

BITS, Pilani – Dubai Campus

Knowledge Village, Dubai

Comprehensive Examination - 2003/2004

1st year – Section: 2 (closed Book)

Course: General Biology / BioUC111

Date: 07-06-04, Monday

Duration: 3 hours

Marks 100 / Weightage (40%)

Note: Attempt all parts of the questions in sequence and together.
Your answers should be brief and to the point.

Draw diagrams wherever necessary.

Full form of the biological terms to be mentioned at least first time in your answer
Marks will be given for only fully correct objective answers.

Q 1. Choose the correct answer from the options:

(10x1=10)

- a) When striated muscle fibres contract
The Z lines are pulled closer together
The A band becomes shorter
The I band remains the same
The H zone widens slightly
- b) Which of the following is / are not found in the prokaryotic cells?
Nucleolus plasma membrane mitochondria nucleus
- c) If the parent cell of fruit fly has 8 chromosomes, then the daughter cells following meiosis will have:
8 chromosomes 16 chromosomes 4 chromosomes none of the above
- d) The greatest contributor of electrons to electron transport system is
Carbon cycle glycolysis krebs cycle EMP
- e) From the following binomial nomenclature which one is internationally accepted.
HOMO SAPIENS Homo Sapiens Homo sapiens Homo Sapiens
- f) Cochlea is related with
Ophthalmic auditory olfactory gustatory
- g) Antirichitic vitamin is otherwise referred as
Calciferol tocopherol retinol riboflavin
- h) Automatic activities like breathing, Blood pressure & heart rate is controlled by
Cerebellum cerebrum hypothalamus Medulla oblongata
- i) Total of all chemical reactions and associated energy changes in the living is referred as
Competitive inhibition glycolysis fermentation Metabolism
- j) Which unit is not an Angstrom?
1/one ten billionth of a meter 1/billionth of a meter 0.0001 m 1/10th of nm

Q 2. Identify the following:

(8x1=8)

- a) $A^2 + 2Aa + a^2 = 1$:
- b) "Co₂ is captured & converted into carbohydrates by using the reducing power of NADPH & energy of ATP"- What is this process?
- c) An organism that obtains energy by the decomposed of dead organic material:
- d) An organ attached to the human liver that stores bile:
- e) Laws designed to eliminate the "bad" genes from the human gene pool:
- f) This porous capsule filters the big molecules (proteins) from the urine:
- g) Vaccine for the tuberculosis:
- h) Thick muscular septum, which separates thoracic cavity & abdominal cavity:

Q 3. Compare & contrast the following:

(4x3=12)

- Enzymes & catalysts:
- BMR & BMI:
- Nephron & Nephredia:
- Deciduous forest & Desert:

Q 4. Write answers briefly:

(8x3=24)

- i) When human RBCs are kept in the hypotonic solution – What will happen? Give the reason
- ii) How does the age of mother influence in trisomy births?
- iii) What is a controlled experiment? Give one example.
- iv) Endo symbiotic theory
- v) List the possible genotypes for the following blood groups. A, B, AB & O .
- vi) Mention how the cells use lysosomes in 4 major ways.
- vii) Stanley millers' experiment:
- viii) Competitive inhibition with illustration:

Q 5. When both parents are heterozygous to ear lobe and blue eye what are the possible outcome when they are crossed? Write the steps you have followed. In your answer mention all possible phenotypes and their ratios.
[In human, free ear lobe is dominant over attached and brown eyes are dominant over blue eyes]

Q 6. Fill in the blanks:

(3x4=12)

- a) Name and give examples of the interspecific interactions symbolized in the table:

| | Interaction | Examples |
|----|-------------|----------|
| ++ | | |
| +0 | | |
| +- | | |
| -- | | |

- b) Label the levels of this food chain. How does a food chain differ from a food web?

A

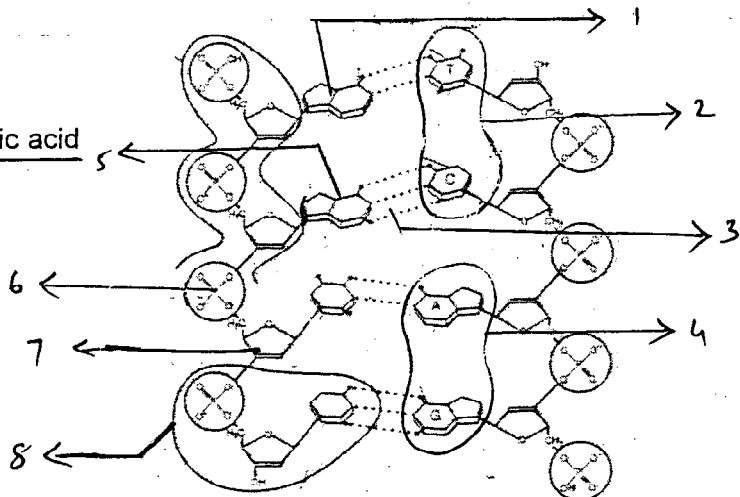
B

E

C

D

- c) Name the components of nucleic acid



Q 7. Expand the abbreviations; mention the place from where hormones released & their main actions.

