# Answers to Biology I - 2012 New syllabus

| | | | |
|---|---|---|---|
| 1 - 3 | 16 - 4 | 31 - 4 | 46 - 4 |
| 2 - 3 | 17 - 4 | 32 - 1 | 47 - 3 |
| 3 - 3 | 18 - 5 | 33 - all | 48 - 2 |
| 4 - 3 | 19 - 4 | 34 - 4 | 49 - 4 |
| 5 - 1 | 20 - 4 | 35 - 2 | 50 - 2 |
| 6 - 2 or 5 | 21 - 4 | 36 - 1 | |
| 7 - 5 | 22 - 3 | 37 - 5 | |
| 8 - 1 | 23 - 5 | 38 - 2 | |
| 9 - 5 | 24 - 1 or 4 | 39 - 5 | |
| 10 - 2 | 25 - 2 | 40 - 4 | |
| 11 - 5 | 26 - 5 | 41 - 3 | |
| 12 - 1 | 27 - 3 | 42 - 5 | |
| 13 - 5 | 28 - 1 | 43 - 4 | |
| 14 - 3 | 29 - 5 | 44 - 4 | |
| 15 - 4 | 30 - 4 | 45 - 1 | |

# G.C.E. A/L Biology - August 2012

## Biology II (New syllabus) - Part A

1 A. (i)

| Element | Major Form |
|---|---|
| C | $CO_2$ |
| H | $H_2O$ |
| O | $H_2O$ / $O_2$ |
| N | $NO_3^-$ / $NH_4^+$ |
| P | $HPO_4^{-2}$ / $H_2PO_4^-$ |
| S | $SO_4^{-2}$ |

(ii)
- Macro elements are necessary in large amounts/ More than 0.01% in dry weight
- Trace elements needed in relatively low amounts/ Less than 0.01% in dry weight

(iii) Functions of trace elements found in plants.
- Maintaining Osmosis/ Ionic balance
- Chlorophyll Synthesis
- Component of cytochromes/ Component of nitrogenase
- Activator of certain enzymes
- Involved in Nucleic acid synthesis
- Component of certain enzymes
- Nitrogen fixation
- Nitrate reduction

Any 2

(iv)
- Carbohydrates
- Proteins
- Lipids
- Nucleic acids

(v) (a) $6H_2O + 6CO_2 \longrightarrow C_6H_{12}O_6 + 6O_2$
(This is the overall reaction of photosynthesis)

(b)
- Cell enlargement
- Mechanical support in herbaceous plants
- Turgor movements
- Movement of guard cells
- Blooming of flowers

(vi)

| | | |
|---|---|---|
| Triose | - | Glyceraldehyde |
| Pentose | - | Ribose / Deoxyribose / Ribulose |
| Hexoses | - | Glucose/Fructose / Galactose |
| Disaccharides | - | -Sucrose/ Maltose / Lactose |

(B) (i)

| Stage | Site |
|---|---|
| Glycolysis | Cytoplasm |
| Krebs cycle | Matrix of mitochondria |
| Electron transport chain | inner membrane of mitochondria / cristae |

(ii) ATP, NADH, FADH / $FADH_2$

(iii) a) Proteins b) Fats / Oils/ Lipids

(iv) a) Proteins ⟶ amino acids ⟶ Carboxylic acids ⟶ Krebs cycle
b) Fats (Oil) ⟶ Glycerol ⟶ Glycolysis
and Fatty acids ⟶ Krebs cycle

(C)(i) It is the arrangement of organisms into groups on the basis of common characteristics of organisms

(ii) Aristotle

(iii) ○ Artificial classification ○ Natural classification

(iv) ○ Morphological ○ Anatomical ○ Cytological
○ Molecular / DNA and RNA base sequences Any 2

(v)

| Character | Insecta | Nematoda | Echinodermata | Mollusca |
|---|---|---|---|---|
| Endoskeleton | - | - | + | + |
| Distinct cephalization | + | - | - | + |
| Well developed coelom | - | - | + | - |

