**PERATURAN PEMARKAHAN (Kertas 2)**

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| **Num.** | **Scoring Criteria** | **Marks** | |
| 1(a)(i) | *Able to name the cell*  **Answer:** Animal cell | 1 | 1 |
| 1(a)(ii) | *Able to state the reason of the answer in (a)(i)*  **Answer:**  Has no cell wall // has no vacuole // has no chloroplast // has centrioles | 1 | 1 |
| 1(a)(iii) | *Able to label structure Q, R and S*  **Answer:**  Q: mitochondria  R: Golgi apparatus  S: Rough ER | 1  1  1 | 3 |
| 1(b)(i) | *Able to state the function of organelle contain structure P*  **Answer:**  Control all cell activities // contain genetic materials | 1 | 1 |
| 1(b)(ii) | *Able to state the component of structure P*  **Answer:** DNA | 1 | 1 |
| 1(b)(iii) | *Able to name the parts labeled X, Y and Z*  **Answer:**  X: phosphate group  Y: Pentose sugar  Z: Nitrogenous base | 1  1  1 | 3 |
| 1(c)(i) | *Able to name cell T*  **Answer:** Mesophyll palisade cell | 1 | 1 |
| 1(c)(ii) | *Able to state why cell T has a large number of organelle R*  **Answer:**  Process and modify protein into enzyme (to carry out photosynthesis) | 1 | 1 |
|  | **TOTAL** | **12** | |

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| **NUM** | **SCORING CRITERIA** | **MARKS** | |
| 2(a)(i) | *Able to state the condition of the red blood cells after being immersed in*  Solution P: **Crenation / shrink / shrivel**  Solution Q:**Haemolysis / swell and burst** | 1  1 | 2 |
| 2(a)(ii) | *Able to name the type of solution R in which the red blood cells are immersed.*  **Solution R is Isotonic solution.** | 1 | 1 |
| 2(a)(iii) | *Able to explain the answers given in a(ii)*  **P1:The cell retains its normal shape.**  **P2:The water diffuses in and out of the cells at equal rate by osmosis**  **P3:Solution R has the same osmotic concentration as the cytoplasmic fluid in the red blood cells** | 1  1  1 | 3 |
| 2(b) | *Able to explain why vinegar is suitable to be used as the natural preservative for the preservation of garlic.*  **F1:** **Vinegar has a low pH/acidic**  **E1: Vinegar diffuses into the tissues of the garlic**  **E2: The tissues of the garlic becomes acidic**  **E3: The low pH prevents the growth of microorganisms in garlics**  **E4: The garlic can be preserved to last longer**  F any 2E | 1  1  1  1  1 | 3 |
| 2(c) | Able to explain the condition of the plant in Diagram 2.2 after one week .  **F: The plant wilt**  **E1: The cells become flaccid/plasmolysed//both the vacuole the vacuole and cytoplasm shrink//the plasma membrane of the root cells pull away from the cell wall.**  **E2:Water molecules diffuse out from the cell sap of the root hair cell by osmosis**  **E3:(the remaining) soil water becomes hypertonic to the cell sap of the root hair cell as the soil dries out.**  F any 2E | 1  1  1  1 | 3 |
| **TOTAL** | | **12** | |

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| **Num** | **SCORING CRITERIA** | **MARK** | |
| 3(a) | *Able to state number of chromosomes in the cell*  **Answer:**  6 chromosomes | 1 | 1m |
| 3(b) | *Able to draw one daughter cell of mitosis and meiosis*  **Answer***:*  (i) mitosis  *Number of chromosomes are 6*  *Same pattern and same size of chromosomes as parent cell*  (ii) meiosis  *Number of chromosomes are 3*  *Pattern and size of chromosomes is different compare to parent cell* | 1  1  1  1 | 2m  2m |
| 3(c) | *Able to explain why the chromosomes numbers are different*  **Suggested Answer:**  In mitosis:  - (During anaphase) chromosome / sister chromatids separated and move to the opposite poles (cause the number of chromosome in daughter cell remain the same)  In meiosis:  - (During anaphase I) homologous chromosomes separated and move to the oppoeite poles (cause the number of chromosome in daughter cell become half form the parent cell) | 1  1 | 2m |
| 3(d) | *Able to explain one difference of importance of mitosis and meiosis*  **Suggested Answer:**  F1: Mitosis produce no variation, while meiosis produce variation  P1: caused by crossing over during Prophase I in meiosis | 1  1 | 2m |
| 3(e) | *Able to explain why buffalo is white colour*  **Answer:**  P1: albino buffaloes caused by gene mutation which control the production of skin pigmentation  P2: in autosomes  P2: controlled by recessive alleles  P3: skin cells unable to synthesis (melanin) pigment // no (melanin) pigment  *Any 3* | 1  1  1  1 | 3 m |
|  | **Total** | **12** | |