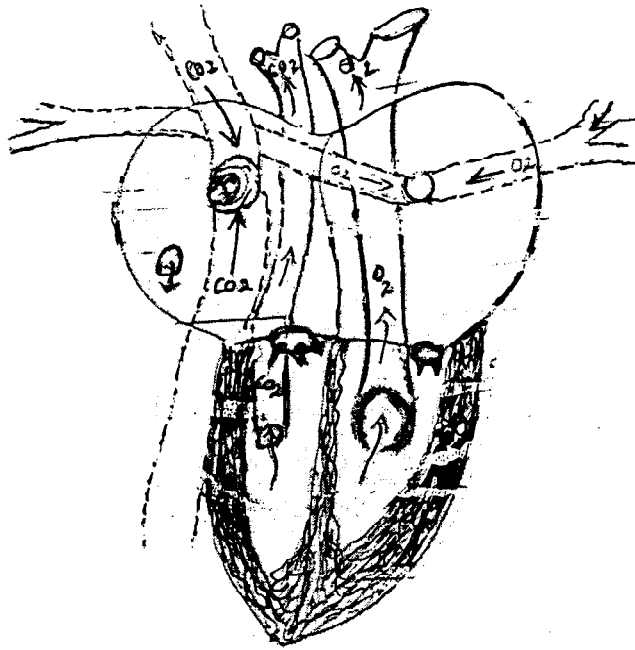
(8x1½=12)

| Hormones | Full form | Secreted from | Main actions |
|----------|-----------|---------------|--------------|
| SH | | | |
| OH | | | |
| TSH | | | |
| ACTH | | | |
| MSH | | | |
| LTH | | | |
| ADH | | | |
| LH | | | |

PTO

Q 8. List the sequences of events that take place when DNA message is translated in to proteins. (6marks)

Q 9 Draw the given diagram, identify the parts and label them. (8x1=8)



- i) Which is an exceptional vein
- ii) Which prevents the back flow of deoxygenated blood from ventricle to auricle
- iii) Which is the covering of the heart.
- iv) Which brings the lymph fluid to the heart through an opening
- v) Which brings the impure blood from the anterior parts of the body
- vi) Which is the thickest and powerful cardiac muscle
- vii) Valve present in between left atrium and left ventricle
- viii) The biggest blood vessel, which takes, oxygenated blood from the heart

Good luck

The possibilities of having phenotypes and their ratios:

9/16 (9:16) Free ear lobe, brown eyes.

* 3/16 (3:16) Free ear lobe, blue eyes

@ 3/16 (3:16) straight hair, brown eyes

\$ 1/16 (1:16) straight eyes, blue eyes.

Q 6. Fill in the blanks

(3x4=12)

- a) Name and give examples of the interspecific interactions symbolized in the table:

| | Interaction | Examples |
|----|------------------------|---|
| ++ | Mutualism | Flowering plants/pollination; protozoan in termites & ruminants |
| +0 | Commensalism | Remora fish getting a free ride on shark |
| +- | Predation & parasitism | Animal predators, herbivores, ectoparasites & endoparasites |
| -- | Competition | Carnivores fighting with each other, cannibalism. |

- b) Label the levels of this food chain. How does a food chain differ from a food web?

