Winter vacation homework

(Biology)
Class JC.

Q.1 What is Inheritance? Discuss the types of inheritance?

2. What are somatic cells and germ cells?

3. What is the difference in mitosis and meiosis?

4. Discuss how Hiv is caused and how it can be cured?

5. What is the function of placenta and estrogen during expecting a child?

6. What is the difference in evolution and natural selection?

7. What does autosomal dominant and recessive trait mean?

8. What are holendric genes?

9. What is pedigree?

10. Construct a pedigree of X linked dominant disease in a family.

Solutions to Practice Problems for Genetics, Session 3: Pedigrees

Question 1
In the following human pedigrees, the filled symbols represent the affected individuals. You may assume that the disease allele is rare and therefore individuals marrying into the family are unlikely to have defective allele.

a)

\[ \begin{array}{c}
  \text{Individual} & \text{Genotype} \\
  \#1 & aa \\
  \#3 & aa \\
  \#4 & Aa \\
  \#5 & aa \\
\end{array} \]

i) What is the most likely mode of inheritance for this pedigree?

*Autosomal dominant*

ii) State the genotypes of individuals # 1-5 in the following table using the letter ”A”. Use the uppercase letter to represent the dominant allele and lowercase letter to represent the recessive allele.

iii) If individuals # 2 and 3 have another son what are the chances that this son will be affected?

*50% (Aa x aa)*
i) What is the most likely mode of inheritance for this pedigree?

*Autosomal dominant*

ii) State the genotypes of individuals # 6-8 in the following table using the letter ”B”. Use the uppercase letter to represent the dominant allele and lowercase letter to represent the recessive allele.

<table>
<thead>
<tr>
<th>Individual</th>
<th>Genotype</th>
</tr>
</thead>
<tbody>
<tr>
<td>#6</td>
<td>Bb</td>
</tr>
<tr>
<td>#7</td>
<td>Bb</td>
</tr>
<tr>
<td>#8</td>
<td>bb</td>
</tr>
</tbody>
</table>

iii) If Individuals #6 and #7 have another daughter what are the chances that she will be affected.

*75% (Aa x Aa)*.
You are analyzing the following human pedigree.
Assume that the individual marked with an asterisk (*) does not carry any allele associated with
the affected phenotype and that no other mutation spontaneously occurs. Also assume complete
penetrance. Use “R or X<sup>R</sup>” for the allele associated with the dominant phenotype, “r or X<sup>r</sup>” for the
allele associated with the recessive phenotype.

\[\begin{array}{c}
\text{affected} \\
\text{female} \\
\text{affected} \\
\text{male} \\
\hline
\text{Unaffected} \\
\text{female} \\
\text{Unaffected} \\
\text{male} \\
\end{array}\]

\[\begin{array}{c}
A \\
B \\
\end{array}\]

a) What is the most likely mode of inheritance of this disease? Choose from: autosomal dominant, autosomal recessive, X-linked dominant, X-linked recessive.

*X linked recessive*

b) List all possible genotypes of the following individuals in the pedigree.

<table>
<thead>
<tr>
<th>Individuals</th>
<th>Genotypes</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>X&lt;sup&gt;r&lt;/sup&gt; X&lt;sup&gt;r&lt;/sup&gt; or X&lt;sup&gt;R&lt;/sup&gt;</td>
</tr>
<tr>
<td>#3</td>
<td>X&lt;sup&gt;R&lt;/sup&gt; X&lt;sup&gt;r&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

c) What is the probability of Individual A being affected?
The father of Individual A has the genotype XY. Individual A is a female so she will inherit the X<sup>r</sup>
from her father. The probability that Individual A’s mother is a carrier (X<sup>R</sup>X<sup>r</sup>) is 1/2 since female #3
is a carrier (#3 has an affected son). If Individual A’s mother is a carrier (X<sup>R</sup>X<sup>r</sup>) then the
probability that Individual A will inherit X<sup>r</sup> from her mother is 1/2. The combined probability that
that Individual A will inherit a X<sup>r</sup> is 1/2 x 1/2, or 1/4.

d) What is the probability of Individual B being affected?
Because individual B is male, he will inherit the Y chromosome from his dad. Thus the probability
of Individual B being affected is the same as the probability of Individual B inheriting the X<sup>r</sup> from
his mother. Given the explanation above, this is 1/4.
The following human pedigree shows a family affected by a specific disease. Assume that the individuals marked with an asterisk (*) do not carry any allele associated with the affected phenotype and that no other mutation spontaneously occurs. Also assume complete penetrance.

1st Pedigree

a) State the most likely mode of inheritance for this disease. Choose from: autosomal dominant, autosomal recessive, X-linked dominant, X-linked recessive.

