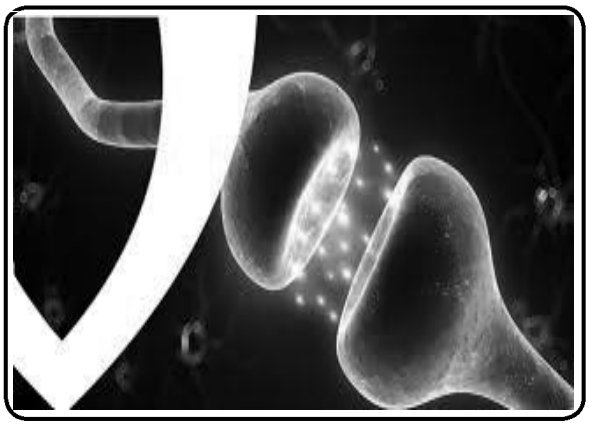
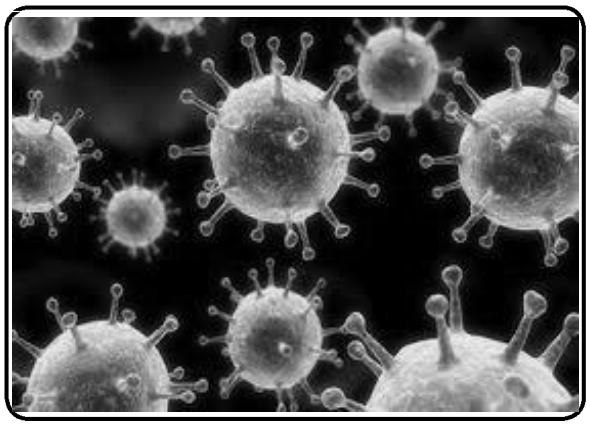
மொறட்டுவைப் பல்கலைக்கழக பொறியியற் பீட தமிழ் மாணவர்கள்
நடாத்தும் க.பொ.த உயர்தர மாணவர்களுக்கான 9வது

முன்னோடிப் பரீட்சை – 2018

09 - உயிரியல் விடைகள்

(ஆங்கில மொழி மூலமானது)



Prepared By **Kuhananthan Rajaratnam**

Mora E-Tamils 2020 | Examination Committee

மொறட்டுவை பல்கலைக்கழக பொறியியற் பீட தமிழ் மாணவர்கள்

நடாத்தும் க.பொ.த உயர்தர மாணவர்களுக்கான 9வது

முன்னோடிப் பரீட்சை – 2018

பாடஎண் } 09 பாடம் } உயிரியல்

This mcq answers are only for english medium examination paper

வினா இல.	விடை இல.	வினா இல.	விடை இல.	வினா இல.	விடை இல.	வினா இல.	விடை இல.	வினா இல.	விடை இல.
01)	2	11)	3	21)	2	31)	2	41)	2
02)	4	12)	4	22)	4	32)	2	42)	4
03)	3/5	13)	2	23)	3	33)	4	43)	open
04)	4	14)	4	24)	2	34)	4	44)	3
05)	5	15)	4	25)	4/5	35)	2	45)	5
06)	4	16)	2	26)	2	36)	4	46)	1
07)	5	17)	4	27)	3	37)	2	47)	2
08)	1	18)	3	28)	5	38)	5	48)	5
09)	3	19)	2	29)	4	39)	3	49)	4
10)	2	20)	4	30)	3	40)	3	50)	1

விசேட அறிவுறுத்தல் } ஒரு சரியான விடைக்கு (01) புள்ளி வீதம் 50

மொத்தப் புள்ளிகள் 1 x 50 = 50

1. A.i) State two polymers which act as the storage components in animals.

Glycogen/ Ovalbumin/ Casein

ii) State two non-polymeric compounds with glycosidic bonds.

Sucrose/ Lactose/ Maltose

iii) How does the high specific heat capacity of water provide influence on animals?

Water resists to change its temperature when a considerable amount of heat is absorbed or loss

iv) a. What is the main type of bond present in proteins?

Peptide bond

b. State the experiment to identify the presence of the bond you mentioned in above (iv) a and describe briefly how this experiment can be carried out in the laboratory.

Biuret test

- **5% NaOH (2ml) for 2ml protein solution**
- **Heat after adding few drops of 1% CuSO4**
- **Violet color (ring) forms**

v) What is cytoskeleton?