A primary producers, plants, phytoplanktons

B primary consumers, herbivores/zooplanktons

E decomposers

C secondary consumers, carnivores

D tertiary consumers, carnivores

- c) Components of the nucleic acid

- 1) Adenine
- 2) T - C = Pyrimidine
- 3) Hydrogen bonds
- 4) A - G = Purine
- 5) Guanine
- 6) Phosphate
- 7) Sugar / pentose
- 8) Nucleotide

Q 7. Expand the abbreviations, place from where hormones released and their main actions. (8x1½ =12)

| Hormones | Full form | Secreted from | Main actions |
|----------|----------------------------------|--------------------------|--|
| SH | Somato Tropic Hormone | Anterior Pituitary lobe | Promotes growth |
| OH | Oxytocin Hormones | Posterior Pituitary lobe | Stimulates contraction of uterus & expulsion of milk. |
| TSH | Thyrotrophic Stimulating Hormone | Anterior Pituitary lobe | Stimulates thyroid glands to release hormones |
| ACTH | Adreno Cortico Tropic Hormone | Anterior Pituitary lobe | Stimulates adrenal cortex to produce & secrete corticosteroids |
| MSH | Melanin Stimulating Hormone | Middle pituitary lobe | Regulates skin pigment cells |
| LTH | Luteo Tropic Hormone | Anterior Pituitary lobe | Promotes the growth of mammary glands & lactation during pregnancy |
| ADH | Anti Diuretic Hormone | Posterior Pituitary lobe | Promotes reabsorption of water by kidney collecting ducts. |
| LH | Lutenizing Hormone | Anterior Pituitary lobe | Stimulates sex hormones & development of corpus luteum in female |

BITS, Pilani – Dubai Campus
Knowledge Village, Dubai
Second Semester – 2003 / 2004 1st Year Section: 2
Test - 2 (Open Book)

Course: General Biology / BioUC111
 Date: Sunday 09.05.04

Duration: 50 minutes
 Marks 50 / Weightage (20%)

*Note: Answer all the questions briefly and to the point.
 All parts of the question should be done together
 Draw diagrams where ever necessary
 For objective questions only completely correct answers will be given marks.*

1) Choose the correct answers from the following and match them properly with the under mentioned. (Some will have more than 1 answer) (10 x 1 = 10.0)

Nucleotide formation, Insulators, UV rays, Bowel movements, Lack of menstrual cycle, Tocopherol, Haemorrhage, Myogenic, ADEK, Essential components of cell membrane, Cardiac rhythm, Thermo regulators, Essential for women in conception, Monocytes, rickets, defensive, Production of prothrombin, Vitamin D.

- Disaccharides –
- Phospholipids –
- Calciferol –
- Vitamin K –
- Vitamin E –
- Amenorrhea –
- Fat soluble –
- Cellulose-
- Macrophage-
- Sino auricular node-

2) Assume that you have taken noodles today with a piece of grilled chicken, and few pieces of deep fried sausages and a cup of yogurt. What will happen to the food in your digestive system?

- ❖ Mention parts of the digestive system that will interact. (6.0)
- ❖ Name the enzymes interacting with the food
- ❖ Name the end products from the food

| Name of the food | Part of the intestine | Reactions (Enzymes acting on it) | End products |
|------------------|-----------------------|----------------------------------|--------------|
| | | | |
| | | | |
| | | | |

3) A 57 years old business executive whose height is 5' 7" and weight 143 lbs carries out **hectic** business transaction with her clients for 3½ hours in the morning and 2 hours in the evening. Calculate how much energy will she spend per week for the job mentioned. (Thursday afternoon & Friday full day - Weekly off) (8.0)

4) A 11-member football team was supplied with (4.0)
 a) Cooked cereals & pasta consisting of 3850 grams of carbohydrates
 b) Fried bean- mutton curry, which consists of 2530 grams of fat.
 Calculate the amount of energy procured by each teammate from the food supplied.

5) Exercise initially gains weight – Why is it so?

(2.0)

6) a) Choose the correct Human dental formula

(10 x 1 = 10.0)

- i2/2, c1/1, pm2/2, m3/3
- c1/1 i2/2, pm2/2, m3/3
- i2/2, c1/1, m3/3 pm2/2,
- i1/1, c2/2, pm2/2, m3/3
- i2/2, c1/1, pm3/3, m2/2

b) Spot out the essential amino acids essentially required for the infants. And mention its significance. : *Valine, Histidine, Methionine, Isoleucine, Leucine.*

c) Pancreatic amylase acts on

- a) Stomach b) Duodenum c) Colon d) Buccal cavity e) Appendix

d) Major constituent of plasma is

- a) NaCl b) Hb c) C₆ H₁₂O₆ d) H₂O e) NH₃

e) In human, blood returning to the heart from kidney drain in to

- a) Left Auricle b) Right Auricle c) Left Ventricle d) Right Ventricle e) renal Artery

f) What are the minerals that are highly essential for women during their adulthood?

g) Ptyalin acts in

- a) Stomach b) Duodenum c) Colon d) Rectum e) buccal cavity

h) Large intestine in human

- a) Digests all types of food
- b) Is the largest part of the intestine
- c) Is connected to the pyloric stomach
- d) Is connected to the cardiac stomach
- e) Absorbs water

i) Which part of the brain receives two major sensory inputs?

j) Microvilli are very few in large intestine than in small intestine. What is the reason?