2.(A) (i) T. S. of liver lobule

ii) a. Hepatocytes
b. Sinusoids
c. Central vein / Intra lobular vein/ Branch of hepatic vein
d. Glissons capsule / (branch of) bile duct, artery, vein / portal canal

iii) **Digestion of polysaccharides** -
Buccal cavity / small intestine / deudenum
**Digestion of polypeptides** -
Stomach / small intestine / deudenum
**Digestion of fats** -
Stomach / small intestine / deudenum
**Absorption of nutrients** -
Small intestine / large intestine
**Absorption of water** - Stomach /small intestine / large intestine / colon / rectum

v) ○ Permeable to gases
○ Wet / moist
○ Thin - for short diffusion distance
○ Possess large surface area
○ Possess a good blood supply/Highly vascularized

(v) Platyhelminthes - Body surface
Annelida - Body surface, External gills
Arthropoda - Internal gills / gills, Trachea, Book lungs
Chordata - Internal gills / External gills / gills Lungs, Skin / Buccal cavity or Lining of buccal cavity

(B) (i) A respiratory pigment is, a molecule which acts as an oxygen carrier, by binding reversibly with oxygen.

(ii) (a)Insecta / Chilopoda / Diplopoda Coelenterata,
(b) Respiration takes place via trachea where oxygen is directly transported to cells or, in Coelenterata, direct gas exchange across body wall

(iii) ○ Sickle cell anaemia
○ Thalassemia

(iv) $B^+$, $B^-$, $O^+$, $O^-$

(C) (i) ○ Cuticle
○ Lenticels

(ii) ○ Light
○ Temperature,

- Wind, / Wind speed
- Humidity of air
- Available water in soil
- $CO_2$ concentration Any 4

(iii)
- Starch sugar conversion
- $K^+$ ion intake

(iv) Starch to sugar conversion
- During photosynthesis $CO_2$ concentration decreases in guard cells raising pH in guard cells.
- Hydroiysis starch to sugars (by enzymes), occurs.
- This increases solute potential / decreases water potential in guard cells
- Water enters guard cells by osmosis increasing Largor, to cause opening of stomata.
- At night reverse reactions occur and stomata close.

OR

$K^+$ ion intake
- In the presence of light active intake of K+ ions into guard cells, occurs
- This increases solute potential / decreases water potential in guard cells
- Water enters guard cells by osmosis
- and increases turgor to cause opening of stomata
- Exit of $K^+$ from guard cells closes stomata
- This occurs in the absence of light / at night

(v)
- Transpiration pull
- Cohesive and adhesive forces of water molecules
- Water potential gradient between soil solution and atmosphere

(vi) Transportation of some material need APT, produced by aerobic respiration

(vii) Blocking free movement of ions through apoplast pathway allowing selective absorption

3.(A) (i)
- Excretion is the removal of the waste products of metabolism from the body
- Because, if accumulated, they are toxic to the cells or body

(ii)

| | | |
|---|---|---|
| Annelids | - | Nephridia |
| Platyhelminthes | - | Flame cells |
| Mammals | - | Nephrons |
| Crustaceans | - | Green glands |

(iii)
- No carbon loss from the body
- Energy is not needed for synthesis of $NH_3$

(v)
- Proximal convoluted tubule
- Distal convoluted tubule

(vi) $NH^+_4$, $K^+$, $H^+$

(vii)
- Maintain the constant osmotic pressure in blood
- Control or regulate blood volume
- Secretes hormones
- Regulation of blood pH
- Regulation of blood pressure
- Osmoregulation Any 4

(B)(i) Cerebrum, Hypothalamus, Thalamus

(ii) Coordination, Maintain homeostasis, Integration

(iii) Neuroglea / glea cells

(iv)
- It is a moving action potential
- Immediately after one action potential, another action potential cannot be formed /Due to the presence of refractory period

