

**MOCK TEST 3, 2024**  
**HS 2ND YEAR SCIENCE**

**TIME : 1 HOUR**

**MARKS: 120( JEE), 200( NEET)**

**BIOLOGY**

1. What is the name of the structure composed of ova and their neighboring tissues at different phases of development?

- a. Ovarian follicles      b. Graffian follicles      c. Corpus luteum      d. Primary follicles

2. Which of the following organs serve as the primary reproductive organs in human males and females respectively?

- a. Testis in males and Ureter in females.      b. Urethra in males and Ovary in females.  
c. Testis in males and Ovary in females.      d. None of these.

3. Which cells in the testis of a human male produce testosterone?

- a. Germinal cells      b. Interstitial cells      c. Sertoli cells      d. Both (a) and (c)

4. Out of the following glands mentioned below, select one which is not a male accessory reproductive gland.

- a. Bulbourethral gland.      b. Prostate gland.      c. Seminal Vesicle.      d. Urinary Bladder.

5. In females, certain developmental changes occur during pregnancy due to the release of hormones. Which hormone is responsible for the enlargement of breasts during pregnancy?

- a. Oxytocin      b. Progesterone      c. Estrogen      d. Both (a) and (b)

6. The fluid which is rich in calcium fibrinolysin and acid phosphatase and contributes about 30% of the total volume of semen, is released by

- a. Cowper's glands      b. prostate gland      c. seminal vesicles      d. epididymis

7. Who Proposed the Term Biotechnology?

- a. National Center for Biotechnology Information (NCBI)  
b. The European Federation of Biotechnology (EFB)  
c. National Centre for Cell Science (NCCS)  
d. National Institutes of Health (NIH)

8. Mention the Two Views that the definition of Biotechnology Encompass?

- a. Traditional biotechnology and Modern molecular biotechnology  
b. Medical biotechnology and Agricultural biotechnology

- c. Green biotechnology and Animal biotechnology
  - d. Blue biotechnology and Red biotechnology
9. What are the two core techniques that enabled the birth of modern biotechnology?
- a. Classical and traditional biotechnology
  - b. Red biotechnology and green biotechnology
  - c. Genetic engineering and maintenance of a sterile environment
  - d. Genetics and mathematics
10. Among these which one is a product of Biotechnology?
- a. Skin.
  - b. Bacteria.
  - c. Plants
  - d. Vaccine
11. Traditional hybridization procedures have limitations, which are solved by approaches.
- a. Modern Hybridization
  - b. Immunology
  - c. Cell Biology
  - d. Genetic engineering
12. Mention the term initiates the Replication in DNA?
- a. Origin of replication
  - b. DNA ligase
  - c. Histone protein
  - d. Termination sequences
13. Which of the following is not a correct statement with respect to DNA?
- a) It is a long polymer
  - b) It is found in the nucleus
  - c) It is a basic substance
  - d) First identified by Friedrich Meischer
14. By which of the following bonds, a nitrogenous base is linked to the pentose sugar?
- a) Phosphate bond
  - b) Ester bond
  - c) Peptide bond
  - d) N-glycosidic bond
15. Through which among the following linkages are the two nucleotides connected through the 3'-5' end?
- a) Phosphodiether linkage
  - b) Phosphodisulphide linkage
  - c) Phosphodinitrate linkage
  - d) Phosphodiester linkage
16. Which is the correct complementary strand for AGAATTCGC?
- a) CTCCGGATA
  - b) GAGGCCTAT
  - c) TCTTAAGCG
  - d) GTGGCCATA
17. Which of the following is not consistent with the base pairings in a double stranded DNA molecule?
- a. The number of C equals the number of G
  - b. The number of A equals the number of T
  - c. The amount of purine is equal to the amount of pyrimidines.



