originated:
a) On Earth through chemical reactions b) In the primordial soup
c) Elsewhere in the universe and was transported to Earth d) Through spontaneous generation

26. What is the significance of VNTRs (Variable Number Tandem Repeats) in DNA fingerprinting?
a) VNTRs are regions in DNA with high mutation rates, leading to genetic disorders.
b) VNTRs are used to identify individuals because they vary greatly between unrelated individuals.
c) VNTRs code for proteins that determine blood type. d) VNTRs are used to repair DNA damage.

27. Which of the following is not a feature of the Human Genome Project?
a) Identification of the sequence of human DNA. b) Determining the sequence of every gene in the human bod
c) Understanding the role of every gene in human physiology. d) Sequencing the DNA of all living organisms.

28. Assertion (A): DNA fingerprinting is used to establish paternity.
Reason (R): DNA fingerprinting compares the length of DNA fragments between individuals.
a) Both A and R are true, and R is the correct explanation of A.
b) Both A and R are true, but R is not the correct explanation of A.
c) A is true, but R is false. d) A is false, but R is true.

29. Which of the following enzymes is used in DNA fingerprinting to cut DNA into fragments?
a) DNA polymerase b) Restriction endonuclease c) Ligase d) Helicase

30. Assertion (A): DNA fingerprinting can be used in forensic science.
Reason (R): DNA fingerprinting is unique to each individual except in identical twins.
a) Both A and R are true, and R is the correct explanation of A.
b) Both A and R are true, but R is not the correct explanation of A.
c) A is true, but R is false. d) A is false, but R is true.

MATHEMATICS

1. In a single throw of two dice what is the probability of obtaining a number greater than 7, if 4 appears on the fir dice
(a) $\frac{1}{3}$ (b) $\frac{1}{2}$ (c) $\frac{1}{12}$ (d) None of these

2) If $px^4 + qx^3 + rx^2 + sx + t = \begin{vmatrix} x^2+3x & x-1 & x+3 \\ x+1 & 2-x & x-4 \\ x-3 & x+4 & 3x \end{vmatrix}$ then the value of t is
(a) 16 (b)17 (c) 19 (d) 18

3) If $(x) = \begin{vmatrix} 1 & 2(x-1) & 3(x-1)(x-2) \\ (x-1) & (x-1)(x-2) & (x-1)(x-2)(x-3) \\ x & x(x-1) & (x-1)(x-2) \end{vmatrix}$, then $f(49) =$
(a) 0 (b) 49 (c) -49 (d) None of these

4. If $y = \left(x + \sqrt{1+x^2}\right)^n$, then $(1+x^2)\frac{d^2y}{dx^2} + x\frac{dy}{dx}$ is :
(a) n^2y (b) $-n^2y$ (c) $-y$ (d) $2n^2y$

5. If x>1 for $(2x)^{2y} = 4e^{2x-2y}$, then $(1 + \log_e 2x)^2 \frac{dy}{dx}$ equals

(a) $\frac{x \log_e 2x - \log_e 2}{x}$ (b) $\log_e 2x$ (c) $\frac{x \log_e 2x + \log_e 2}{x}$ (d) none of these

6 The maximum volume (in cu. m) of the right circular cone having slant height 3m is

(a) $2\sqrt{3}\pi$ (b) $3\sqrt{3}\pi$ (c) 6π (d) None of these

7. The maximum value of $f(x) = \frac{x}{1+4x+x^2}$ on $[-1,1]$ is

(a) $-\frac{1}{4}$ (b) $-\frac{1}{3}$ (c) $\frac{1}{6}$ (d) none of these

8. Let $f(x) = [e^x(x-1)(x-2)]$. Then f decreases in the interval :

(a) $(-\infty, -2)$ (b) $(-2,-1)$ (c) $(1,2)$ (d) None of these

9. The equation of the line joining the points $(-2,4,2)$ and $(7,-2,5)$ are

(a) $\frac{x+2}{3} = \frac{y-4}{-2} = \frac{z-2}{1}$ (b) $\frac{x}{7} = \frac{y}{-2} = \frac{z}{5}$ (c) $\frac{x}{-2} = \frac{y}{4} = \frac{z}{2}$ (d) None of these

10. f $sin^{-1}\frac{x}{3} + sin^{-1}\frac{y}{4} = \frac{\pi}{6}$, then the values of $\frac{x^2}{9} + \frac{xy}{4\sqrt{3}} + \frac{y^2}{16}$ is

(a) $\frac{1}{4}$ (b) $\frac{1}{2}$ (c) $\frac{3}{4}$ (d) *None of these*

CHEMISTRY

1. The vapour pressure of a solvent decreased by 10 mm in two columns of mercury when a non-volatile solute was added to the solvent. The mole fraction of the solute in the solution is 0.2. What should be the mole fraction of the solvent if the decrease in the vapour pressure is to be 20 mm of mercury?

