MARKS: 120(JEE), 200(NEET)

BIOLOGY

1. The residue left after methane production from cattle dung is:

a) burnt   b) burried in land fills   c) used as manure   d) used in civil construction

2. Gases found in biogas are:

a) Carbon dioxide is the only gas

b) Methane is the only gas

c) Carbon dioxide, hydrogen sulphide and Methane

d) Carbon dioxide, hydrogen cyanide and Methane

3. Select the correct statement from the following

a) Biogas is produced by the activity of aerobic bacteria on animal waste

b) Methanobacterium is an aerobic bacterium found in rumen of cattle.

c) Biogas, commonly called gobar gas, is pure methane

d) Activated sludge-sediment in settlement tanks of sewage treatment plant is a right source of aerobic bacteria

4. Methanogens are found in:

1) Ethanol   2) Organic acids   3) Anaerobic sludge   4) Rumen of cattle

a) 1,3, 4   b) 3,4   c) 2,3,4   d) 1,2

5. Which of the following is wrong about Penicillin?

a) A chance discovery

b) First antibiotic to be discovered

c) Kills P. notatum

d) Fleming

6. Spermatids are changed into spermatozoa through

a. Spermiogenesis   b.Spermiation   c. Spermatogenesis   d.Spermatosis

7. At the end of first meiotic division, male germ cell differentiates into

a. Secondary spermatocyte

b. Primary Spermatocytes

c. Spermatogonium

d. Spermatids

8.Clitoris in mammals is

a. Homologous to penis   b. Analogous to Penis   c.Ovary of cockroach   d. Ovary of mammals.

9. Egg is liberated from ovary in

a. Secondary oocyte stage   b. Oogonial stage   c. Primary Oocyte stage   d. Mature ovum Stage

10. How many sperms are formed from a Secondary Spermatocyte

a. 4   b. 8   c. 2   d. 1

11. The decomposition of organic matter is brought about by

a. Protozoans   b. Plants   c. Microorganisms   d. All of the above

12. Primary consumers are-

a. Carnivores   b. Herbivores   c. Decomposers   d. Omnivores

13. The source of energy in an ecosystem is

a. Sunlight   b. DNA   c. ATP   d. Producers

14. Which biotic components mainly help in recycling of minerals-

a. Producers   b. Consumers   c. Decomposers d. All the above

15. Ecosystem is-

a. Any functional unit that includes the whole community in a given area interacting with the abiotic factors

b. A group of green plants

c. A group of animals interacting with environment   d. Man and pets living together

16. Which of the following is a palindromic sequence?

a. 5'-CGTATG-3'   b. 5'-CGAATG-3'

3'-CGAATG-5'   3'-GCATAC-5'

c. 5'-GAATTC-3'   d. 5'-GACTAC-3'

3'-CTTAAG-5'   3'-CTTAAG-5'

17. Given below is a sample of a portion of DNA strand giving the base sequence on the opposite strands. What is so, special shown in it?

5'_GAATTC_3'

3'_CTTAAG_5'

a. Deletion mutation   b. Start codon at the 5' end

c. Palindromic sequence of base pairs   d. Replication completed

18. There is a restriction endonuclease called Eco RI. What does the 'co' part in it stand for?

a. Coelom   b. Coenzyme   c. coli   d. Colon

19. For cloning, restriction enzymes with sticky ends are used for

a) ease of transformation

b) easy insertion into plasmids of DNA segments from different sources

c) easy identification of plasmids with antibiotic resistance

d) easy identification of plasmids having inserts.

20. The host controlled restriction is a process associated with

a) gene of interest   b) bacteria   c) plasmid   d) viruses

21. The Nucleosome is the repeating unit of what in a nucleus?

a) chromosome   b) genes   c) chromatin   d) chromosome

22. The strand of DNA that forms mRNA is called?

a) Lagging strand   b) Coding strand   c) Antisense strand   d) Template strand

23. In Avery, Macleod and McCarty experiment, the transformation of bacteria was inhibited by:

a) Proteases   b) RNase   c) DNase   d) None of these

24. Frederick Griffith discovered:

a) DNA is the genetic material   b) RNA can be the genetic material

c) Sterptococcus has two strains   d) Bacterial transformation

25. RNA is not the genetic material in:

a. Tobacco mosaic virus   b. bacteriophage   c. HIV   d. Rhino virus

26. Which of the following is a common fungal disease that affects the skin and is characterized by red, circular rashes?

a) Aspergillosis   b) Candidiasis   c) Ringworm   d) Histoplasmosis

27. Which cells are primarily involved in the innate immune response?

a) B lymphocytes and T lymphocytes   b) Neutrophils and macrophages

c) Erythrocytes and platelets   d) Plasma cells and memory cells

28. Which type of acquired immunity is provided by the administration of a vaccine?

a) Naturally acquired active immunity b) Naturally acquired passive immunity

c) Artificially acquired active immunity   d) Artificially acquired passive immunity

29. Which of the following statements about ringworm is true?

a) It is caused by a bacterium.   b) It primarily affects the lungs.

c) It can be treated with antifungal medications such as clotrimazole.

d) It is a viral infection.

