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உயர்ப்பாட்டுத் தராதரப் பத்திர (உயர் தரப் பதி) - 2014 ஆகஸ்ட்
General Certificate of Education (Adv. Level) Examination, August 2014

சிவ தீர்த்தம்	I
உயிரியல்	II
Biology	III

09 E II

இரண்டு மணித்தியாலம்
Two hours

Instructions:

- * Answer all questions.
- * Write your Index Number in the space provided in the answer sheet.
- * Instructions are given on the back of the answer sheet. Follow those carefully.
- * In each of the questions 1 to 50, pick one of the alternatives from (1), (2), (3), (4), (5) which is correct or most appropriate and mark your response on the answer sheet with a cross (x) on the number of the correct option in accordance with the instructions given on the back of the answer sheet.

- Which one of the following represents the composition of elements of albumin?
(1) CHO (2) CHONPS (3) CHONS (4) CHONP (5) CHOP
- Which one of the following chemical tests can be used to show the presence of glucose in a solution?
(1) Biuret test (2) Benedict test (3) Iodine test
(4) Sudan test (5) Methylene blue test
- Which of the following final products are formed during anaerobic respiration of glucose in yeast?
(1) Ethanol and water (2) Ethanol and CO_2
(3) Pyruvic acid and CO_2 (4) Lactic acid and CO_2
(5) CO_2 and water
- Which one of the following is the final electron acceptor in the electron transport chain in animal respiration?
(1) NAD (2) Oxygen (3) Cytochrome C
(4) Water (5) NADP
- Which one of the following is incorrect regarding prokaryotic cells?
(1) All prokaryotic cells have 70 S type of ribosomes.
(2) All prokaryotic cells have peptidoglycans in the cell wall.
(3) All prokaryotic cells do not have a cytoskeleton.
(4) All prokaryotic cells do not have membrane bound organelles.
(5) All prokaryotic cells contain lipids in the cell membranes.
- Which one of the following is involved in the fixation of atmospheric CO_2 in C_4 plants?
(1) PEP carboxylase (2) RUBISCO (3) RUBP
(4) NAD (5) Cytochrome oxidase
- Which of the following cellular processes produces ATP from glucose in the absence of oxygen?
(1) Krebs cycle (2) Glycolysis
(3) Electron transport chain (4) Photophosphorylation
(5) CO_2 fixation
- Which of the following phyla does not include animals that possess suckers?
(1) Platyhelminthes (2) Annelida (3) Nematoda
(4) Mollusca (5) Echinodermata
- Which of the following groups includes an animal/animals that does/do not show internal fertilization?
(1) *Planaria*, butterfly, snail (2) shark, *Biparium*, house fly
(3) cockroach, mullet, liver fluke (4) *Ichthyophis*, tape worm, mosquito
(5) parrot, dragonfly, skate

Mollusc	Structure	Environment
A - Mussel	a - Eyes	i - Marine
B - Snail	b - Tentacles	ii - Fresh water
C - Oyster	c - Radula	iii - Terrestrial
D - Squid	d - External shell	

Which of the following 'mollusc-structure-environment' combination is correct?

- (1) C a i (2) B b iii (3) A c ii (4) D d i (5) C b i

11. An external feature of each of the specimens labelled as A, B, C and D is given below.

- A - Two dorsal fins
B - Blackish longitudinal bands in the belly region
C - A yellow band on either side of the body
D - Two spines separated from the anal fin

Specimens A, B, C and D in correct sequence are

- (1) tuna, carangid, grey mullet and skate.
(2) grey mullet, tuna, *Ichthyophis* and carangid.
(3) carangid, shark, grey mullet and tuna.
(4) shark, *Ichthyophis*, skate and grey mullet.
(5) carangid, *Ichthyophis*, grey mullet and shark.

12. Which one of the following statements regarding vitamins is correct?

- (1) No vitamin can be synthesised in humans.
(2) Cereals are a rich source of vitamin A.
(3) Deficiency of vitamin D causes osteomalacia in children.
(4) Vitamin E acts as an antioxidant.
(5) In humans, presence of an intrinsic factor is essential for vitamin B₆ absorption.

13. Which of the following statements regarding human respiratory system is incorrect?

- (1) Functional units of lungs are alveoli.
(2) Vital capacity of lung is about 3.5 dm³.
(3) Bronchi are lined with ciliated pseudocolumnar epithelial cells.
(4) Cartilages are present in the bronchioles.
(5) Pharynx is connected both to the nasal cavity and buccal cavity.