- **provides support and shape to the cell**
- **formed by micro tubules, protein filaments/ micro filaments, intermediate filaments**
- **breaking and reforming as needed**
- **dynamic/ three dimensional web like lattice structure**

vi) State three functions of cytoskeleton

- **Provides strength to cytoplasm**
- **Anchorage organelles**
- **Anchorage cytosolic enzymes of the cell.**
- **cytoplasmic streaming**
- **moves organelles/ helps to keep them in considerable positions**
- **moves chromosomes when necessary**
- **maintain the shape of the cell (mainly in animal cells)**

B. i) State three co-factors essential for the activity of enzymes and give one example for each of them.

Co-factor	Example
Inorganic ions	**Cl-/ Zn2+/Fe2+/ Cu2+**
Co-enzymes	**NAD/ NADP/ Co-enzyme A**
Prosthetic groups	**FAD/ Biotin/ Haem**

ii) Briefly describe the influence of temperature on the rate of enzyme reaction.

- **Rate of enzymatic reactions increases double**
- **For the every 100C rise until it reaches an optimum temperature**
- **Rate of enzymatic reactions decreases with the further increase above the optimum temperature**

iii) Name the molecules which carry the energy generated in the light reactions of photosynthesis to the Calvin cycle.

ATP, NADPH

iv) State the processes of Calvin cycle in which the molecules you mentioned in above B (iii) participate.

ATP (a Portion) PGA → PGAL

ATP (a Portion) RUMP → RUBP

NADPH PGA → PGAL

C. i) Complete the dichotomous key given below using the following animals.

Earth worm, Liver fluke, Jelly fish, *Chiton*, Snail, Round worm

1. Cylindrical shaped body .....2.....
   Non-cylindrical shaped body .....3.....

2. Have setae .....**Earthworm**.....
   Have no setae .....**Round worm**.....

3. Have suckers .....**Liver fluke**.....
   Have no suckers .....**4**.....

4. Have tentacles .....**5**.....
   Have no tentacles .....***Chiton***.....

5. Have shell .....**Snail**.....
   Have no shell .....**Jelly fish**.....

ii) a. What is tentacle?

The flexible structure found on the head of the invertebrates which helps for the sensory/ attachment

b. Name two phyla of invertebrates which pocess tentacles.

Coelenterata/ Annelida/ Mollusca/ Echinodermata

iii) Name an organ of aquatic invertebrates which is used to identify the state of its body in its surroundings.

Statocyst

2. A. i) Name the three types of salivary glands in human and state the locations of them.

Parotid glands — **Just below the auditory meatus**

Sub-mandibular glands — **below the angle of jaw**

Sub-lingual glands — **above the base of mouth/mucous membrane/ in front of the sub-mandibular glands under tongue**

ii) Give two anti-microbial substances which are found in the human saliva?

Lysozyme, Immunoglobulin

iii) Which is the proximal part of the human large intestine?

Caecum

iv) What are the nutritional components stored in the human liver?

•Glycogen **•Fat soluble vitamins/ A,D,E,K**

•Some water soluble vitamins/ Vit.B12 **•Fe, Cu ions/ minerals**

v) a. Which is the bile secreting gland?

Liver

b. Which hormone induces the release of bile from its storage part?

Cholecystokinin

vi) What are the advantages of fibres in the human food?

Provide bulk to the diet and satisfy the appetite

Stimulating peristalsis leading to defecation

Prevent constipation by attracting water to increase fecal bulk

Protect against some gastro-intestinal disorders (such as cancers in colon and rectum

B. i) Name one basic respiratory structure found in following animals.

a. *Areniocola* **External gills**

b. Mite **Trachea**

c. Starfish **Tube feet**

ii) Give reasons for the animals belong to phylum coelenterate, phylum Platyhelminthes have the body surface as their respiratory structure.

They consist of small body size

Their energy requirement is low

iii) Name the main type of cells which involve in the formation of human alveoli and the other types of cells which found along with this main type of cells.

Main cells **Main cell- Simple squamous epithelial cells**

Other cells **Other cells- Septal Cells/Surfactant cells, Macrophages**

iv) a. What is the main function of respiration in human?

Supplies O2 to the alveoli and remove CO2 from it

b. What is the average rate of respiration in a healthy adult human at rest?

12-15 cycles per minute

c. What is the major factor which controls the human respiration?

high CO2 concentration/ partial pressure is in the blood or hypercapnia

d. What is the location of the peripheral chemoreceptors which identify the factor you mentioned above in (iv) c?