- a. Wine                      b. Whisky                      c. Rum                      d. Brandy
22. Conversion of milk to curd improves its nutritional value by increasing the amount of
- a. vitamin D                      b. vitamin A                      c. vitamin B12                      d. vitamin E
23. A dikaryon is formed when
- a. Meiosis is arrested                      b. The two haploid cells do not fuse immediately.
- c. Cytoplasm does not fuse                      d. None of the above
24. Difference between Virus and Viroid is
- a. Absence of protein coat in viroid but present in virus
- b. Presence of low molecular weight RNA in the virus but absent in viroid.
- c. Both a and b                      d. None of the above
25. Which of the following is a bacterial infection primarily affecting the lungs and causing inflammation of the air sacs?
- a) Common cold                      b) Pneumonia                      c) Malaria                      d) Typhoid
26. Which of the following diseases is caused by a viral infection characterized by symptoms like runny nose, sore throat, and cough?
- a) Typhoid                      b) Malaria                      c) Common cold                      d) Filariasis
27. Which of the following diseases is transmitted to humans through the bite of infected female Anopheles mosquitoes?
- a) Filariasis                      b) Amoebic dysentery                      c) Malaria                      d) Typhoid
28. *Wuchereria bancrofti* is the causative agent of which of the following diseases transmitted by mosquitoes?
- a) Typhoid                      b) Common cold                      c) Filariasis                      d) Pneumonia
29. Which of the following diseases is caused by the protozoan parasite *Entamoeba histolytica* and is characterized by symptoms like abdominal pain, diarrhea, and bloody stools?
- a) Typhoid                      b) Amoebic dysentery                      c) Pneumonia                      d) Malaria
30. *Salmonella typhi* is the causative agent of which of the following diseases spread through contaminated food and water?
- a) Filariasis                      b) Typhoid                      c) Common cold                      d) Pneumonia

## PHYSICS

Q1. Suppose the charge of a proton and an electron differ slightly. One of them is  $-e$ , the other is  $(e + \Delta e)$ . If the net of electrostatic force and gravitational force between two hydrogen atoms placed at a distance  $d$  (much greater than atomic size) apart is zero, then  $\Delta e$  is of the order of [Given mass of hydrogen =  $1.67 \times 10^{-27} \text{kg}$ ]



- (a)  $10^{-23} \text{ C}$  (b)  $10^{-37} \text{ C}$  (c)  $10^{-47}$  (d)  $10^{-20} \text{ C}$

Q2. When an  $\alpha$ -particle of mass  $m'$  moving with velocity ' $v$ ' bombards on a heavy nucleus of charge  $Ze$ , its distance of closet approach from the nucleus depends on  $m$  as:

- (a)  $m$  (b)  $1/m$  (c)  $1/m^{1/2}$  (d)  $1/m^2$

$$b = \frac{2e^2 \cos \theta}{v^2}$$

Q3.  $\alpha$ -particle consists of :

- (a) 2 protons and 2 neutrons only (b) 2 electrons, 2 protons and 2 neutrons  
(c) 2 electrons and 4 protons only (d) 2 protons only

Q4. When a beam of light is used to determine the position of an object, the maximum accuracy is achieved if the light is

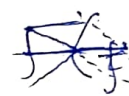
- (a) Polarised (b) of longer wavelength (c) of shorter wavelength (d) Of high intensity

Q5. A convex mirror has a focal length  $f$ . A real object, placed at a distance  $f$  in front of it from the pole, produces an image at

- (a)  $2f$  (b)  $f$  (c)  $f/2$  (d) infinity

Q6. A concave mirror of focal length  $f$  produces an image  $n$  times the size of object. If image is real, then distance of object from mirror is

- (a)  $(n-1)f$  (b)  $(n-1)f/n$  (c)  $(n+1)f/n$  (d)  $(n+1)f$



Q7. When an amber is rubbed with a woollen cloth, the amber acquires a charge of

$16 \times 10^{-18} \text{ C}$ . What is the charge on the woollen cloth ?

- (a)  $16 \times 10^{-18} \text{ C}$  (b)  $-16 \times 10^{-18} \text{ C}$  (c) zero (d) none of these

B

Q8. Which of the following is not a unit of magnetic flux

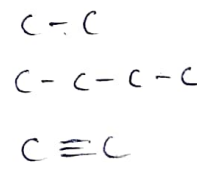
- (a) Tesla metre<sup>2</sup> (b) Webber (c) Volt second (d) Newton Ampere/metre

Q9. A charge particle will experience maximum force in a magnetic field, if it

- (a) Moves along the direction of field (b) moves at right angles to the field  
(c) kept fixed at a point (d) always experiences maximum force.