14. Which one of the following statements is correct regarding human blood?

- (1) It is slightly acidic.
(2) Most of the leukocytes are agranulocytes.
(3) Haemoglobin has a higher affinity to oxygen than carbon monoxide.
(4) It helps to maintain homeostasis.
(5) A person with O blood group has both A and B agglutinogens.

15. Which one of the following statements regarding human heart is correct?

- (1) It is made up of long and cylindrical fibres.
(2) The right atrioventricular valve is bicuspid.
(3) The rate of heart beat is increased by stimulation of the parasympathetic nervous system
(4) Duration of atrial systole is 0.1 seconds.
(5) Ventricular depolarization is represented by T wave in the electrocardiogram (ECG).

16. Which of the following does not involve active transport across the cell membranes?

- (1) The transport of mineral ions from apoplast to the symplast
(2) The transport of sugar from leaf cells into sieve tube element of the phloem
(3) The transport of sugar from one sieve tube element to the adjacent sieve tube element
(4) K⁺ uptake by guard cells in stomatal movements
(5) The transport of mineral ions into the vascular pathway

17. Which of the following statements regarding human receptors is incorrect?

- (1) They transform one form of energy to nerve impulses.
(2) Activity of some receptors diminishes with continuous stimulation.
(3) Pacinian corpuscles are mechanoreceptors.
(4) Organ of Corti contains vibration receptors.
(5) Krause's bulbs are sensitive to high temperatures.

18. Which of the following statements regarding human brain is **incorrect**?
 - (1) Thalamus is derived from embryonic forebrain.
 - (2) The surface of cerebellum is formed of white matter.
 - (3) It has four large cavities.
 - (4) Endocrine functions of the pituitary is regulated by the hypothalamus.
 - (5) Large representation is devoted to hand in the sensory area of the cerebrum.
19. Contribution of which one of the following systems is least important in coordination?
 - (1) Circulatory system
 - (2) Muscular system
 - (3) Endocrine system
 - (4) Digestive system
 - (5) Nervous system
20. Which of the following attributes of action potential prevents the reverse conduction of a nerve impulse?
 - (1) Hyperpolarization phase
 - (2) Repolarization phase
 - (3) Refractory period
 - (4) Depolarization phase
 - (5) Duration
21. Which one of the following statements regarding excretion is **incorrect**?
 - (1) Bilirubin is considered as an excretory product.
 - (2) In all animals, the first nitrogenous excretory product is ammonia.
 - (3) With reference to carbon loss from the body, production of uric acid is disadvantageous.
 - (4) In man, main site of urea production is the kidney.
 - (5) Nephridia open both to inside and outside of the body.
22. Which one of the following contributes least in weight lifting by the human upper limb?
 - (1) Long and strong humerus
 - (2) Pronation
 - (3) Supination
 - (4) Precision grip
 - (5) Broad palm
23. Which one of the following statements regarding human smooth muscles is correct?
 - (1) They all show rhythmic contractions.
 - (2) Their unit of contraction is not the sarcomere.
 - (3) They fatigue quickly.
 - (4) They are innervated by the somatic nervous system.
 - (5) They are not elastic.
24. Which one of the following statements is **incorrect** regarding contraception?
 - (1) Lactation can provide a contraceptive effect.
 - (2) Oral contraceptive pill obstructs the release of FSH and LH from the pituitary.
 - (3) Depo-Provera prevents uterine implantation.
 - (4) IUDs prevent ovulation.
 - (5) Vasectomy is a permanent method of male contraception.
25. Which of the following statements regarding human pregnancy is **incorrect**?
 - (1) Its duration is usually about 40 weeks after fertilization.
 - (2) During pregnancy placental progesterone suppresses myometrial contractions.
 - (3) Foetus has a hairy wrinkled skin by the end of the first trimester of pregnancy.
 - (4) Presence of hCG in urine confirms pregnancy.
 - (5) Towards the end of pregnancy oestrogen triggers the development of oxytocin receptors in the myometrium.
26. Which one of the following statements regarding human fertilization is correct?
 - (1) It usually occurs in the lower $\frac{1}{3}$ of the fallopian tube.
 - (2) It must occur within 24 hours of ovulation.
 - (3) During this process polyspermy is prevented by the egg membrane.
 - (4) At fertilization entire sperm enters the egg.
 - (5) Under no circumstances it occurs outside the female reproductive system.
27. A fruit is
 - (1) a mature ovary.
 - (2) a mature ovule.
 - (3) the seed and integuments.
 - (4) the fused carpels.
 - (5) the enlarged embryo sac.