Aortic arche, Carotaid body

v) a. What is the respiratory rhythmic centre?

Medulla Oblongata

b. Which part involves in the regulation of the centre you mentioned in above (v) a?

Pons Varolli

C. i) Name the components involve in the formation of artrio -ventricular (AV) valves of human heart.

Endo cardic memberance

Fibrous tissue

ii) State three processes of cardiac cycle which perform in the human heart during the relaxation of heart.

Atria and ventricles relaxed

Aortic/ pulmonary valves closed

AV valves open

iii) What are the factors responsible for the hypotension in human?

•Shock /Weakening of heart **•Fasting**

•low nutrition **•Hemorrhage/ Dengue hemorrhagic fever/over bleeding**

•Adison's disease **•standing up suddenly from sitting or lying position**

iv) State two consequences of hypertension in human.

•stroke /Cerebral thrombosis **•Kidney failure**

•Heart attack (sometimes leads to death)

3. A. i) What are the components involve in the formation of human peripheral nervous system?

(31 pairs of)spinal nerves

(12 pairs of) cranial nerves

Autonomic nervous system/ Sympathetic-Parasympathetic nervous system

ii) Place a tick (✓) in the corresponding column to indicate that the following human body functions are increased by the sympathetic or parasympathetic nervous system.

Activity	Sympathetic	Parasympathetic
a. Increases salivary secretion		✓
b. Dilation of coronary artery	✓	
c. Decreases urine production	✓	
d. Relaxation of intestinal sphincters		✓

iii) State two target organs of oxytocin.

Smooth muscles of endometrium of uterus (during pregnancy)

Smooth muscles of mammary glands (during breast feeding)

iv) Give three functions performed by human insulin.

•Increasing conversion of glucose to glycogen in the liver and skeletal muscles.

•Acting on cell membrane & stimulating uptake and use of glucose by muscles

•Synthesizing the proteins by accelerating uptake of amino acids into the cells

•Decreasing the breaking down of glycogen into glucose **•Preventing the breaking down of proteins and fats**

v) State two functions of somatostatin (GHIH).

•Inhibiting the secretion of GH (from anterior pituitary)

•Inhibits the secretion of both insulin and glucagon

B. i) What are the main steps of urine formation?

Ultrafiltration

Selective reabsorption

Secretion

ii) State three nitrogenous wastes found in glomerular filtrate.

Urea, Uric acid, Creatinine

iii) In which part of the human nephron the Na^+ and Cl^- get passively reabsorbed?

Ascending limb of loop of Henle (thin part)

iv) What are the functions of aldosterone in human nephron?

Reabsorbs the Na+ in distal convoluted tubules (actively)

Reabsorbs the water in distal convoluted tubules (passively)

v) a. Name the animal phylum only with the exoskeleton?
Arthropoda

b. What are the components form the exoskeleton of the animal phylum you mentioned in above (V) a?
Chitin, Protein and $CaCO_3$

c. State two disadvantages faced by the animals with exoskeleton.
Restricts growth/ limits Growth **Need ecdysis**
Vulnerable to predation **Could be present in small animals (only)**

C. i) What is sarcomere?
The highly contractile unit of the muscle fibril, found in between two Z-lines

ii) What are the proteins which made the thick and thin filaments of sarcomere?
Thick filament **Myosin**
Thin filament **Actin**

iii) State what will happen to the following during the contraction of muscles.
a. H zone **Shorten**
b. I band **Shorten**
c. A band **no change**

iv) State the type of each of the following plant movements.
a. *Passiflora* grows with its tendrils
Thigmotrophism

b. Daisy flowers open in the light and close in the dark
Photo nastic movement/photonasty

c. Sperms of *Pogonatum* move towards the ovary.
Chemo tactic movement

v) Name one cell which shows the pseudopodial movement in human.
Neutrophil/Monocytes

4. A. i) Which part transfer the sperms from epididymis to the urethra in human?
Vas deferens

ii) What are the hormone involve in the maintenance of corpus luteum?
LH, hCG

iii) Which is the hormone found in women during the whole period of pregnancy and give functions of that hormone.
Progesterone
Inhibition contraction of endometrium of uterus
Inhibition of prolactin secretion

iv) Which contraceptive method prevents the implantation only in women?
IUD / loop

v) What is the test used to identify the pregnancy of a woman?
Presence of hCG in blood after 10 days/ urine in 15 days

vi) Give two sexually transmitted bacterial diseases.
Gonorrhea, Syphilis

vii) Give two post fertilization changes in flowering plants.