Q10. Which of the following is correct ?

- (a)  $1 \text{ T} = 10^4 \text{ G}$  (b)  $1 \text{ G} = 10^4 \text{ T}$  (c)  $1 \text{ G} = 1 \text{ T}$  (d)  $1 \text{ T} = 10^{12} \text{ G}$



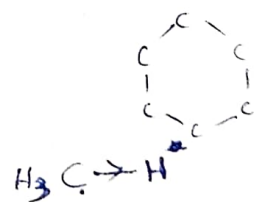
## CHEMISTRY

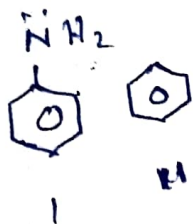
1. The distance between two adjacent carbon atoms is largest in

- (a) benzene (b) ethane (c) butane (d) ethyne

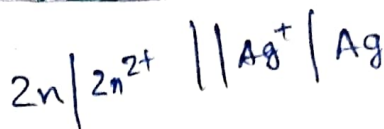
2. Reactivity of hydrogen atoms attached to different carbon atoms in alkanes has the order

- (a) tertiary > primary > secondary (b) primary > secondary > tertiary  
(c) Both (a) and (b) (d) tertiary > secondary > primary





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3. The correct order of reactivity towards the electrophilic substitution of the compounds aniline (I), benzene (II) and nitrobenzene (III) is
- (a)  $II < III > I$  (b)  $I > II > III$  (c)  $III > II > I$  (d)  $II > III > I$

4. Which of the following is a free radical substitution reaction?

- (a) Benzene with  $Br_2/AlCl_3$  (b) Acetylene with  $HBr$   
(c) Methane with  $Br_2/h\nu$  (d) Propene with  $HBr / (C_6H_5COO)_2$

5. For the following galvanic cell,  $Zn(s) + 2Ag^+(aq) \rightarrow Zn^{2+}(aq) + 2Ag(s)$  which of the electrode is positively charged?

- (a) Zinc (b) Silver (c)  $Zn | Ag$  (d) None of these

6. Saturated solution of  $KNO_3$  is used to make salt bridge because

- (a) velocity of  $K^+$  is greater than that of  $NO_3^-$   
(b) velocity of  $NO_3^-$  is greater than that of  $K^+$   
(c) velocity of both  $K^+$  and  $NO_3^-$  are nearly the same  
(d)  $KNO_3$  is highly soluble in water

$20 \rightarrow 100$

$$\frac{10^{-3}}{\frac{100}{1000}}$$

$$\frac{10^{-2} \times \frac{2}{10}}{166 \times \frac{2}{10}}$$

7. An example of a double salt is

- (a) bleaching powder (b)  $K_4[Fe(CN)_6]$  (c) hypo (d) potash alum

8. What would be the molality of 20% (mass/mass) aqueous solution of  $KI$ ? (Molar mass of  $KI = 166 \text{ g mol}^{-1}$ )

- (a) 1.48 (b) 1.51 (c) 1.35 (d) 1.08

9.  $6.02 \times 10^{20}$  molecules of urea are present in 100 mL of its solution. The concentration of urea solution is (Avogadro constant,  $N_A = 6.02 \times 10^{23} \text{ mol}^{-1}$ )

- (a) 0.001 M (b) 0.01 M (c) 0.02 M (d) 0.1 M

$$\frac{6.02 \times 10^{20}}{6.02 \times 10^{23}} \times \frac{1000}{100} = 0.01$$