(v) **Mid brain**
- Control reflex movement of eye muscles
- Controls reflex movement of the head, neck, and trunk
- Changes the size of a pupil
- Changes the size of the lens in the eye
- Changes the shape of the lens in the eye

Any 2

**Cerebral cortex**

Memory / Intelligence / sense of responsibility / thinking / reasoning / moral senses / learning / sensory perception /perception of pain / perception of temperature / perception of touch / sight / hearing/ perception of taste / perception of smell / control of voluntary muscle contraction / initiation of muscle contraction / Recognition and interpretation of sensory information Any 2

**Red nucleus - Deleted**

**Rods of eye**
- Involve in night vision,
- Response to low light intensity
- Black and white vision Any 2

**Free nerve ending of skin**
- Act as thermoreceptors / Sensitive cold and warmth
- Act as touch / pain / mechano receptiors

(C)(i) Maintenance of a constant internal environmen

(ii) ADH, Aldosteron, ACTH, CRH

(iii) ○ Set point (Norm) / Fixed value
○ Receptors
○ Corrective mechanism

(iv) Glucogan, Thyroxin, Adrenalin, Growth hormone, Cortisol

(v) Extensibility
Elasticity
Excitability / irritability
Contractability

4. (A)(i) XY

(ii) XX

(iii) X chromosome

(iv)

| | Genotype |
|---|---|
| Normal Male - | $X^N Y$ |
| Color blind male - | $X^n Y$ |
| Carrier female - | $X^N X^n$ |
| Colorblind female - | $X^n X^n$ |

(v) ○ Downs syndrome
○ Klinefelters syndrome
○ Turners syndrome

(B)(i) (a) Habitat - Place where an organism lives in the environment

(b) Niche - Role that and organism plays in the environment /eco system

Or

Sum total of the ways or methods that a species uses the environmental resources

(ii) (a) Ramsar convention

(b) ○ Bundala national park
○ Madu ganga sanctuary
○ Anavilundawa tank sanctuary
○ Vankalai sancturay Any 3

(iii) Grasslands - Savanna, Patana

Major difference - Savanna contains isolated / scattered trees

Patana - Trees are not normally present

(iv) Evergreen trees - Montane forests,
Tropical rain forests
Dry Mixed (evergreen) forests Thorn forests
Emergent trees - Tropical rain forests
Trees with twisted trunks - Montane forests
Continuous canopy Tropical rain forests

(C)(i) Production of new plants by vegetative parts of plants, like from axillary buds or branches etc. (not from seeds)

(ii) **Type of vegetative reproduction**
Using Rhizames
Using Corms
Using Bulbs
Using Runners
Using Tubers
Using Bulbils

**Example**
*Zingiber* (Giner)/ *Canna* (cannas)/ *Musa* (banana)/ *Curcuma* (turmeric
*Alocasia,/ Colocasia/ Gladiolus*
*Allium* (onion) / *Crinum*
*Centella / Cyperus / Pistia*
*Solanum* (Potato)
*Ananas,* (pineapple) / *Dioscoria*
Using Adventituous buds
*Bryophyllum/ Begonia*

(iii) **Advantage** -
Rapid propagation / Genetically identical plants can be obtained
**Disadvantage** -
No genetic variations

(iv)(a) ○ Growing tissues of plants / Growing parts of Plants
○ in sterile,
○ artificial culture media,
○ under in-vitro conditions.

(b) ○ Water,
○ Carbon source / Sucrose,
○ Plant growth substances / Auxins & Cytokinins
○ Inorganic nutrients
○ Organic Substances / Vitamins

(c) ○ Producing plants in large numbers
○ with same genotype
○ Rapid propagation
○ Require small space for propagation
○ Can be grown irrespective of climatic conditions
○ Ability to propagate plants which do not produce viable seeds
○ Ability to produce disease free plants.