Ovule → Seed **Funiculus** → Hilum

Ovary → Fruit **Wall of Ovary** → Pericarp

Integument of ovule → Seed coat **Endosperm nucleus** → Endosperm

B. i) Briefly describe what DNA finger printing is.

- **identifying an individual**
- **based on DNA/ nucleotide sequence variation**
- **at mini satellite /micro satellite loci**
- **based on the number of repeat sequences (tandem)/units(found throughout genome**

ii) State two applications of DNA finger printing.

Forensic medicine/ identifying the criminals (murderers) Identifying the parents/ relatives

iii) Name the species of bacteria which can be used to gain the soya beans resistance to glyphosate weedicide.

Agrobacterium tumefaciens

iv). a. What is the genetypic ratio of a dihybrid test cross of traits which are independently assorted?

1:1:1:1

b. If you do not get the ratio mentioned above and gets only two phenotypes, what is the name of this hereditary pattern?

Complete gene linkage

v) What is transformation of bacteria?

Introducing external DNA molecules or genes into bacterial cells

C. i) What are the biomes (worldwide group of living organisms) with the grasslands?

Savanna, Temperate grass lands

ii) What are the Sri Lankan forest ecosystems consist of lichens and mosses?

Tropical rain forests, Montane forests

iii) a. What is net primary productivity of an ecosystem?

The amount of biomass produced by the primary producers in a unit area in a unit time

b. Name the terrestrial ecosystem with highest net primary productivity in earth.

Tropical rainforests

iv) What is link in food chain/food web?

Each trophic level in the food chian/web

v) What is the energy source for generating the biogeochemical cycles?

Solar energy

vi) Phagocytosis is one of the non-specific immunity processes. Briefly describe what phagocytosis is.

- **When micro-organisms penetrate the body's outer barrier and enter the circulatory system**
- **found in blood, lymph circulatory system**
- **Neutrophils** • **Monocytes/Macrophages**
- **destroyed by engulfing**

vii) Name the antibiotics corresponding to the following activities.

a. Inhibition of bacterial protein synthesis **Erythromycin/Chloramphenicol /streptomycin/tetracycline**

b. Inhibition of synthesis of bacterial cell wall :..... **Ciprofloxacin** .....

viii) What are the plant growth substances produced by the micro-organisms living in soil?

..... **IAA, Gibberellin, Cytokinins** .....

.....

.....

5) There are two cellular respiratory processes are taking place in skeletal muscles.

1. Aerobic respiration
2. Anaerobic respiration
3. Aerobic respiration consists of three steps
4. Glycolysis
5. Krebs cycle
6. Electron transport chain/Oxidative phosphorylation

Glycolysis

7. It is the common step for the both aerobic and anaerobic respirations or it is irrespective on the availability of oxygen
8. Common respiratory substrates like glucose
9. Oxidized(partially) through many steps with the catalyze of enzymes
10. Initially 2 ATP is used (to activate the glucose)
11. 4 ATP/net product of 2 ATP is formed
12. by substrate level phosphorylation
13. (H^+ are accepted by NAD^+) and 2 NADH
14. 2 pyruvate molecules are obtained
15. 2 pyruvate molecules enters into the matrix of the mitochondria (using the energy) in the presence of molecular oxygen (Link reaction).
16. 2 pyruvate molecules involve to the decarboxylation inside the matrix of mitochondria/ by losing 2 CO_2 molecules
17. Becoming 2 Acetyl co-enzyme- A
18. 2 NADH molecules are formed by dehydrogenation.

Krebs cycle

19. Acetyl co-enzyme A combines with the 4C compound oxaloacetate molecule (in the matrix of mitochondria)
20. During this process, 6C compound citric acid is formed
21. by the enzymes of Krebs cycle in the matrix of mitochondria
22. Citric acid is regenerated as oxaloacetate by involving in the sequential/chain reactions
23. H^+ NAD^+ generated during this
24. accepted by FAD
25. by this 6 NADH and
26. 2 $FADH_2$ molecules are generated/reduced
27. 2 ATP are produced by the substrate phosphorylation
28. Glucose is completely oxidized/2 CO_2 molecules are formed

Electron transport chain reactions

29. Reduced co-enzymes like NADH and $FADH_2$ get oxidized in the inner membrane of the mitochondria to release ATP
30. 34 ATP molecules are generated by the oxidative phosphorylation
31. NAD^+, FAD are resulted during this
32. Final electrons are accepted by the molecular oxygen
33. which are included/combined in water.