30. Which of the following statements best distinguishes innate immunity from acquired immunity?

a) Innate immunity involves B cells and T cells, while acquired immunity involves phagocytic cells.

b) Innate immunity provides specific long-term protection, while acquired immunity offers non-specific immediate defense.

c) Innate immunity involves physical and chemical barriers, while acquired immunity involves the production of antibodies and memory cells.

d) Innate immunity is slower to respond, while acquired immunity is immediate and non-specific.

PHYSICS

Q1. A wheel with 10 metallic spokes each 0.5 m long is rotated with a speed of 120 rev/min in a plane normal to the horizontal component of earths magnetic field B, at a place. If B, =0.4 G at the place, the magnitude of induced emf between the axle and the rim of the wheel is

(a) 1.256 x 10^{-3} V   (b) 6.28 x 10^{-4} V   (c) 1.256 x 10^{-4} V (d) 6.28x 10^{-5}V

Q2. The magnetic flux through a circuit of resistance R changes by an amount $\Delta\phi$ in time Δt. Then the total charge q that passes during this time through any point of the circuit is given by

(a) q= $\Delta\phi/\Delta t$ (b) q=($\Delta\phi/\Delta t$) R   (c) q= - ($\Delta\phi/\Delta t$) R   (d) q= $\Delta\phi/R$

Q3. In a circuit with a coil of resistance 2Ω, the magnetic flux changes from 2.0 Wb to 10.0 Wb in 0.2 s. The charge that flows in the coil during this time is

(a) 5.0 C   (b) 4.0 C   (c) 1.0 C   (d) 0.8 C

Q4. Suppose the number of turns in a coil be tripled, the value of magnetic flux linked with it

(a) remains unchanged (b) becomes 1/3   (c) is tripled   (d) none of these.

Q5. In Lenz's law, there is conservation of

(a) charge   (b) momentum   (c) energy   (d) current

Q6. The direction of induced current is such that it opposes the cause which produces it. This is the law of

(a) Lenz   (b) Faraday   (c) Kirchhoff   (d) Fleming

Q7. If in a circular coil A of radius R, current I is flowing and in another coil B of radius 2R, a current 2I is flowing; then the ratio of the magnetic fields BA, and BB produced by them will be

(a) 1   (b) 2   (c) 1/2   (d) 4

Q8. A uniform electric field and a uniforn magnetic field are acting along the same direction in a certain region. If an electron is projected along the direction of the fields with a certain velocity, then

(a) its velocity will decrease   (b) its velocity will increase

(c) it will turn towards right of direction of motion (d) it will turn towards left of direction of motion.

Q9. A charge Q is placed at each of the opposite corners of a square. A charge q is placed at each of the other two corners. If the net electrical force on Q is zero, then Q/q equals

(a) -2   (b) -1   (c) 1   (d) 1 V2

Q10. A charged oil drop is suspended in uniform field of 3 x 10^{4} Vm/m so that it neither falls nor rises. The Charge on the drop (take the mass of the charge 9.9x 10 kg and g=10 ms) will be

(a) 3.3×10^{-18} C   (b) 3.2 × 10-18 C   (c) 1.6x 10^{-18} C (d) 4.8x 10^{-18}C
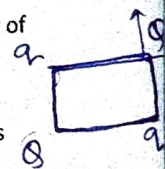
MATHEMATICS

1. If $f(x) = \frac{[x]}{|x|}, x \neq 0$, where [ ] denotes the greatest integer function, then $f'(1)$ is

(a) --1 　　　 (b) x 　　　 (c) None existent 　　　 (d) None of these

2. If $(x) = e^{-\frac{1}{x^2}}, x \neq 0$ and $f(0) = 0$ then $f'(0) =$

(a) 0 　　　 (b) 1 　　　 (c) e 　　　 (d) *None of these*

3. Assuming that the chances of a couple having a son or daughter are equal, what is the probability that out of two children that a couple has, one is a son and other is a daughter ?

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

4. A bag contains 5 brown and 4 white socks. A man pulls out 2 socks. The probability that they are of the same colour is -

(a) $\frac{4}{9}$ 　　　 (b) $\frac{1}{6}$ 　　　 (c) $\frac{5}{18}$ 　　　 (d) None of these

5. $\int \frac{\sin 3x}{\sin 5x . \sin 2x} dx$

(a) $\log|\sin 2x| + \frac{\sin 5x}{5} + c$

(b) $\frac{1}{2}\log|\sin 2x| - \frac{1}{5}\log|\sin 5x| + c$

(c) $\frac{1}{5}\log|\cos 2x| + \frac{1}{2}\log|\sin 2x| + c$

(d) None of these

6. $\lim_{x \to 0} \frac{\sin nx[(a-n)nx - \tan x]}{x^2} = 0$, where n is non zero positive integer. Then "a" is equal to

