

**CMB Entrance exam 2021**

**A. General Knowledge and Aptitude**

1. Seats for Mathematics, Physics and Biology in a school are in the ratio 5 : 7 : 8. There is a proposal to increase these seats by 40%, 50% and 75% respectively. What will be the ratio of increased seats?
  - a. **2 : 3 : 4**
  - b. 6 : 7 : 8
  - c. 6 : 8 : 9
  - d. None of these
2. Walking with  $\frac{4}{5}$  of my usual speed, I miss the bus by 5 minutes. What is my usual time?
  - a. 15 min
  - b. **20 min**
  - c. 25 min
  - d. 30 min
3. Which of the following rivers are the tributaries of Godavari River?
  - A. Tawa
  - B. Sone
  - C. Pranhita.**
  - D. Bhavani
4. Currently which country is the top exporter of oil to India?
  - A. Saudi Arabia
  - B. Iran
  - C. United States of America**
  - D. United Arab Emirates
5. India recently finished the construction of the world's largest solar power plant. Where is it located?
  - A. Uttar Pradesh
  - B. Tamil Nadu**
  - C. Karnataka
  - D. Madhya Pradesh
6. Andaman and Nicobar Islands are home to which of the following tribes?
  - A. Bru
  - B. Shompen.**
  - C. Kondhs.
  - D. Baiga

7. Find the odd one out in reference to the Olympic medal

- a. Saina Nehwal
- b. M.C. Mary Kom
- c. **Chanu Saikhom Mirabai**
- d. Karnam Malleswari

8. The nomenclature given to Delta plus variant of SARS-Cov2 is

- a. B. 1. 617
- b. **B.1.617.2.1**
- c. B.1.1.7
- d. B. 1. 617.2

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## B. Physics

1. What is true about velocity and acceleration of an oscillator undergoing simple harmonic motion
  - (a) They are in phase
  - (b) They have a phase difference**
  - (c) The acceleration is zero
  - (d) The velocity is zero
2. The following is a statement of the second law of thermodynamics
  - (a) The combined entropy of the system and the surroundings increases for a spontaneous process
  - (b) The entropy of the system + surroundings is unchanged for a perfectly reversible process
  - (c) The energy is conserved
  - (d) Both (b) and (c)**
3. The work done to move an electric charge  $q$  in an electric field  $E$  by distance  $dx$  is
  - (a)  $E dx$
  - (b)  $qE dx$**
  - (c)  $qE$
  - (d)  $(E/q) dx$
4. A particle undergoes uniform circular motion. About which point on the plane of the circle, will the angular momentum of the particle remain conserved?
  - (a) Centre of the circle.**
  - (b) on the circumference of the circle.
  - (c) inside the circle.
  - (d) outside the circle.
5. What are the conditions for total internal reflection to occur if there are two media, water and glass touching each other?
  - (a) Rays of light should be incident through water on glass with angle more than the critical angle
  - (b) Rays of light should be incident through glass on water with angle more than the critical angle**
  - (c) Rays of light should be incident through water on glass with angle less than the critical angle
  - (d) Rays of light should be incident through glass on water with angle less than the critical angle
6. Which of the following is the combination that is used in the formation of achromatic lenses?
  - (a) 1 convex and 1 plane mirror**
  - (b) 2 convex lenses
  - (c) 1 convex and 1 concave lens
  - (d) 2 concave lenses
7. Two equal positive charges are placed at appoint A and B. The electric potential at a point between A and B is studied while moving from A to B. The potential
  - (a) continuously increases
  - (b) continuously decreases
  - (c) increases then decreases
  - (d) decreases then increases**

8. A charged particle moving along x-axis. If an electric field is applied in y direction the motion of a particle in xy-plane is\_

(a) **elliptical** (b) parabolic (c) circular (d) linear

9. If heat is supplied to an ideal gas in an isothermal process

(a) the internal energy of the gas will be increases

(b) **the gas will do positive work**

(c) the gas will do negative work

(d) the said process is not possible

10. Tensile Strain is

(a) **Increase in length / original length**



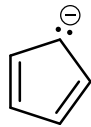
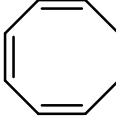
(b) Decrease in length / original length