Anaerobic respiration

34. Skeletal muscles involve to anaerobic respiration/lactic acid fermentation in the absence of oxygen
35. partially oxidized pyruvate in the glycolysis
36. reduced by NADH
37. gives lactic acid as a product.
38. pyruvate accepts the final electrons
39. 2 ATP molecules (produced in glycolysis) are obtained as net energy gain.
40. NADPH is not carry energy and used to oxidize pyruvate/ Give H^+ to lactic acid/ NAD^+ is not a product.

Any 38 x 4 = 152
Maximum 150 marks

6) Mechanism of opening and closing of stomata

(a)

1. K^+ intake / K^+ influx theory/ hypothesis.
2. In the presence of light
3. K^+ ions are actively taken into the guard cells
4. Solute potential increases (in guard cells)
5. Water potential decreases
6. Water enters from the neighboring epidermal cells into guard cells
7. which take place through osmosis
8. turgidity increases by this causes the stomata to open
9. K^+ ions released in the night time causes the stomata to close.
10. Starch -sugar conversion hypotheses /theory.
11. during photosynthesis
12. CO_2 concentration decreases in guard cells
13. pH value increases in the guard cells
14. Starch is hydrolyzed as sugar by the enzymes
15. Solute potential increases/ water potential decreases
16. Water enters from the neighboring epidermal cells to the guard cells
17. by osmosis
18. Turgor pressure increases causes the guard cells to open
19. The opposite instances taking place in the night and causes the stomata to close

(b)

20. Inter fascicular cambium which is found in between the primary stem, primary xylem, primary phloem becomes active.
21. Primary medullary rays made of parenchyma cells achieve the cell division
22. It differentiates into intra fascicular cambium
23. Intra fascicular cambium and the inter fascicular cambium joins and forms the vascular cambium/vascular cambium ring
24. Vascular cambium begins meristematic activities producing new cells outward and inward of the cambium
25. The cells formed in the inward direction differentiates to form the secondary xylem
26. The cells formed in the outward direction differentiates to form the secondary phloem
27. Secondary xylem and secondary phloem are arranged around the circumference of the stem
28. Parenchyma cells are formed I the inside and outside directions in some places
29. Secondary medullary rays develop from the band of parenchyma cells
30. Diameter of the stem increases due to the formation of secondary xylem and secondary phloem
31. as the tissues are formed inward direction, cortex protrudes outward
32. Cell layer of the cortex undergoes the cell division and forms the cork cambium
33. Cork cambium undergoes the cell division
    Cells which are formed inside forms the secondary cortex
34. Cork cells are thickened by the wall
35. Lenticels are formed in a few/some places over the complementary cells
36. Becomes as secondary xylem at the matured stage
37. All the tissue found outside to the vascular cambium become bark
38. Cork cambium and secondary cortex combine to form the periderm
39. Annual rings are formed due to the seasonal changes

(Any 38 x 4 = 152 marks)
Maximum 150

7)

(a)

1. Formed of cells derived from the two organisms- mother
2. and fetus
3. It is an organ
4. found only in mammals/ known as deciduous alanto-chorion placenta
5. (circular) disc shaped
6. It is formed by fetal membranes such as Chorion
7. allantois
8. and endometrium of the uterus.
9. well developed at the 12^{th} week of gestation.
10. chronic villi project into the maternal blood
11. A thin barrier is found in between the maternal and fetal blood
12. Umbilical cord connects placenta to the fetus

Functions

13. Exchange of materials/ substances between the mother and fetus
14. Mother to fetus- oxygen, water, glucose/ amino acid/ vitamins/ hormones. Diverse substances/Imunoglobulins. (any 4)
15. From fetus to mother- carbon dioxide, water, urea, (some) hormones
16. connecting fetus to the mother
17. acting as a barrier to certain materials
18. Example- Rh factor
19. Acting as respiratory /gas exchange structure of the fetus
20. Protecting the fetus from the coagulation of blood and relatively high blood pressure
21. Secretes hormones as endocrine glands
22. hCG
23. maintaining corpus luteum
24. progesterone
25. development of mammary glands
26. oestrogen
27. development of ducts of mammary glands
28. hPL
29. prepare the mammary glands to secrete the milk.