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| **Num** | **Mark Scheme** | **Mark** | |
| 4(a) | *Able to name corectly R dan S*    **Answer**:  R : Tendon  S : Ball and socket joint | 1  1 | 2 |
| 4(b) | *Able to explain the function of X muscle, Y muscle and R in action to straighten the arm*  **Suggested answer**:  F : Muscle X and muscle Y act as an antogonistic pair  P1 : Muscle Y / triseps contract while muscle X / biseps was relaxes  P2 : to transfer the force by tendon / R tissue to the bone  P3: (Tendon is inelastic and tough) pulled the ulna bone downward (and caused the forearm is straighten) | 1  1  1  1 | Max 3 |
| 4 (c) | *Able to explain why muscle work in pairs to produced movement*  **Suggested answer:**  F: The muscle can only contract / pull out  P: It has to be extended back to it original lenght (to contract again) by the contraction of another muscle | 1  1 | 2 |
| 4 (d) | *Able to state the importance of skeletal part in movement*  **Suggested answer:**  P1: provides surface area for muscle attachment  P2: form the joints that enable the bone to move and allowing movement  P3: support the body / forearm weight | 1  1  1 | Max  2 |
| 4( e ) | *Able to explain what happened if the tissue R torn*  **Suggested answer :**  F: the forearm cannot bend / straightens  P1: when the muscle X or Y contract  P2: the pulling force (produced by contraction of muscle) is not transmit to the radius / ulna | 1  1  1 | 3 |
|  | **Jumlah** | **12** | |

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| **Num** | **Mark Scheme** | **Mark** | |
| 5(a)(i) | *Able to name the machine*  **Answer:** Dialysis machine | 1 | 1 |
| 5(a)(ii) | *Able to explain the function of the machine*  **Suggested answer:**  P1: During haemodialysis, patient’s blood is pumped out from artery in the arm and flow into dialysis machine  P2: the blood flow through semipermeable tube in the machine  P3: blood has higher concentration of urea and salts  P4: urea and salts diffuse out through the semipermeable tube into dialysis fluid  P5: dialysis fluid contain lower concentration of urea and salts compare to the blood  P6: the blood is returned back in the body through vein in the same arm  P7: concentration of urea and salts in the blood // blood osmotic pressure back to normal range | 1  1  1  1  1  1  1 | Max 3 |
| 5(b)(i) | *Able to state the effect of salts to the formation of urine*  **Answer:** Volume of urine is less and concentrated | 1 | 1 |
| 5(b)(ii) | *Able to explain the answer in (b)(i)*  **Suggested answer:**  P1: salted “sup tulang” cause the blood osmotic pressure increase  P2: more ADH secretes by pituitary gland  P3: wall of nephron in kidneys become more permeable to water  P4: more water reabsorb into blood capillary by osmosis | 1  1  1  1 | Max  3 |
| 5(c)(i) | *Able to label the structure*  *Notes:*  *3 labels correct*  *2 labels correct*  *1 label correct* | 2  1  0 | 2 |
| 5(c)(ii) | *Able to explain why there is no glucose and amino acids in urine*  Suggested answer:  P1: all glucose and amino acids are reabsorbed into blood capillary  P2: at proximal convoluted tubules | 1  1 | 2 |
|  | **Total** | **12** | |

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| **NUM.** | **MARK SCHEME** | **MARKS** | |
| 6(a)(i) | *Able to name the organs that are involved in the processing of food P correctly.*  *Answer:*  Mouth / Oral cavity  Duodenum  Ileum / Small intestine | 1  1  1 | 3 |
| 6(a)(ii) | *Able to explain the processes which occur to the food P until it can be used by body cells.*  *Sample answer:*  P1 Food P rich in starch  P2 (In oral cavity) saliva contains enzyme salivary amylase  P3 To hydrolysis starch to maltose //    Salivary amylase  Starch + (Water) Maltose  P4 Duodenum receive pancreatic amylase from pancreas  P6 Pancreatic amylase completes the digestion of starch to maltose //  Pancreatic amylase  Starch + (Water ) Maltose  P7 (In ileum) intestinal juice contains maltase (erepsin, sucrase, lactase)  P8 (Maltase) hydrolysis maltose to glucose //  Maltase  Maltose + Water Glucose  P9 Glucose diffuse into the epithelial cells and absorbed into the capillaries (villus)  P10 Capillaries drain glucose into hepatic portal vein, which leads to the liver  P11 Glucose is distributed throughout the body by the circulatory system  P12 (When the glucose molecules reach the cells) glucose are oxidised to release energy (during cellular respiration) | 1  1  1  1  1  1  1  1  1  1  1  1 | Max 7 |
| 6(b) | *Able to explain the role of organ R in assimilation of nutrients in foods P.*  *Answer:*  F (At the end of the digestive process) Food P are hydrolysed / digested into glucose (at ileum)  P1 Excess glucose is converted into glycogen  P2 stored in the liver  P3 (When the blood sugar level falls) the stored glycogen is converted back to glucose  P4 (When the glycogen stored in the liver is full) excess glucose is converted into lipid (by liver) | 1  1  1  1  1 | 5 |
| 6(c) | *Able to explain how the gastric bypass surgery can reduce excessive weight problems*  *Sample answers:*  F: (Due to the stomach becomes too small) the patient has less appetite  P1: reduce food intake  P2: reducing the absorption of nutrients (from digested food)  P3: causing the system in body takes energy from fat (in the body as a substitute for food that is often taken)  P4: leading to weight loss | 1  1  1  1  1 | Max  5 |
|  | TOTAL MARKS | 20 | |