28. Which one of the following features of the life cycles of gymnosperms and angiosperms does not help to distinguish them from other vascular plants?
- (1) The presence of alternation of generations
 - (2) The presence of ovules
 - (3) The presence of integuments
 - (4) The production of pollen
 - (5) The presence of a dependent gametophyte
29. Which one of the following is not directly required for replication of DNA?
- (1) Nucleotides
 - (2) DNA templates
 - (3) Polymerase enzymes
 - (4) Ligase enzymes
 - (5) ATP
30. In a pea plant red seeds (R) are dominant to yellow seeds (r) and long pods (L) are dominant to short pods (l). When a plant having red seeds and long pods was crossed with a homozygous recessive plant the following progeny resulted.
- Plants with red seeds and long pods - 138
- Plants with red seeds and short pods - 145
- The genotype of the plant having red seeds and long pods which was crossed with the homozygous recessive plant is
- (1) RrLL
 - (2) rrLL
 - (3) RRLL
 - (4) RRLl
 - (5) RrLl
31. Which of the following statements regarding mutations is correct?
- (1) External mutagens cause spontaneous mutations.
 - (2) Haemophilia is an example for a lethal dominant mutation.
 - (3) Cancer occurs due to chromosomal mutations.
 - (4) Polydactyly occurs due to a dominant mutation.
 - (5) Albinism is an example for a lethal recessive mutation.
32. The genes of which of the following microorganisms has been used to develop genetically modified corn varieties that are resistant to insect attacks?
- (1) *Erwinia* sp.
 - (2) *Bacillus thuringiensis*
 - (3) *Escherichia coli*
 - (4) *Agrobacterium tumefaciens*
 - (5) *Thiobacillus thiooxidans*
33. Which of the following is not a general application of recombinant DNA technology at present?
- (1) Production of hormones for treating dwarfism
 - (2) Production of vaccines
 - (3) Production of virus resistant plants
 - (4) Introduction of genetically modified genes into human gametes
 - (5) Production of weedicide resistant crop plants
34. When the period of origin is considered, which of the following indicates the correct order of organisms from the oldest to the most recent group?
- (1) Bacteria, single celled eukaryotes, mosses, annelids
 - (2) Lobed fin fishes, amphibians, reptiles, ferns
 - (3) Vertebrates, terrestrial plants, terrestrial animals, conifers
 - (4) Gymnosperms, insects, lobed fin fishes, tree ferns
 - (5) Conifers, amphibians, placental mammals, flowering plants
35. Species P was observed to be highly abundant in a small lagoon when sampled in May 2012. When sampled in this lagoon in May 2014, this species was not present but another species Q, which was not present in May 2012 was abundant. Which of the following is the least acceptable reason for the above observations?
- (1) Q is a parasitic species which depends only on P.
 - (2) Q is an invasive species.
 - (3) P has been overexploited by man.
 - (4) Intense pollution has occurred in the lagoon.
 - (5) Salinity of the lagoon has increased.

Which of the following indicates in correct order, the animals included in the least concerned (LC), near threatened (NT) and data deficient (DD) categories of the IUCN red data book?

- (1) *Crocodylus palustris*, *Melanocheilus trijuga*, *Mystus keletius*
- (2) *Caryota urens*, *Oecophyla smaragdina*, *Ichthyophis glutinosus*
- (3) *Caretta caretta*, *Elephas maximus*, *Chloroxylon swietenia*
- (4) *Melurus ursinus*, *Loris tardigradus*, *Garcinia quesita*
- (5) *Dermochelus coreacea*, *Ophicephalus striatus*, *Lantana camera*

37. If coal with a high sulphur content is used in coal thermal power plants, which one of the following is most likely to happen?