Any 3

## Part B - Essay

1. Enzymes are (globular) protein molecules
2. Produced by living cells.
3. (Generally) catalyze catabolic reactions and anabolic reactions / metabolic reactions/ biological reactions in living cells.
4. by reducing the activation energy required for the reaction
5. without being used up (during the reaction)
6. Enzymes act by active sites combining with substrates to form and enzyme-substrate complex
7. Which is short live / unstable
8. and hence breaks down into products.
9. Enzymes are specific / catalyse only a single reaction Two hypothesis have been proposed to explain mechanism of enzyme activity
10. Lock and key hypothesis
11. Which suggests that enzymes have a particular shape into which substrates fit
12. Induced - fit hypothesis
13. Which suggests that enzymes and active sites are (physically) more flexible structures which can assume shapes that fit on to the substrate.
14. When substrate combines with and enzyme it induces changes in the enzyme structure
15. which enable enzymes to function effectively
16. Many enzymes require non proteineous components/ Co-factors, which are
17. Inorganic ions or
18. Prosthetic groups
19. Co-enzymes activate enzyme activity
20. Eg: Salivary Amylase activity increases by $Cl^-$ ions
21. Prosthetic groups are organic molecules,
22. Which are tightly bound to enzymes
23. Eg: FAD/FMN/ Biotin / Heam
24. Functions / acts as electron carriers / oxygen carriers
25. Co-enzymes are organic molecules,
26. which are loosely associated with enzymes
27. Eg: NAD / NADP/ Co enzyme A - (for respiration, photosynthesis etc)
28. They act as hydrogen acceptors.
29. Different factors affect enzymes activity
30. pH affects rate of enzyme activity / Different enzymes function best at optimum pH values/ have different optimum pH values / Extremes of pH denature enzymes
31. Temperature affects rate of enzyme activity./very high temperature denatures enzyme
32. Rate of enzyme reaction doubles For every rise of temperature by 10 °C until an optimum temperature reaches.
33. Increase in substrate concentrations increases rate of enzyme activity.
34. A variety of small molecules / inhibitors inhibit enzyme activity
35. Competitive reversible inhibitors.
36. where compound structurally similar to substrate combines with active site of the enzyme
37. Eg: sulfonamides
38. Non - competitive reversible inhibitors,
39. combines with sites other than active site of enzyme
40. Eg: cyanide ions combine with metallic ion of enzyme / Copper ions in cytochrome oxidase
41. Irreversible inhibitors
42. Such as heavy metal ion / $Hg^{+2}$ /$Ag^+$ / As / Cu
43. combine permanently with - SH groups in enzymes, thereby preventing the enzyme from combining with substrate.

6.a)
- An organism whose genetic characteristics / genome have been modified / altered by
- insertion of a modified gene / or a gene
- from another organism / bacteria / plant /animal / virus/ fungi
- using the technique of genetic engineering / recombinant DNA technology in a way
- that does not occur naturally

b) Many crop plants with useful characters introduced from other species are used in agriculture. Medicine and industry

1. Pest resistance / insect resistance have been acheived
2. in corn / soya bean / cotton / canola
3. using Bt gene/ genes from *B. thuringiensis* Bacillus thuringiensis
4. These organisms are resistant to viral diseases / rings spot disease
5. in papaya
6. Herbicide tolerant / weedicide resistant
7. Soya beans produced
8. Using genes / Glyphosate tolerant gene
9. using *Agrobacterium* tumifacient and *A. vehiclale*
10. increased nutrients
11. Golden rice containing
12. β carotene gene from bacterium / *Ervinia,* has been produced
13. Production of drought resistant plants and
14. production of salt tolerant plants have also been produced.