*autosomal recessive*

b) Write all possible genotypes of the following individuals in the pedigree. Use the uppercase “A” for the allele associated with the dominant phenotype and lowercase “a” for the allele associated with the recessive phenotype.

<table>
<thead>
<tr>
<th>Individuals</th>
<th>All possible Genotypes</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>AA or Aa</td>
</tr>
<tr>
<td>#2</td>
<td>AA or Aa</td>
</tr>
<tr>
<td>#4</td>
<td>Aa</td>
</tr>
</tbody>
</table>

c) What is the probability that Individual 5 will be a carrier?

Individual 4 is a carrier since she gets a disease allele from her father. Individual 4 marries a person who is AA (this was given in the prompt). Therefore the chance that Individual 5 is a carrier is ½.

d) The following human pedigree shows a family affected by a different disease. Assume that the individuals marked with an asterisk (*) do not carry any allele associated with the affected phenotype and that no other mutation spontaneously occurs. Also assume complete penetrance. State the most likely mode of inheritance for this disease.

*X-linked recessive*

2nd Pedigree

Note: Use the notation such as “R or X^R” for the allele associated with the dominant phenotype and “r or X^r” for the allele associated with the recessive phenotype.
e) Individual 3 from the 1st pedigree has a second marriage with Individual 6 from the 2nd pedigree. They have a son and a daughter as shown below.
What would be the genotype of their son for the two disease genes?

Aa X^r Y

What would be the genotype of their daughter for the two disease genes?

Aa X^r X'^r
Chemistry: Home Assignment (Winter Vacation)
Class: JC

# How much volume of ammonia is produced by reacting 500g of nitrogen hydrogen each at STP

# Find out the mass of H2O Alumina Al2O3 and CaO formed by reacting 500g, 700g and 900g of each reactant as by the following equations

\[
\text{CH}_4 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}
\]

\[
\text{Al} + \text{O}_2 \rightarrow \text{Al}_2\text{O}_3
\]

\[
\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2
\]

# Explain the electrolysis of the aqueous sulphuric acid and also explain the factors effecting the electrolysis

# Why combustion of the methane is an exothermic reaction while thermal decomposition of calcium carbonate is an endothermic reaction.

# HOW TEMPERATURE, CONCENTRATION OF REACTANTS, PRESSURE, SURFACE AREA AND CATALYST EFFECT THE RATE OF REACTION

# How we Identify Captions and Anions (Table at page 191 and 192)

# Explain industrial preparation of sulphuric acid by contact process

Explain the following

Crystallization of the microchips

Boiling of water above 100°C and well below 100°C

Quark in atom

How atoms are amazingly small

IUPAC

Contribution of Amide Avogadro

Empirical and molecular formulae of Hemoglobin

Space shuttle and catalyst

Catalytic converter

Different colored flowers of Hydrangea shrub

Test of Hemoglobin by copper sulphate

Eutrophication and aquatic life

Names of halogens and their origin

Work of correction fluid

Different colors of hairs

Relation between CO2 and Hiccups

Relation between O3 and railway lines and photocopier

Restore the old paintings

A burning candle shows all the three states of matter

(Take help from Fancy that and think science from book)

# Solve the complete past papers of last five years
WINTER VACATION HOME ASSIGNMENT

Subject: ENGLISH          Class: JC

Q2. Solve the Past Papers of 1123 of the years 2015 to 2018.
Q3. Write an essay on the topic:
    ‘Impact of Electronic Media on Youth’

Islamiyat Class - JC (New)

1. Revise Quranic Passage from text book (Passage No. 1 to 15)

ARMY BURN HALL COLLEGE FOR BOYS

HOMEWORK WINTER VACATION

Maths
CLASS : JC

Topic 1: Numbers
Solve all questions in topical book

Topic 2: Indices and Standard form.
Solve all questions in topical book.

Topic 3: Inequalities.
Solve all questions from past papers.

Topic 4: Algebraic Expressions and Manipulations.
Solve all questions from past paper.

Topic 4a: Variation Solve all questions from the past paper.

Topic 5: Solution of Equations and Simultaneous Equations.
Solve all questions from the past paper.

Topic 6: CO-ORDINATE GEOMETRY.
Solve all questions studied till date.

Topic 9: Similarity and Congruency.
Solve questions related to book 1,2 and 3.

Topic 10: Mensuration.
Solve all questions from the past paper.

Topic 11: Symmetry.
Solve all questions from the past paper.

Topic 16: Probability.
Solve all the questions studied till date.

Topic 20: Sets and Venn diagram.
Solve all questions studied till date.

Topic 22: Functions

Solve all questions from the past paper.

NOTE: 13|23 TOPICS ARE GIVEN IN HOMEWORK WHICH ARE STUDIED IN BOOK I, II, AND III IN PJC & JC.