(a) 0.8 (b) 0.6 (c) 0.4 (d) 0.2

2. A 5% solution of cane sugar (mol. wt. =342) is isotonic with 1% solution of a substance X. The molecular weight of X is

(a) 34.2 (b) 171.2 (c) 68.4 (d) 136.8

3. Find out the solubility of $Ni(OH)_2$ in 0.1 M NaOH. Given, that the ionic product of $Ni(OH)_2$ is 2×10^{-15}.

(a) 2×10^{-8} M (b) 1×10^{-13} M (c) 1×10^{8} M (d) 2×10^{-13} M

4. The number of electrons delivered at the cathode during electrolysis by a current of 1 ampere in 60 seconds is (charge on electron = 1.60×10^{-19} C)

(a) 6×10^{23} (b) 6×10^{20} (c) 3.75×10^{20} (d) 7.48×10^{23}

5. The weight of silver (at. wt. =108) displaced by a quantity of electricity which displaces 5600 mL of O_2 at STP will be

(a) 5.4 g (b) 10.8 g (c) 54.0 g (d) 108.0 g

6. For an endothermic reaction, energy of activation is E_a and enthalpy of reaction is ΔH (both of these in kJ/mol). Minimum value of E_a will be

(a) less than ΔH (b) equal to ΔH (c) more than ΔH (d) equal to zero

7. In a zero order reaction for every 10°C rise of temperature, the rate is doubled. If the temperature is increased from 10°C to 100°C, the rate of the reaction will become

(a) 256 times (b) 512 times (c) 64 times (d) 128 times

8. An example of a sigma bonded organometallic compound is

(a) ruthenocene (b) Grignard's reagent (c) ferrocene (d) cobaltocene

9. A magnetic moment of 1.73 BM will be shown by one among the following

(a) $[Cu(NH_3)4]^{2+}$ (b) $[Ni(CN)_4]^{2-}$ (c) $TiCl_4$ (d) $[CoCl_6]^{4-}$

10. The product formed by the reaction of an aldehyde with a primary amine is

(a) Ketone (b) Carboxylic acid (c) Aromatic acid (d) Schiff base

PHYSICS

Q1.Which one of the following phenomena is not explained by Huygens' construction of wavefront?

(a) Refraction (b) reflection (c) diffraction (d) origin of spectra

Q 2. The frequency of a light wave in a material is 2×10^{14} Hz and wavelength is 5000Å. The refractive index of material will be

(a) 1.50 (b) 3.00 (c)1.33 (d) 1.40

Q3.Interference is possible in

(a) light waves only (b) sound waves only (c) both light and sound waves. (d) neither light nor sound waves

Q4. In the Young's double slit experiment, the intensity of light at a point on the screen where the path difference is is λ is k (λ being the wavelength of light used). The intensity at a point where the path difference is λ/4 , will be

(a) k (b) k/4 (c) k/2 (d) zero

Q5. Two coherent sources of light interfere and produce fringe pattern on a screen. For central maximum, the phase difference between the two of waves will be

(a) π/2 (b) zero (c)π (d) 3π/2

Q6. The energy equivalent of one atomic mass unit is

(a) 1.6×10^{-19} J (b) 6.02×10^{23} J (c) 931 MeV (d) 9.31 MeV

Q7.At absolute zero, Si acts as

(a) non metal (b) metal (c) insulator (d) none of these.

Q8.The mass density of a nucleus varies with mass number A as

(a) A^2 (b) A. (c) constant. (d) 1/ A

Q9. The mass number of He is 4 and that of sulphur is 32. The radius of sulphur nucleus is larger than that of helium by the factor of

(a) 4 (b) 2 (c) 8 (d) v8

Q10. A nucleus of mass number 189 spilits into two nuclei having mass number 125 and 64. The ratio of radius of two daughter nuclei respectively is

(a) 1:1 (b) 4:5. (c) 5:4 (d) 25: 16

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