**Human applications are :**

15. Recombinant human insulin
16. Human growth hormone / somatotropin
17. Human blood clotting factor
18. Antigrowth hormone
19. Hepatitis B vaccine

20. Gene therapy
21. Vitamins / biotin / Riboflavin / Vitamin C
22. Amino acids / Glutamic acids
23. Enzymes like Invertase /Chymosin /Amylase / Pectinase

) 1. Potential risks to human
2. Allergenicity / Food allergies produced
3. Production of novel (new) toxic substances
4. Transfer of antibiotic resistance into gut bacteria (antibiotics used as markers)
5. Unintended transfer of genes through/ Gene flow to plants
6. through cross pollination
7. Producing herbicide resistant weeds.
8. Bt - (insecticidal gene) gene containing plant, can affect beneficial insects.
9. Unknown effects on Biodiversity / loss of flora / Fauna / soil microorganisms
10. Domination of world food production by few companies / developed world
11. Bio piracy or foreign exploitations of natural resources.
12. Violation of natural organisms intrinsic values.
13. Tampering with nature by mixing genes among species.
14. Objections to consuming animal genes in plants (by vegetarians)

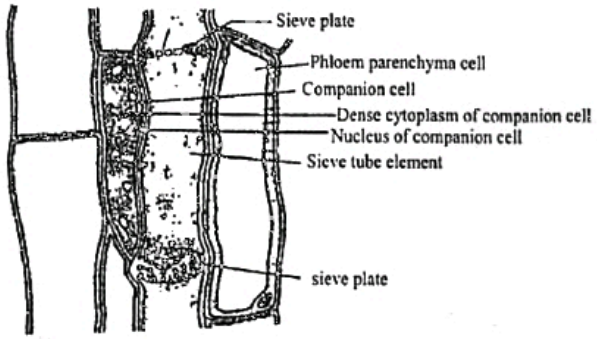
1. Defense mechanisms of the human body prevents the entry and establishment of pathogens / microbial infections.

uman body has

2. Non specific defense mechanism and
3. Specific defense mechanism
4. Non specific defenses are present in normal healthy human and
5. protect host from any pathogen regardless of a particular species.
6. Eg; Skin
7. acts as a physical barrier because
8. its Keratinized outer layer,
9. is not easily degraded by microbial enzymes.
10. Saline sweat / sebum / antimicrobial substances prevent the establishment of pathogens.
11. Mucous membranes of the respiratory tract secretes mucous which traps microorganisms
12. Cilia in the epithelium of respiratory tract / trachea / bronchi removes microorganisms.
13. Coughing / sneezing expel microorganisms from the respiratory tract / trachea / body.
14. Some body fluids contain antimicrobial substances and
15. Enzymes,
16. which prevent considerable growth of microorganism
17. Eg: Lysozymes in saliva / tears,
18. by break down becterial cells.
19. Lactoferrin present in tears / semen / breast milk / bile,
20. binds iron,
21. which is essential growth element required for pathogenic microorganisms.
22. Acid in the stomach,
23. kills many bacteria ingested with food.
24. Lactic acid that is produced in vagina,
25. createsacidic/unfavourable environment for pathogens.
26. Interferon produced in blood is response to
27. viral infections (in eukaryotic cells) protect host against viral infections
28. Neutrophils,
29. Macrophages (in blood), Monocytes
30. destroy microbial pathogens by phagocytosis
31. Inflammatory response prevents the spread o infection from the original site.
32. Inflammatory response is a generalized response t infections / tissue damage
33. Specific defence mechanism /development of specifi immunity, take place when foreign substances microorganisms /virus /bacteria & fungi /enter th body / invade the body.
34. Invading microorganisms which are called antigens
35. produce in the blood of host.
36. Specific antibodies,
37. Which are immunoglobulin / proteins,
38. combine with antigen,
39. and eliminate the invaded pathogen preventir infections.
40. Development of specific immunity with specif antibodies is called acquaired immunity.
41. Four types of acquired immunity protects host fro microbial infection
42. Naturally acquired active immunity
43. Eg: as a result of natural infection
44. Such as measles / chicken pox / mumps
45. Naturally acquired passive immunity
46. Eg( antibodies of mother is passed to the foetus
47. Through placenta / breast milk.
48. Artificially acquired active immunity
49. Eg: attenuated microbial cells used in vaccines actively produce antibodies against infections diseases
50. Eg: Polio vaccine / BCG vaccine
51. Artificially acquired passive immunity
52. Vaccines containing already prepared antibodies given as injections.
53. Eg: antitetanus vaccine / antirabies vaccine
54. Formation of a scab / blood clot when skin g damaged
55. due to the action of platelets and fibrinogen