(a) $\frac{(n+1)}{n}$ 　　　 (b) n^2 　　　 (c) $\frac{1}{n}$ 　　　 (d) $n + \frac{1}{n}$

7. If A and B are matrices such that A + B and BA are both defined , then

(a) A, B are square matrices of same order 　　　 (b) A and B can be any matrices

(c) A, B are square matrices not necessarily of same order

(d) Number of columns of A = number of rows of B

8. $y = x^{x^{x^{\cdots \alpha}}}$ then $x \frac{dy}{dx}$ is

(a) $\frac{x(1 - y\log x)}{y^2}$ 　　　 (b) $\frac{y^2}{x(1 - y\log x)}$ 　　　 (c) $\frac{y^2}{1 - y\log x}$ 　　　 (d) None of these

9. $\int \frac{dx}{9 + 16\sin^2 x}$ is

(a) $\frac{1}{15}\tan^{-1}\left(\frac{5\tan x}{3}\right)$ 　　　 (b) $\frac{1}{3}\tan^{-1}\left(\frac{3\tan x}{5}\right)$ 　　　 (c) $\frac{1}{5}\tan^{-1}\left(\frac{\tan x}{15}\right)$ 　　　 (d) None of these

10. If $A = \begin{bmatrix} \alpha & \beta \\ \gamma & -\alpha \end{bmatrix}$ is a square root of $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, then α, β and γ satisfy:

(a) $1 + \alpha^2 + \beta\gamma = 0$ 　　　 (b) $1 - \alpha^2 + \beta\gamma = 0$ 　　　 (c) $1 - \alpha^2 - \beta\gamma = 0$ 　　　 (d) None of these

CHEMISTRY

1. The increasing order of the pKa values of the following compounds is

(A) phenol
(B) phenol with NO₂
(C) phenol with NO₂
(D) phenol with OMe
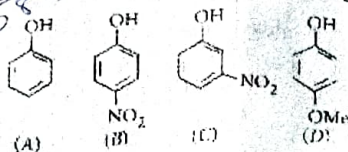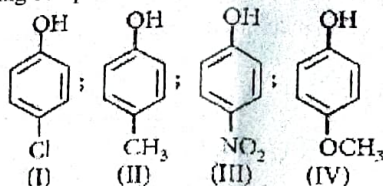
(a) D < A < C < B   (b) B < C < A < D   (c) C < B < A < D   (d) B < C < D < A

2. Which amongst the following is the strongest acid?
(a) CHJ_3 (b) $CHBr_3$ (c) $CH(CN)_3$ (d) $CHCl_3$

3. Arrange the following compounds in order of decreasing acidity.

(I) phenol–Cl   (II) phenol–CH₃   (III) phenol–NO₂   (IV) phenol–OCH₃

(a) IV > III > I > II   (b) II > IV > I > III   (c) I > II > III > IV   (d) III > I > II > IV

4. The coordination numbers of Co and Al in $[Co(Cl)(en)_2]Cl$ and $K_3[Al(C_2O_4)_3]$, respectively are :
(en = ethane-1,2-diamine)
(a) 5 and 3   (b) 3 and 3   (c) 5 and 6   (d) 6 and 6

5. The coordination number of a central metal atom in a complex is determined by
(a) the number of ligands around a metal ion bonded by sigma bonds
(b) the number of ligands around a metal ion bonded by pi-bonds
(c) the number of ligands around a metal ion bonded by sigma and pi-bonds both
(d) the number of only anionic ligands bonded to the metal ion.

6. Ejection of the photoelectron from metal in the photoelectric effect experiment can be stopped by applying 0.5 V when the radiation of 250 nm is used. The work function of the metal is
(a) 5 eV   (b) 4 eV   (c) 5.5 eV   (d) 4.5 eV

7. Which of the following statement is not correct for the reaction $4A + B \rightarrow 2C + 2D$
(a) the rate of disappearance of B is one-fourth the rate of disappearance of A
(b) the rate of appearance of C is one-half the rate of disappearance of B.
(c) the rate of formation of D is one-half the rate of consumption of A.
(d) the rate of formation of C and D are equal.

8. For a complex reaction _____.
(a) order of overall reaction is same as molecularity of the slowest step.
(b) order of overall reaction is less than the molecularity of the slowest step.
(c) order of overall reaction is greater than molecularity of the slowest step.
(d) molecularity of a reaction can be zero for the slowest step

9. An unopened soda has an aqueous concentration of CO_2 at 25° C equal to 0.0506 molal. Thus, pressure of CO_2 gas in the can is ____ . ($K_H = 0.034$ mol/kgbar)
(a) 0.671 bar   (b) 1.49 bar   (c) 1.20 bar   (d) 1.71 bar

10. An aqueous solution is 6% methanol, CH_3OH, by mass with d=0.988gmL⁻¹.Thus, molarity of CH_3OH in this solution is____
(a) 1.88 M   (b) 1.80 M   (c) 1.90 M   (d) 1.85 M