(c) Change in volume / original volume

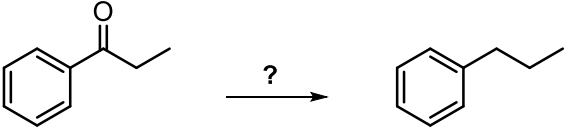
(d) All of the above

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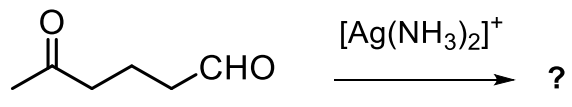
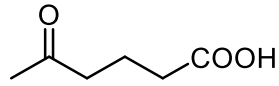
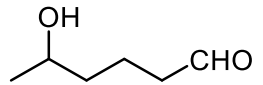
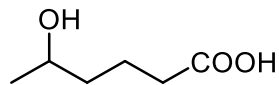
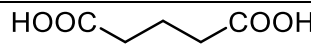
C. Chemistry

<p><b>Q-1</b></p>	<p>Which of the following compounds will be aromatic in nature?</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>I</p> </div> <div style="text-align: center;">  <p>II</p> </div> <div style="text-align: center;">  <p>III</p> </div> <div style="text-align: center;">  <p>IV</p> </div> </div>
<p><b>A</b></p>	<p>I and II</p>
<p><b>B</b></p>	<p>I and III</p>
<p><b>C</b></p>	<p>II and IV</p>
<p><b>D</b></p>	<p>I, II and III</p>

<p><b>Q-2</b></p>	<p>Which of the following alkenes will produce acetic acid on treatment with ozone, followed by oxidative workup with hydrogen peroxide?</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <math>\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}=\text{CH}_2</math> <p>I</p> </div> <div style="text-align: center;"> <math>\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}=\text{CHCH}_3</math> <p>II</p> </div> <div style="text-align: center;"> <math>\text{CH}_3\text{CH}_2\text{CH}=\text{CHCH}_2\text{CH}_3</math> <p>III</p> </div> </div>
<p><b>A</b></p>	<p>I</p>
<p><b>B</b></p>	<p>II</p>
<p><b>C</b></p>	<p>III</p>
<p><b>D</b></p>	<p>I and III</p>

<p><b>Q-3</b></p>	<p>What will be most suitable reagent/condition for the following conversion?</p> <div style="text-align: center;">  </div>
<p><b>A</b></p>	<p><math>\text{NaBH}_4</math></p>
<p><b>B</b></p>	<p><math>\text{LiAlH}_4</math></p>
<p><b>C</b></p>	<p><math>\text{H}_2</math>, Pd-C (Catal.)</p>

<b>D</b>	NH <sub>2</sub> NH <sub>2</sub> , NaOH
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<b>Q-4</b>	What main product will be formed in the following reaction? 
<b>A</b>	
<b>B</b>	
<b>C</b>	
<b>D</b>	

<b>Q-5</b>	$E_{\text{red}}^{\ominus}$ of three metals A, B, C are respectively +0.5 V, -3.0 V and -1.2 V. The reducing powers of these metals are:
<b>A</b>	B > C > A
<b>B</b>	A > B > C
<b>C</b>	C > A > B
<b>D</b>	B > A > C

<b>Q-6</b>	A zero order reaction $A \rightarrow \text{products}$ , has rate constant $10^{-2}$ mol/L/s. If a process is started with 10 moles of A in a one litre vessel, the number of moles of reactant after 10 minutes will be
<b>A</b>	10
<b>B</b>	5
<b>C</b>	6
<b>D</b>	4

<b>Q-7</b>	When lead storage battery discharges .....
<b>A</b>	Sulphur dioxide is evolved
<b>B</b>	Lead sulphate is consumed
<b>C</b>	Lead is formed
<b>D</b>	Sulfuric acid is consumed

<b>Q-8</b>	Which of the following alkali metals emits light of the largest wavelength in the flame test?
<b>A</b>	Li
<b>B</b>	Na
<b>C</b>	K
<b>D</b>	Cs

<b>Q-9</b>	Sulphur has highest oxidation state in
<b>A</b>	SO <sub>2</sub>
<b>B</b>	H <sub>2</sub> SO <sub>4</sub>
<b>C</b>	Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>
<b>D</b>	Na <sub>2</sub> S <sub>4</sub> O <sub>6</sub>