Any

. a) Structure of phloem tissue as it appears in a longitudinal section




1. Transport can take place in both directions / bidirectional
2. Amount of material transported is very high.
3. Rate of transport is very high
4. Distance of transport can be long (in some plants)
5. Transport takes place with hydrostatic pressure.
6. Sucrose is the major organic substance transported through phloem tissue.
7. Other substances tike Amino acids,
8. Vitamins,
9. Growth substances / hormones,
10. Inorganic ions / $PO^-_4$ /$K^+$ are also transported.
11. The tissue from which translocation begins in called the source which is mesophyll cells
12. The tissue of destination is called the sink, may be root cells.
13. Transfer cells which are some modified companion cells,
14. actively/using ATP/ using metabolic energy transport sucrose
15. into sieve tubes at the source
16. against concentration gradient
17. This process is called phloem loading.
18. This increases the solute potential of the sieve tubes,
19. and decreases the water potential of the sieve tubes.
20. The water then enters the sieve tubes,
21. by osmosis,
22. from adjacent xylem vessels,
23. resulting in a buildup of hydrostatic pressure in sieve tubes.
24. Sucrose is actively removed from the sieve tubes, at the sink (using ATP/energy)
25. through transfer cells
26. This is called phloem unloading.
27. This reduces solute potential in sieve tubes.
28. increases water potential in sieve tubes,
29. causing moving of water to adjacent xylem by osmosis,
30. resulting in a decrease in hydrostatic pressure in sieve tubes,
31. establishing a pressure potential gradient from source to sink
32. This allows sucrose solution to be transported along sieve tubes,
33. Passively,
34. by mass flow
35. This mechanism is pressure flow hypothesis

Any 33

9. 1. Homeostasis is the maintenance of constant internal environment.
2. Hypothalamus is involved in thermoregulation / Regulation of body temperature
3. thermoregulatory center is located in hypothalamus
4. When body temperature is reduced, heat gain center in hypothalamus is stimulated and
5. heat generating mechanisms are initiated
6. These are shivering - more work done by muscles using increased respiration
7. Increase in metabolic rate - increased respiration with heat energy as by product.
8. Constriction of erector pilli muscle - to trap air (insulator)
9. Skin blood vessels are also constricted - reducing heat loss by radiation from surface blood.
10. Those result is increasing the body temperature (To the normal level)
11. When body temperature is increased, heat loss center in hypothalamus is stimulated and
12. heat loss mechanisms are initiated
13. these are sweating - which uses body heat to evaporate water in sweat
14. reduction in metabolic rate - less respiration. Hence less heat produced as by product
15. skin blood vessels dilate - lesser heat lost by radiation from skin surface
16. these result in decreasing the body temperature (to the normal level)
17. hypothalamus is involved in osmoregulation / maintenance of the osmotic pressure of blood
18. when osmotic pressure of blood increases due to insufficient water in blood osmoreceptors in hypothalamus gets stimulated and (due to impulses from these )
19. ADH is secreted
20. And released from posterior pituitary
21. ADH increases the resorption of water in
22. Distal convoluted tubule and
23. Collecting duct of nephron
24. Increases in osmotic pressure of blood stimulate thirst center also (located in hypothalamus)
25. resulting in (stimulating) drinking of water
26. Due to these osmotic pressure in blood reduces to