(b) After ovulation in menstrual cycle

30. LH
31. Stimulates the development of corpus luteum
32. from the corpus luteum progesterone
33. oestrogen and
34. inhibin are secreted.

Progesterone

35. Maintaining the endometrium of the uterus
36. Develops the glands and induce to secrete the liquefied mucus.
37. This helps the sperms to move through the uterus
38. all these three hormones- progesterone, oestrogen and inhibin
39. suppress the hypothalamus and anterior pituitary
40. therefore FSH and LH levels falls.
41. This leads to degeneration of corpus luteum.
42. Due to this, there is a steady decline in the levels of progesterone, oestrogen
43. leads to menstrual cycle.

(Any 38 x 4 = 152 marks)
Maximum 150

8. (a)

1. Increase of average temperature of atmosphere is global warming.
2. Greenhouse gases prevent a part of radiation that reaches the earth's surface being radiated back into space
3. leading to increase of temperature of atmosphere
4. Excess CO_2
5. Nitrogen oxides/ N_2O/ NO_2/ NO
6. CH_4
7. Water vapor
8. (stratosphere) ozone/ O_3
9. CFC/ HFC
10. caused by greenhouse gases
11. burning of fossil fuels
12. deforestation
13. by the burning of aero plane fuels

(b)

14. melting of polar ice caps and glaciers
15. expansion of sea water
16. volume of sea water increases
17. beach erosion
18. disruption of coastal fisheries
19. increase of effects on bio-diversity of sea
20. changes in pattern of atmospheric flow
21. Alter the rainfall patterns.
22. Changes in climatic factors
23. Increase of drought conditions
24. Increase irrigation demand
25. Effecting the agricultural products/vegetation
26. Increase of floods
27. Due to the excess storage of water
28. changes in the composition of vegetation
29. alter the limits of grasslands, forests
30. alter the limits of deserts
31. loss of habitats
32. increase of forest fires/ changes in vegetation patterns
33. increased deaths by heat diseases
34. spread of tropical diseases to temperate areas

c)

35. follows the international conventions/protocols/acts
36. Kyoto protocol
37. International agreement linked to the United Nations Framework Convention on climatic change
38. Its aim is to control the emission of greenhouse gases
39. National environmental act
40. Central Environmental Authority (CEA)
41. has wide powers to regulate pollution
    other measures
42. controls deforestation
43. encourages the resource regeneration
44. decreases the usage of fossil fuels

(Any 38 x 4 = 152 marks) Maximum 150

9) (a) The following features of the micro-organisms are used to produce the commercially based products useful for humans.

1. Microbial cells/microbial structures
2. Metabolic products
3. Metabolic processes
4. Genetically modified micro-organisms
5. Microbial cells used as food supplements
6. Single cell protein food- *Spirulina*
7. Sexual reproductive structures/mushrooms
8. *Agaricus/ Pleurotus/ Lentinus*
9. Active immunization for many diseases
10. Hepatitis, Metabolic products
11. Alcoholic beverages/wine/beer/bread production
12. *Saccharomyces cerevisiae*
13. Vinegar production
14. *Acetobacter aceti / Gluconobacter*
15. Yoghurt/Curd
16. Cheese/Butter
17. *Lactobacillus bulgaricus/ Streptococcus lactis*
18. Production of enzymes
19. Amylase/Cellulase- *Aspergillus niger* (Accept Other examples also)
20. Antibiotics
21. Penicillin - *Penicillium notatum*
22. Production of vaccines.
23. Hepatitis-B vaccine
24. Passive immunization
25. Antitoxins against tetanus/Botulism toxin/Immunoglobulin against Rabies
26. Bio fertilizer
27. *Rhizobium*
28. Bio pesticides
29. *Bacillus thuringiensis,*Microbial processes
30. Composting
31. Mixed population of aerobic and anaerobic micro-organisms
32. Obtained by the decomposition of organic matters
33. Biogas production
34. Biological breakdown of organic matter in the absence of oxygen
35. Biogas- CH_4, CO_2, H_2S, N_2, H_2
36. Copper (metal) extraction
37. From low grade metal ores
38. *Thiobacillus ferroxidans*
39. *Thiobacillus thiooxidans*
40. H_2SO_4, Fe^{3+}/Microbial leaching
41. Retting
42. Heterogeneous micro-organisms from the plant fibers
43. Bio-remediation
44. Removal of pollutants from the environment/ management
45. By accelerating the biodegradation of micro-organisms
46. Genetically modified micro-organisms/GMOs

b. 47. Human insulin/human growth hormone/vaccines/Hepatitis-B vaccine

48. Convert the cheap raw material into useful products rapidly
49. High growth rate of micro-organisms
50. Metabolic processes which can be in many path ways
51. Metabolic versatility and ability to use many different materials or substrates.
52. No need of high temperature, pressure, labor intense (mostly)