- (1) Reduction of crop harvest
- (2) Occurrence of skin cancer
- (3) Erosion of buildings
- (4) Impaired vision
- (5) Drowsiness

38. Administration of antitetanus vaccine is an example of

- (1) artificially acquired passive immunity.
- (2) artificially acquired active immunity.
- (3) naturally acquired passive immunity.
- (4) a routine vaccination procedure in public health to prevent tetanus.
- (5) naturally acquired active immunity.

39. Which of the following bacteria species is used in commercial extraction of copper from low grade ores containing iron sulphide?

- (1) *Bacillus subtilis*
- (2) *Bacillus thuringiensis*
- (3) *Thiobacillus ferrooxidans*
- (4) *Pseudomonas denitrificans*
- (5) *Bacillus polymyxa*

40. Which of the following antibiotics inhibits bacterial growth by inhibiting DNA synthesis?

- (1) Polymixin
- (2) Penicillin
- (3) Erythromycin
- (4) Ciprofloxacin
- (5) Clotrimazole

41. For each of the questions 41 to 50 one or more of the responses is/are correct. Decide which response/ responses is/are correct and then select the correct number.

- If only A, B and D are correct..... 1
- If only A, C and D are correct 2
- If only A and B are correct..... 3
- If only C and D are correct 4
- If any other response or combination of responses is correct 5

Directions summarised				
1	2	3	4	5
A, B, D correct.	A, C, D correct.	A, B correct.	C, D correct.	Any other response or combination of responses correct.

41. Which of the following organelle/organelles is/are involved in photorespiration in plants?

- (A) Chloroplasts
- (B) Mitochondria
- (C) Peroxisomes
- (D) Lysosomes
- (E) Golgi complex

42. Which of the following statements is/are correct regarding human pancreatic juice?

- (A) It is an acidic secretion.
- (B) It emulsifies fats.
- (C) Its secretion is stimulated by secretin.
- (D) It contains inactive precursors of proteolytic enzymes.
- (E) Its secretion is decreased by parasympathetic stimulations.

43. Which of the following plant growth substances is/are transported through the xylem?

- (A) IAA
- (B) Gibberellic acid
- (C) Cytokinins
- (D) Abscissic acid
- (E) Ethylene

44. Which of the following statements regarding the skull of a normal adult man is/are incorrect?

- (A) Its cranial capacity is about two litres.
- (B) Mastoid process is found in the lower jaw.
- (C) Maxillary bone has air sinuses.
- (D) Facial region is made up of 12 bones.
- (E) Upper jaw has six molars.

45. Which of the following statements regarding human hormones is/are correct?
- (A) Erythropoietin acts only in bones.
 - (B) Prolactin plays an important role in the release of milk.
 - (C) Both glucagon and cortisol increase blood glucose level.
 - (D) Both ADH and aldosterone can alter water reabsorption in nephrons.
 - (E) Parathyroid hormone decreases blood calcium level.
46. Which of the following statements regarding human nephron is/are incorrect?
- (A) Water reabsorption can occur at proximal convoluted tubule, ascending limb of loop of Henle and distal convoluted tubule.
 - (B) Urea is actively reabsorbed in the proximal convoluted tubule.
 - (C) Juxtamedullary nephrons have long loops of Henle.
 - (D) Na^+ reabsorption always occurs actively.
 - (E) It helps in maintaining blood volume.
47. Sclerenchyma cells which are supporting cells in plants are normally located in which of the following region/regions of dicotyledonous plants?
- (A) Cortex in primary stem
 - (B) Bundle sheath in leaves
 - (C) Xylem tissues
 - (D) Phloem tissues
 - (E) Pith
48. Which of the following statements regarding human spermatogenesis is/are incorrect?
- (A) Once started it is a continuous process.
 - (B) Its duration is about 72 days.
 - (C) It occurs optimally at body temperature.
 - (D) Meiosis occurs when spermatogonia are transformed into primary spermatocytes.
 - (E) It is initiated by FSH.
49. Which of the following genetic disorders of man occurs/occur due to a change in the number of sex chromosomes?
- (A) Huntingdon's disease
 - (B) Downs syndrome
 - (C) Turner syndrome
 - (D) Klienfelter's syndrome
 - (E) Cystic fibrosis
50. Which of the following microorganisms is/are important in the production of vinegar from fruit juice?
- (A) *Gluconobacter*
 - (B) *Saccharomyces*
 - (C) *Lactobacillus*
 - (D) *Acetobacter*
 - (E) *Streptococcus*