7) Calculate the BMI:

- For a person whose weight is 5' 3" and weight is 190 Lbs.
- Suggest what type of food that he should consume.

(4.0)

8) Blind spot and yellow spots are present on the sensitive layer of eye. Which one is more perceptible to light? Give reasons.

(4.0)

9) Which food will you select considering its health point of view?

(2.0)

Justify the reason for your choice.

- Dressed chicken / grilled chicken / dressed deeply fried chicken
Broiled fish / smoked fish / preserved fish.

Good luck

BITS, Pilani – Dubai Campus
Knowledge Village, Dubai
Second Semester – 2003 /2004 – 1st year Section: 2
Test - 2 (Open Book)

Course: General Biology / BioUC111

Date : Make up test

Duration: 50 minutes

Marks 50 / Weightage (20%)

Note: Answer all the questions briefly and to the point.

All parts of the question should be done together

Draw diagrams where ever necessary

For objective questions only completely correct answers will be given marks.

- 1) Assume that you have taken fried rice today with a piece of grilled chicken, and little yoghurt. What will happen to the food in your digestive system? (8.0)
 - a) Mention the nutrients (biochemical ingredients) of the food.
 - b) Mention which part of your digestive system interacts with the food.
 - c) Name the enzymes that interact with the food
 - d) Name the end products from the digested food
- 2) A woman having a weight of 195 Lbs and height of 5' 5" is considered to be obese. Justify the statement giving scientific reason. (4.0)
- 3) A boy has consumed Pasta, which consists of 635 gms of carbohydrates and fried bean-meat curry, which consists of 290 gms of fat, how much energy will he be getting from that food? (4.0)
- 4) Solve the problems: 21-year sports woman whose height is 5' 10" and weight 68 Kgs goes for an extensive exercise for 1 ½ hours a day. How much energy will she spend on that day? (7.0)
- 5) Calculate the BMI:
 - For a person whose weight is 5' 3" and weight is 190 Lbs. (4.0)
 - Suggest the type of food and exercise that he must adopt.
- 6) Which type of food compensates the Biochemical ingredients of grilled meat and poultry? Recommend some of them with reasoning. (3.0)
- 7) Mention the name of food which acts as anti carcinogenic. (2.0)
- 8) What do you mean by "ketone breath" briefly explain its phenomena (2.0)
- 9) It was noticed that after recovering from the head injury the 'patient – A' forget about his whereabouts. Another 'patient –B' is conscious but not able to express verbally. Which parts of the brain must have got affected in Patient A & B? (2.0)
- 10) Which hormone determines the behaviour of a person / responses / reactions / movements made by him in any situation (2.0)
- 11) Name the muscle, which has the ability to stay contracted for a long period without being fatigued. (2.0)
- 12) **Correct the statements by giving reason** (5 x 2 =10)
 - a) More the vassopresine is produced more you get excited.
 - b) Vitamins are the sources of energy
 - c) Vigorous and anaerobic exercises are most beneficial in weight loss.
 - d) Sports personal must increase intake of protein in their diet.
 - e) Hydrogen ion concentration in the blood rises when you breath more deeper.

BITS, PILANI – DUBAI CAMPUS
 Knowledge Village, Dubai
QUIZ (Closed Book)

1st year 2nd Semester – Section: 2

Wednesday 07th April 2004 (Second period)

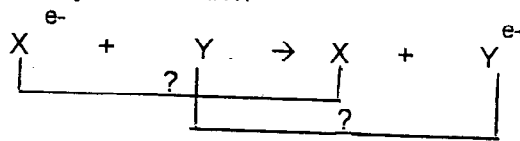
Course: General Biology (BIO UC111)

Time 30 minutes – Max Marks 30 (Weightage 10)

Instructions: Fill / Circle the write answers. Marks will be awarded only for fully correct answers.