10. Oxidation number of  $Ni$  in  $[Ni(C_2O_4)_3]^{4-}$  is

- (a) 1 (b) 2 (c) 3 (d) 4

## MATHEMATICS

1. The value of left continuous if  $f(x) = 3x^2 - 1$  in  $[1, 8]$  is

- (a) 190 (b) 191 (c) 200 (d) -1004

2. The value of right continuous if  $f(x) = x^3 - 1$  in  $[0, 1]$  is

- (a) 0 (b) 1 (c) -1 (d) None of these

3. If  $f(x) = \frac{\cos x + \sin x}{\cos x - \sin x}$ , find  $\frac{dy}{dx}$

- (a)  $\frac{\sec^2 x - \cot^2 x}{(\cos x - \sin x)^2}$  (b)  $\sec^2\left(\frac{\pi}{4} + x\right)$  (c)  $\propto$  (d) None of these

4.  $g(x) = h^x$  is called exponential function if

- (a)  $x > 1$  (b)  $x \geq 1$  (c)  $h > 1$  (d)  $h \geq 1$

~~$\cos x + 2 \cos x$~~   
 $\cos x - \frac{1}{2} \cos x$

b, b, b  
 b, b, g  
 b, g, g  
 g, g, g

5. If there are three children in a family, then probability that there is one girl in the family is

- (a)  $\frac{2}{3}$  (b)  $\frac{1}{3}$  (c)  $\frac{3}{28}$  (d)  $\frac{3}{8}$

6. Given a throw of three unbiased dice shows different faces, the probability of at least one face showing 6 is

- (a)  $\frac{5}{6}$  (b)  $\frac{5}{18}$  (c)  $\frac{1}{2}$  (d)  $\frac{13}{18}$

6 × 6 × 6  
 36 × 6  
 216  
 5 + 5  
10  
 30

7.  $\int \frac{\cos 5x + \cos 4x}{1 - 2\cos 3x} dx$  is equal to

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

5 + 5 + 5 + 5 + 5

8.  $\int \frac{x^2 - 1}{(x^4 + 3x^2 + 1)\tan^{-1}(x + \frac{1}{x})} dx$

- (a)  $\log |\tan^{-1}(x + \frac{1}{x})| + c$  (b)  $-\log |\tan^{-1}(x^2 - 1)| + c$   
 (c)  $\log |x^4 + 3x^2 + 1| + c$  (d) None of these

$\int \frac{x^2 - 1}{(x^4 + 3x^2 + 1)\tan^{-1}(x + \frac{1}{x})} dx$   
 $\frac{x^2 - 1}{(x^2 + 2x^2 + 1)\tan^{-1}(x + \frac{1}{x})}$   
 $\frac{(x+1)(x-1)}{x^2(x^2+2)(x+\frac{1}{x})}$   
 $z = \tan^{-1}(x + \frac{1}{x})$   
 $dz = \frac{1 + x^2 + \frac{1}{x^2} + 2}{1}$   
 $\frac{16}{8} = \frac{x^2 - 1 + 3x^2}{x^2}$

9. Which of the given values of x and y make the following pairs of matrices equal

$\begin{bmatrix} 3x+7 & 5 \\ y+1 & 2-3x \end{bmatrix}, \begin{bmatrix} 0 & y-2 \\ 8 & 4 \end{bmatrix}$

- (a)  $x = -\frac{1}{3}, y = 7$  (b) not possible to find  
 (c)  $y = 7, x = -\frac{2}{3}$  (d)  $x = -\frac{1}{3}, y = -\frac{2}{3}$

10. The number of all possible matrices of order 2 × 5 with each entry 100 or 200

- (a) 512 (b) 20000 (c) 1024 (d) None of these

$\frac{dy}{dx} = \frac{\cos x + \sin x}{\cos x - \sin x}$   
 $\log y = \log(\cos x + \sin x) - \log(\cos x - \sin x)$   
 $\frac{1}{y} \frac{dy}{dx} = \frac{-\sin x + \cos x}{\cos x + \sin x} - \left[ \frac{-\sin x - \cos x}{\cos x - \sin x} \right]$   
 $= \frac{-\sin x + \cos x}{\cos x + \sin x} + \frac{\sin x + \cos x}{\cos x - \sin x}$   
 $= \frac{1}{\cos^2 x} = \sec^2 x$   
 $\int \sec^2 x = \tan x + c$   
 $\frac{18}{4} = 3$   
 $\frac{72}{3} = 24$