normal level
27. When osmotic pressure of blood reduces due to excessive water in blood, secretion of ADH is inhibited and
28. amount of water resorped is reduced
29. resulting in an increase in osmotic pressure of blood
30. Hypothalamus maintains homeostasis through regulating function of anterior pituitary/ releasing thyrotropin releasing hormone/ corticotrophin hormone
31. and maintains sodium ion concentration of blood
32. through ACTH / Aldosteron
33. and maintains basal metabolism /metabolic rate.
34. through the TSH / thyroxin
35. Hypothalamus maintains homeostasis through preparing body for stress condition / fight or flight / emergency situation.
36. through adrenalin / noradrenalin production.
37. Hypothalamus maintains homeostasis through regulating the autonomic function of the body
38. by regulating sympathetic and
39. para sympathetic nervous system
40. Hypothalamus maintains homeostasis also by regulating hunger
41. through the stimulation of appetite center / hunger center /satiety center (which is located in the hypothalamus)

Any 38

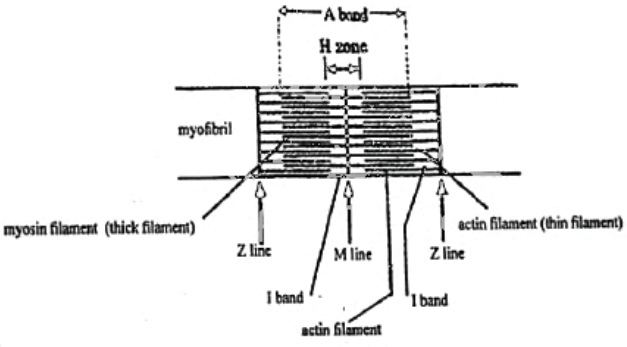
10.a) Genetic code
1. It is the sequence of nucleotides in DNA/ RNA/ gene
2. that determines the amino acid sequence,
3. during the synthesis of protein.
4. Code consists of codons.
5. A codon consists of triplet of nitrogenous bases
6. Each codon is specific for a single amino acid
7. Sixty-four codons are available
8. Only 61 codons specify amino acids
9. Code is degenerate / some amino acids are repeated / coded by more than one codon
10. Code is non over-lapping / successive triplets are read in order
11. Code is universal / almost all organisms in nature use the same genetic code
12. During protein synthesis some codons act as start codon and,
13. some as stop codons

Points 13

b) AIDS
1. Acquired immune deficiency syndrome is
2. Caused by a virus
3. Known as Human immune deficiency virus (HIV).
4. Is a retro virus
5. Enveloped virus
6. Contain envelope protein
7. Contain RNA
8. AIDS brings about a progressive failure of human immune system.
9. causing opportunistic pathogenic infectious
10. Cancers.
11. and pneumonia
12. causing death ultimately.
13. The HIV is transmitted through sexual contact
14. through body fluid / blood or serum (through blood transfusion)
15. and by unsterilized needles

Points 15

c) Sarcomere
1. Sarcomere is the contractile unit of muscle fibril / muscle contraction
2. There are several sarcomeres in a fiber
3. They are found only in skeletal and
4. cardiac muscle fibers
5. Sarcomere is the region between two dark lines / Z line
6. These Z lines / dark lines are made up of (a protein called) actin.
7. Sarcomere contains thick filaments,
8. which are made of (a protein called) myosin
9. Actin is made up of
10. thin filaments.
11. All these filaments are longitudinally arranged (in the sarcomere)
12. Sarcomere has dark bands / A bands,
13. which have (thick) myosin and (thin) actin filamints
14. Light bands / I bands,
15. which contains (thin) actin filaments only
16. Thin / actin filaments are attached to Z lines, which are also thin membranes.
17. Thick/ myosin filaments are attached to M line.
18. In the H zone
19. which is the gap between two thin filaments.
20. Each thick filament is surrounded by 6 thin filaments
21. Thin filaments are stacked between thick filaments.
22. Only thick filaments are present in the H zone




The diagram earns extra marks.