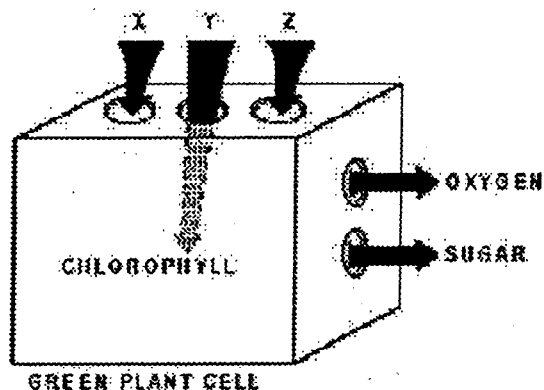
- 1) The sulfa drugs are used to control the proliferation of Streptococcus bacterium in the human body. This is an example of _____ (23 x 1 = 23)
- 2) An enzyme of pancreatic origin; catalyzes the hydrolysis of proteins to smaller polypeptide units _____
- 3) _____ Plants fixes Co₂ at night to produce a C₄ molecule, which helps in the release of Co₂ to the Calvin cycle during daytime.
- 4) Eight ringed head of the chlorophyll pigment is called as _____
- 5) Pigment chlorophyll possesses an important mineral called _____
- 6) Chlorophyll-a & Chlorophyll-b will have _____ & _____ functional group respectively.
- 7) When *prosthetic group / cofactor* joins with organic group is referred as _____
- 8) _____ is the sugar component present in the nucleotide.
- 9) How many molecules of Co₂ are generated for each molecule of acetyl CoA introduced in the Krebs's cycle? a) 1 b) 2 c) 3 d) 4 e) 6
- 10) In C₄ plants, the Calvin cycle
 a) takes place at night b) only occurs when the stomata are closed
 c) takes place in the mesophyll cells d) takes place in the bundle-sheath cells.

11) Identify the reaction



- 12) Identify & under line the amino acid sequence, which triggers the protein synthesis
 AGUCGCUCUUAUGUGAAGUCUCGGU
- 13) Transcription involves the transfer of information from
 DNA → RNA
 RNA → DNA
 mRNA → an amino acid sequence
 Nucleus → cytoplasm
- 14) In prokaryotic gene, a lengthy 600 nucleotides code can form a polypeptide chain of about how many amino acids
 a) 100 b) 200 c) 300 d) 600 e) 1800
- 15) Which enzyme is responsible for the synthesis of tRNA?
 a) RNA replicase b) RNA polymerase c) tRNA synthetase
 d) tRNA reductase e) Amino acetyl tRNAse.

- 16) Whole process of electron transport and generation of Adenine Triphosphate is referred as
 a) Chemiosmosis b) Glycolysis c) Protein synthesis d) Phosphorilation.
- 17) Anticodons are situated on
 a) RNA template b) Transfer RNA c) DNA template d) Messenger DNA
- 18) Circle the odd one from the following: UAA AUA UAG UGA
- 19) Mitochondria is an organelle present in
 a) all eukaryotes b) all prokaryotes c) only in plants d) only in animals.
- 20) Which part of a typical land plant is most directly involved with the process of transpiration?
 (a) Chloroplasts (b) phloem (c) cambium (d) stomata
- 21) Which type of organism synthesizes organic materials from inorganic raw materials?
 (a) autotroph (b) heterotroph (c) parasite (d) saprophyte
- 22) The raw materials for photosynthesis are
 (a) O₂ & Co₂ (b) Co₂ & H₂O (c) O₂ & H₂O (d) C₆H₁₂O₆ & Co₂
- 23) During photosynthesis in a bean plant, which wavelength of light is least effective?
 (a) red (b) blue (c) green (d) violet
- 24) Use the diagram below and your knowledge about the events that take place in autotrophic cell to answer the following questions
(2 x 1 = 2)



- i) The oxygen and sugar leaving the cell were most likely produced by the processes of
 (a) hydrolysis (b) deamination (c) fermentation (c) aerobic respiration (d) photosynthesis
- ii) The letters X, Y, and Z most likely represent
 (a) light, ammonia, & H₂O (b) Co₂, light, & H₂O (c) N₂, O₂, & H₂O (d) light, O₂, & methane
- 25) Where does it take place? Choose the correct from the bracket and match them properly.
 {Cytoplasm, Mitochondria, Nucleolus, Ribosome, Mesophyll, Cytochrome, Chromosome, Nucleus, Nucleolus, Thylakoid, Granna, Stroma, Centrosome, lysosome, chromosome, Enzyme inhibition}.
(10 x ½ = 5)

EMP, TCA, ETS, Transcription, Light dependent reaction, Calvin cycle, Light independent reaction, Co₂ fixing reaction, Light-fixing reaction, Splitting of water.