(Any 50 x 3 = 150 marks)

10) (a) Respiratory pigments

1. Reversibly combines with the oxygen at the high partial pressure of oxygen
2. reversibly release oxygen at the low partial pressure of oxygen.
3. Which are organic molecules.
4. They are formed in the complex animals due to the low solubility of oxygen in water/ blood
5. **Haemoglobin**
6. found in human, other invertebrates and some annelids
7. quaternary proteins/ consists of four polypeptide chains
8. Each polypeptide contain contains one Haem group/ haemoglobin has four Haem groups
9. Haem group contains Fe
10. **Haemocyanin**
11. consists of Cu
12. Haemolymph of some arachnids & some mollusks
13. **Chlorocruorin**
14. consists of Haem group/ Fe
15. many annelids/polychaetes
16. **Haemoerythrin**
17. contains Haem group/Fe
18. Annelids (some sea living)
19. **Myoglobin**
20. found in the muscles of vertebrates
21. store and release the oxygen in the muscles

(b) Agricultural uses of plant growth substances

1. Natural plant growth substances
2. as well as Synthetic compounds also act similar to natural plant growth substances used in agriculture.
3. Auxin/ IBA/ IAA
4. induction of roots in stem cuttings
5. fruit development
6. (induce) parthenocarpy
7. (act as) weedicides
8. 2-4 D,
9. MCPA.
10. Cytokinins
11. Maintaining the freshness of cut leaves and flowers
12. Inducing the cell division by interacting with the auxin.
13. Gibberellin
14. Induces seed germination
15. Induces the elongation of stems
16. Induces the parthenocarpy in some plants.
17. Ethylene
18. Induces the ripening of fruits

(c) Chromosomes and genes

1. Gene is the portion of DNA
2. which determines /specifies a single polypeptide
3. Genes are the basic structural and
4. Functional unit of heredity
5. DNA is a hereditary material
6. Genes consist of specific nucleotide sequences of DNA.
7. Long chains of DNA are
8. tightly packed in chromosomes
9. and associated with protein/(which is called) histone.
10. Genes occupies a definite position in a chromosomes
11. which is called as locus.
12. There are many genes on a chromosome.

(20+18+12 = 50 x 3 = 150 marks)

இலங்கையின் மிகப்பாரிய தனியார் உயர்கல்வி வலையமைப்பு

உயர்தரத்தின் பின்னர் சர்வதேச தரம் வாய்ந்த

இரட்டை டிப்ளோமா

Pearson சர்வதேசதரச் சான்றிதழ்

- **DiHN** — 4 Months — Diploma in Hardware & Networking
- **DiBM** — 4 Months — Diploma in Business Management
- **DiAE** — 4 Months — Diploma in Academic English
- **DiCA** — 5 Months — Diploma in Computerized Accounting
- **DiBE** — 4 Months — Diploma in Business English
- **DiSE** — 6 Months — Diploma in Software Engineering
- **DiTEC INTERNATIONAL** — 4 Months — Diploma in Information Technology
- **DiM** — 4 Months — Diploma in Multimedia
- **DiWE** — 6 Months — Diploma in Web Engineering
- **DiE** — 4 Months — Diploma in English

WEEK DAYS & WEEKEND **BATCHES**

Pearson APPROVED

FURTHER DETAIL:
021 7 572572

ESOFT *Shaping Lives, Creating Futures.*

ESOFT METRO CAMPUS

No. 137, K.K.S Road, Jaffna, Sri Lanka
Hotline : 077 309 9 308 | Tel : 021 222 4142

இலங்கையின் மிகப்பாரிய உயர்கல்வி வலையமைப்பு

Pirakanth

Photo Copy Centre

School & Office
Stationary Items

Photo Copy,
Colour Print,
Computer Typing,
Colour Photo Copy,
Binding, Laminating

55,Palaly Road,
Thirunelvely,
Jaffna.