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| No | Mark Scheme | Mark | |
| 7(a) | *Able to explain the development of pollen based on the diagram above.*  **Suggested answer:**  E1: pollen mother cell ( diploid) undergo meiosis I  E2: 2 cell stage of pollen cell (haploid) is form  E3: 2 cell stage undergo meiosis II  E4: tetrad stage is form  E5: after the secretion of cell wall, the pollen is form | 1  1  1  1  1  1 | max  4 |
| 7(b) | *Able to explain the process of double fertilisation occurs in the plant.*  **Suggested answer:**  E1- The pollen tube grows down the style towards the ovule  E2- The sugar solution (sucrose) secreted by the stigma stimulates  the pollen grain to germinate and form a pollen tube  E3- The generative nucleus divides by mitosis to form two male  gamete nuclei  E4- The male gamete nuclei move down the pollen tube led by the  tube nucleus  E5- When the pollen tube reaches the ovary, it penetrates the  ovule through the micropyle  E6- The tube nucleus degenerates, leaving a clear passage for the  male nuclei to enter the embryo sac  E7- Double fertilization occurs in the ovule. One male nucleus fuses  with the egg nucleus to form a diploid zygote(2n)  E8- The other male nucleus fuses with the two polar nuclei to form a  triploid nucleus(3n) | 1  1  1  1  1  1  1  1 | Max  6 |
| 7(c) | *Able to explain the process of secondary growth in plant*  **Suggested answer:**  F1:Vascular cambium divides actively radially  E1:forming cambium ring/ intervascular cambium  F2:Cambium cells divides tangently,  E2:cell in the outside differentiate to form secondary phloem  E3:while the inner cell differentiate to form secondary xylem  E4:primary xylem pushed towards the pith  E5:and primary phloem pushed towards the epidermis  E6:the walls of secondary xylem will be thickened with lignin  E7:this give tissues mechanical strength to support the plant  E8:the tissues outside become increasingly compressed  E9:the circumference/ diameter increased caused the epidermis to be stretched  E10:the ruptured epidermis will be replaced by cork as a result of the  activity of cork cambium  F3:cork cambium divides tangently  E11:form secondary cortex/inner cell and cork/ outer cell | 1  1  1  1  1  1  1  1  1  1  1  1  1  1 | max  6 |
| 7(d) | *Able to explain the important of secondary growth in plant.*  **Suggested answer:**  P1: Increase the diameters of the plant stems and roots for additional mechanical support  P2: Produces secondary xylem called wood to support and strengthen the growing plant  P3: Produces more secondary phloem and secondary xylem to accommodate the increase in demand for water, mineral and organic nutrient  P4: produced new phloem and xylem tissues to replace old and damaged ones  P5: Produces a thick and tough bark which reduces evaporation of water from the surface of stem, also protects the plant against of insect and parasite fungi  P6: Increase the opportunities to produce seeds and propagate as plant that undergo secondary growth live longer  P7: produce large quantities of fruit for local consumption and export | 1  1  1  1  1  1  1 | Max  4 |
|  | **TOTAL** | | **20** |