Good luck

BITS, PILANI – DUBAI CAMPUS

Knowledge Village, Dubai

Test-1 (closed book)

1st year 2nd Semester – Section 2
Sunday 28th March 04, 9.30 to 10.20am

Course: General Biology (BIO UC111)
Marks: 50 / Weightage 20

Note: 1. Answer briefly and to the point. Avoid unnecessary explanation.
2. All parts of the question should be done together
3. Draw diagrams wherever necessary

1) Correct the statement giving justification. Expand the abbreviations wherever mentioned (5x2=10)

- ELISA is a vaccine given for the people infected with AIDS.
- PLACEBO is a statistical tool used to represent the results in the seminars / symposiums
- DNA, Double helical structure was proposed by Edward Jenner.
- ANOVA is diagnostic tool helps in identifying Diphtheria.
- BCG is a vaccine administered for Mumps & Measles.

2) Write the difference between:

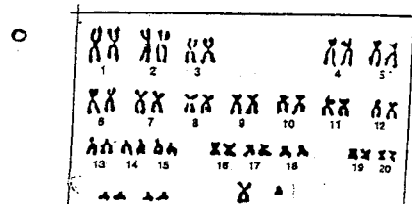
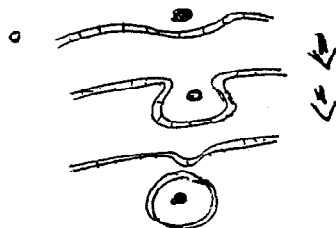
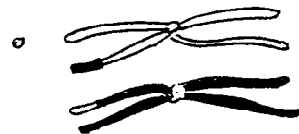
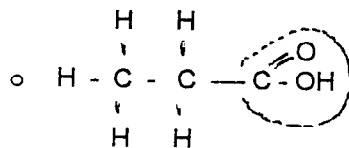
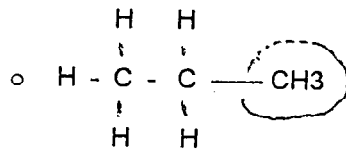
(5x2=10)

- Population & Community
- Saturated & Unsaturated fatty acids.
- Resolution & magnification.
- Metastasis & Apoptosis.
- Karyokinesis & Cytokinesis.

3) Identify the following:

(5x1=5)

- Glucose + Fructose \longrightarrow Sucrose + water molecule.



4) Match the following:

(4 x 1/2 = 2)

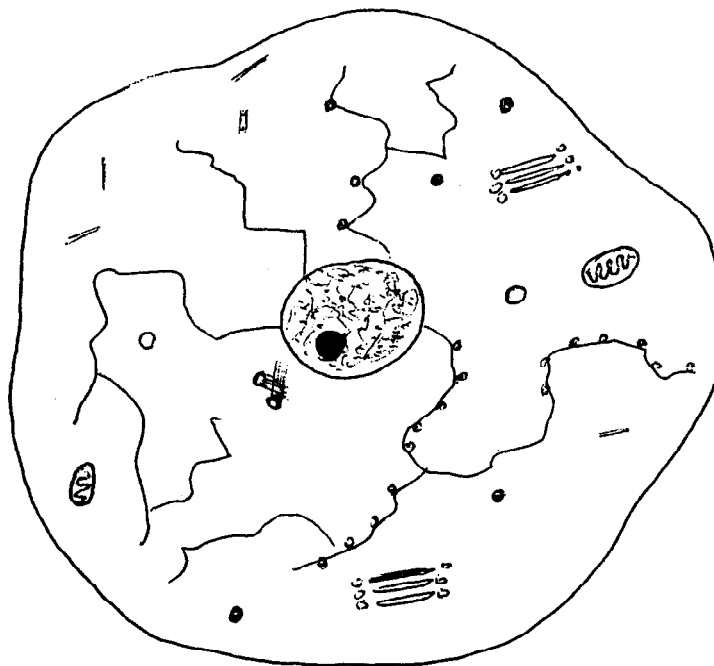
| | |
|---------------|---------------|
| Fats | Chloroplast |
| Steroids | Hair |
| Protein | Vitamin D |
| Phospholipids | Cell membrane |
| | Tallow |
| | Brinjal |

5) Explain briefly:

(5 x 3 = 15)

- Prophase-1 of Meiosis
- Non-disjunction? Illustrate with an example.
- At least three functions of lysosomes.
- List five characteristic features of living things
- Classify protein based on its complexity. Give examples.

6) Draw the given diagram in your answer book and label at least four non-membranous organelles and mention their functions: (4 x 2 = 8)



(Good luck)