T.P : 077 223 8447
075 498 5417
077 313 8881

Evergreen Printers

எவகிறீன் அச்சகம்

(Offset Printers, Publishers & Book Binders)

பில் புத்தகங்கள்
லெட்டர் ஹெட்
திருமண அழைப்பிதழ்கள்
சுவரொட்டிகள்
போஸ்டர்கள்
கலண்டர்கள் / டயறிகள்
சான்றிதழ்கள்
இன்னும் பல.....

Reasonable Prices
Neat Works
Quick Services
Free Delivery
In Addition

Bill Books
Letter Heads
Wedding Invitation
Hand Bills.
Posters
Diaries
Calendars
Certificates
And Many More.....

ALL KINDS
OF OFFSET
PRINTING WORKS
UNDER TAKEN
UNDER ONE ROOF

அனைத்து வேலைகளையும் தரமாகவும் நேர்த்தியாகவும் மிக விரைவாகவும்
செய்து கொடுக்கும் வடக்கு, கிழக்கின் அச்சக முன்னோடிகள்

Tel: 021 221 9893 / 0777 1414 44

இல. 693, கே.கே.எஸ். வீதி,
யாழ்ப்பாணம்.

693, K.K.S Road, Jaffna.
E-mail : evergreenjaffna@gmail.com

Evergreen
PRINTERS

INFORMATICS INSTITUTE OF TECHNOLOGY

UNIVERSITY OF WESTMINSTER

Producing
Innovators, Entrepreneurs and Business leaders
since 1990

Employability | Marketability | Industry Ready

Krishnakripa Jayakumar
Software Engineer
99X Technology

Scan here for the video

Foundation

Foundation Certificate in Higher Education (IT | Business)
(A fast-track for students after O/L towards selected degree programmes in IT & Business)

Duration 1 Year

REGISTRATIONS NOW ON

Undergraduate Programmes

BEng(Hons) Software Engineering

BSc(Hons) Computer Science
With Specialization Options
Games & Computer Graphics | Mobile & Web Computing | Multimedia Computing

BSc(Hons) Business Information Systems

BA (Hons) Business Management

Duration 4 Years
(Includes 1 year industrial placement)

100% JOB GUARANTEED

100% Job Assurance

Compulsory 1Year Industrial Placement

An Award Winning Campus Life

IIT CAMPUS
Informatics Institute of Technology
#57, Ramakrishna Road,
Colombo 06.

Tel: 0112 360 212
admissions@iit.ac.lk

Hotline....
0722 72 72 72

www.iit.ac.lk
iitsl

IDM INTERNATIONAL DIPLOMA IN BUSINESS MANAGEMENT

bucks new university

EDhat INTERNATIONAL

Sri Lanka's Highly Trusted Higher Education Partner

IDM Nations Campus® Since 1981

IDM NATIONS CAMPUS
#216. Navalar Road, Jaffna
Tel : 021 222 9901
E-mail : jaffna@idmedu.lk

SGS ISO 9001 : 2015 CERTIFIED ORGANISATION

TVEC REGISTERED INSTITUTE
TVEC No. - P01/0727

CALL FOR MORE INFORMATION
0774 419 901
HOTLINE

For More Info www.idmedu.lk www.facebook.com/idmnc

SQA

NORTHSHORE
COLLEGE OF BUSINESS & TECHNOLOGY

Intakes - Sep /Oct

மாணவர்களுக்கு ஓர் அரிய வாய்ப்பு

இலங்கையிலேயே குறைந்த கட்டணம்

+94 115 990 000
+94 715 500 200

www.northshore.lk
141, Church Road, Colombo-15.

www.facebook.com
/northshorecollege

இலங்கையிலேயே
உயர் பிரித்தானிய பட்டங்களை
பூர்த்தி செய்யும் அதே சந்தர்ப்பத்தில்
சர்வதேச பல்கலைக்கழகங்களில் உயர்கல்வி
தொடர விரும்பும் மாணவர்களுக்கு முதலாம்
இரண்டாம் வருடத்தை இலங்கையிலும் எஞ்சிய
வருடங்களை இங்கிலாந்திலும் பூர்த்தி செய்யும்
ஓர் அரிய வாய்ப்பு

- **SQA HND in Business**
- **SQA HND in Computing : Software Development**
- **Northshore Foundation Programme**

Join with pending
O/Level Or A/Level
Results

NORTHSHORE
COLLEGE OF BUSINESS AND TECHNOLOGY