REST OF THE 10 TOPICS, WE WILL STUDY IN (FINAL YEAR) PSC, SC CLASSES.

ADVICE: NEXT 14 CHAPTERS ARE BASED ON PREVIOUS STUDIES, SO MUST PRACTICE THESE TOPICS IN WINTER VACATIONS TO MAKE THE CONCEPTS STRONG.

Winter Vacations Assignment, 2019-20
Class: JC (New) Subject: History

➢ Preparation of Chapter# 11-16 from The History and Culture of Pakistan by Nigel Kelly. Write down summery (200-250 words) of each chapter.
➢ Preparation of the topics included in the Third Section of The History and Culture of Pakistan by Nigel Kelly, from the following websites.
https://asiasociety.org/education/Pakistan-politics-history
➢ After preparation, write summery (highlighting key concepts) of each chapter separately in-between 200-250 words.

Home Work Assignment Winter Vacation 2019
Subject: Geography Class: JC

Q1: Read the following extract:
Pakistan is a water-deficit country. The rainfall is neither sufficient nor regular, and does not meet the growing need for water. Agriculture is a major user, and good yields depend on the adequate availability of water at the right time. The increasing pressures of population and industrialization have already placed great demands on water supplies and there are an ever-increasing number of local and regional conflicts over water availability and use.

a) Why do the writers refer to Pakistan as a “water-deficit country”? 
b) Using examples, explain why there are conflicts over water availability and use?

Q2: Heavy rain and thunderstorms affect the business and industry in urban areas. Explain the advantages and disadvantages of summer monsoon rain for the lifestyle and economic activities of the people in urban areas.

Q3: Read the following views:
A: Pakistan would benefit from stronger trade links with China.
B: There are more advantages to Pakistan maintaining trade with EU (European Union) countries.
Which statement do you agree with more? Give reasons for your answer and refer to places or examples you have studied in Pakistan to support your answer.
Q4: Solve the following past papers:
   a) Year 2017 (June & November)
   b) Year 2018 (June & November)
Q. 5 Memorize and prepare Pakistan studies portion of the general quiz for the academic quiz test
Q6: Read the following views:
A: Unemployment levels are best reduced by increasing training opportunities in agriculture and other primary sector jobs.
B: Unemployment is more likely to be reduced by providing education in skills for the manufacturing and service industries.
Which view do you agree with more? Give reasons and refer to places or examples you have studied to support your answer.

WINTER VACATIONS ASSIGNMENT - PHYSICS
CLASS JC (New)
Note: The winter home assignment must be done on a separate notebook, except where told otherwise.

1. Write the definitions, statements, and sketch diagrams (where required) of all the topics.
   Chapter 02
   Chapter 03
      i. Force ii. Newton Laws of motion iii. Balanced and unbalanced forces
   Chapter 04
      i. Mass ii. Weight iii. Density iv. Differentiate between mass and weight
   Chapter 05
      i. Torque or moment ii. Moment arm iii. Principle of moments iv. Types of equilibrium v. Stability
   Chapter 06
   Power
      Chapter 07
         i. Pressure ii. Atmospheric pressure iii. Pressure in liquids iv. Barometer and manometer
   Chapter 08
      i. Temperature ii. Thermometric property ii. Thermometric liquids, write their properties
   Chapter 09
      i. Kinetic Molecular Theory ii. Describe the structure and properties of three states of matter on basis of kinetic molecular theory.
   Chapter 10
      i. Heat ii. Heat capacity iii. Specific heat capacity
Chapter 11
   i. Melting and freezing/solidification ii. Boiling and condensation iii. Evaporation iv. Differentiate between Evaporation and Boiling v. Melting and Boiling point vi. Factors affecting evaporation

Chapter 12
   i. Conduction and its mechanism ii. Convection and its mechanism iii. Radiations and its mechanism

Chapter 13
   i. Waves ii. Types of waves iii. Characteristics of wave iv. Ripple tank v. Electromagnetic spectrum

Chapter 14
   i. Reflection ii. Refraction iii. Laws of reflection and refraction iv. Types of reflection v. Total internal reflection vi. Image formation by plane mirror

Chapter 15
   i. Lenses and their types, ii. Ray diagrams, iii. Image formation by concave and convex lens

Chapter 16
   i. Longitudinal waves, Transverse waves, ii. Sound as longitudinal waves, iii. Characteristics of sound (Loudness, pitch and quality)

2. Solve the Exercises of the following chapters:
   Chapter 1 – 16

3. Solve these topics from topical on separate note book.
   (Topic 01 to topic 16)

4. Write the formulae of all the units from 1 –16 on colour pages.

Winter vacation home work JC