<b>Q-10</b>	In XeOF <sub>4</sub> the type of hybridization is
<b>A</b>	Sp <sup>3</sup> d <sup>3</sup>

<b>B</b>	$Sp^3d^2$
<b>C</b>	$Sp^3d$
<b>D</b>	compound not possible

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## D. Biology

1. The speciation in which a population splits into two geographically isolated populations experience dissimilar selective pressure and genetic drift is known as:
  - A. Sympatric speciation
  - B. Parapatric speciation
  - C. Peripatric speciation
  - D. **Allopatric speciation**
2. Which of the following geological periods is characterized by the first appearance of mammals?
  - A. **Triassic**
  - B. Tertiary
  - C. Cretaceous
  - D. Permian
3. The Lamarckian concept of evolution was chiefly based upon:
  - A. Inheritance
  - B. **Variation**
  - C. Transformation
  - D. Speciation
4. Which of these is a correct statement?
  - A. Pyramid of energy is always inverted
  - B. **Pyramid of energy is always upright**
  - C. Pyramid of energy can be upright or can be inverted
  - D. Pyramid of energy also takes into account the mass of species
5. Here is a list of adaptations shown by the animals living in cold areas. Find the INCORRECT one.
  - A. Thick fur
  - B. Hibernation
  - C. **Aestivation**
  - D. Small surface area to volume ratio
6. Which of the following disease is maternally inherited?
  - a. Huntington's Disease
  - b. **Leigh Syndrome**
  - c. Down's Syndrome
  - d. Klinefelter Syndrome
7. Which is of the following genetic disorder is popularly known as Royal disease?
  - a.  $\beta$ -Thalassemia
  - b. Sickle cell anemia
  - c. **Hemophilia**
  - d. Leukemia

8. Size of SARS-CoV-2 genome is about
- a. 29.7kb**
  - b. 19.7kb
  - c. 25.7kb
  - d. 15.7kb
9. The gland which is very large at the time of birth and later regresses is
- a. Pineal
  - b. Pituitary
  - c. Thyroid
  - d. Thymus**
10. Transgenic Golden rice is rich in following nutrient
- a. Vitamin A**
  - b. Vitamin C
  - c. Riboflavin
  - d. Thiamine
11. Vitamin B12 deficiency leads to
- a. Scurvy
  - b. Night blindness
  - c. Pernicious anemia**
  - d. Mouth ulcers
12. The First genetically modified crop approved for cultivation in India was
- a. Bt Brinjal
  - b. Amflora Potato
  - c. Bt Cotton**
  - d. Golden Rice
13. Which of the following plant hormone is most effective in eliminating seed dormancy?
- a. Ethylene
  - b. Cytokinins
  - c. Auxins
  - d. Gibberellins**
14. Which of the following Auxin is used as selective herbicide
- a. IAA
  - b. IBA
  - c. 2-4-D**
  - d. NAA
15. The Great Irish Famine was caused by
- a. Aspergillus
  - b. Phytophthora**
  - c. Puccinia
  - d. Fusarium

16. O- Antigen is normally found in .....
- Gram positive bacteria
  - Gram negative bacteria**
  - Fungi
  - Algae
17. ....is a free-living nitrogen-fixing bacteria present in the soil.
- Azotobacter**
  - Saccharomyces
  - Rhizobium
  - Both a and c
18. Microbes are also used as biocontrol agents such as .....against insects/pests.
- Bacillus subtilis*
  - Bacillus cereus*
  - Lacto bacillus*
  - Bacillus thuringiensis***
19. The number of chromosomes in Primary spermatocyte and spermatid of human male are
- 46 and 23**
  - 23 and 46
  - 46 and 46
  - 23 and 23
20. In the process of folliculogenesis, the primordial follicle in the female ovary transforms to \_\_\_\_\_ which secretes \_\_\_\_\_.
- Primary oocyte, estrogen
  - Mature oocyte, progesterone
  - Graafian follicle, progesterone**
  - Graafian follicle, estrogen
21. A signal originates from the placenta and fully developed fetus which initiates the foetal ejection reflex triggers the release of which hormone?
- Progesteron
  - Lutenizing hormone
  - Prolactin
  - Oxytocin**
22. The fluidity of plasma membrane increases with
- Unsaturated fatty acid**
  - Saturated fatty acid
  - Glycolipid
  - Phospholipid