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| **NUM** | **SCORING CRITERIA** | **MARKS** | |
| 8(a) | *Able to explain the used of microorganism S and T in the field of biotechnology*  **Sampel answer:**  Microorganism S – fungi / yeast   |  |  |  | | --- | --- | --- | |  | Uses | Explanation | | E1 | Producing wine | Fermentation of glucose (grape juice) by yeast produces etahanol | | E2 | Making of bread | Respiration of yeast produces carbon dioxide which causes bread dough to rise | | E3 | Producing beer | Yeast is added to maltose to produce alcohol | | E4 | Producing citric acid | Break down maize starch into citric acid |   *Any 2*  Microorganism T – bacteria   |  |  |  | | --- | --- | --- | |  | Uses | Explanation | | E5 | Treatment of industrial wastes | Anaerobes bacteria are used to break down / converted industrial wastes into non-poisonous materials | | E6 | Making yogurt | Bacteria (*Lactobacillius bulgaricus*) used to break down lactose into lactic acid | | E7 | Producing vinegar from alcohol | Bacteria (*Acetobacter sp*) is used to change alcohol into acetic acid (vinegar) |   *Any 2* | 1  1  1  1  1  1  1 | 2 m  2m |
| 8(b) | *Able to explain the used of biotechnology in the waste treatment process*  **Sampel answer:**  P1 - rich in organic matters, bacteria / microorganism  P2 - the sewage is decomposed by aerobic bacteria  P3 - in the presence of oxygen  P4 - (Decomposed sewage /sludge) settled to the bottom of the  pond  P5 - Fermentation takes place (at sedimentation tanks)  P6 - Using anaerobic bacteria  P7 - Produce methane / carbon dioxide / minerals  P8 - Digested sludge used as fertilisers  *Any 6* | 1  1  1  1  1  1  1  1 | 6 m |
| 8(c) | *Able to explain the characteristics, transmission of microorganism Q and prevention from spreading*  **Sampel answer:**  **The characteristics of living things**:-  C1 - ability to reproduce  C2 - the presence of nucleic acids  **The characteristics of non-living things**:-  C3 - do not respire  C4 - Do not feed  C5 - Do not excrete  C6 - Can be crystallised *Any 2*  **Transmission of Microorganism Q**  T1 - microorganism Q is virus HIV  T2 - enters the body through the transfer of body fluids / blood /  semen / vagina fluids  T3 - from infected pregnant mother to the foetus (across the  placenta) // from infected mother to the baby by breast  feeding  T4 - contaminated needles used to inject drugs / for tattoo  T5 - unprotected sex with infected person  Prevention disease from spreading  P1 - type of disease : AIDS  P2 - blood produces used should be treated to detect the virus  P3 - people who have sex with different partners must wear a  condom to reduce the risk of infection // do not have sex  with any individual whose background / correct health status  is unknown // royalty to one sex-partners only // do not have  sex with homosexual person  P4 - do not share (contaminated) needles / syringes  Note   * Characteristics * At least one from C1 to C2; one from C3to C6 * Maximum four C only * Transmission and Prevention * At least two T and two P | 1  1  1  1  1  1  1  1  1  1  1  1  1  1 | Max  10M |
| ***TOTAL*** | | **20** | |

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| **NO** | **SCORING CRITERIA** | **MARKS** | |
| 9 (a)(i)  9(a)(ii) | *Able to state the example of continuous variation and discontinuous variation and the difference of continuous variation and discontinuous variation*  **Sample answer:**  Example of continuous variation: Height or weight  Example of discontinuous variation: ABO blood group  Differences:   |  |  | | --- | --- | | Continuous variation | Discontinuous variation | | Graf distribution shows a normal distribution | Graf distribution shows a discrete distribution | | The characters are quantitative / can be measured and graded (from one extreme to the other) | The characters are qualitative / cannot be measured and graded (from one extreme to the other) | | Exhibits a spectrum of phenotypes with intermediate character | Exhibits a few distinctive phenotypes with no intermediate character | | Influenced by environmental factors | Is not Influenced by environmental factors | | Two or more genes control the same character | A single genes determines the differences in the traits of the character | | The phenotype is usually controlled by many pair of alleles | The phenotype is controlled by a pair of alleles |   *Able to state the importance of variation to organism*  **Sample answer:**  P1: variation provided better adaptation for organism to survive in the changing environment  P2: variation are essential to the survival of species / to survive more successfully  P3: variation be able to organism explore a new habitat  P4: to ensure organism survival from predator  Any 3 | 1  1  1  1  1  1  1  1  1  1  1  1 | 2  Max 5  3 |
| 9(b) | *Able to explain how genetic factors cause the variation among the organism*  **Sample answer:**  F1: meiosis  P1: produce varies gamete with different genetic content  P2: through homologous chromosomes random assortment during metaphase I  F2: crossing over  P3: two homologous chromosomes are paired up / synapsis during prophase I  P3: crossing over occurs between non-sister chromatids at the chiasma  P4: chromatids break and rejoin in such a way that segments of chromatids are exchange // causing a genetic recombination  P5: genes in the chromosomes is altered and gametes with various combinations of chromosomes are produced  F3: Fertilization  P6: random fertilization between sperm and ovum  P7: produce zygote with varies genetic material | 1  1  1  1  1  1  1  1  1  1  1 | Max 10 |
|  | **JUMLAH** | **20** | |