**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: mitochondriaR: Golgi apparatusS: Rough ER | 111 | 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 groupY: Pentose sugarZ: Nitrogenous base | 111 | 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** | 11 | 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** | 111 | 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 | 11111 | 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 | 1111 | 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* | 1111 | 2m2m |
| 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)  | 11 | 2m  |
| 3(d) | *Able to explain one difference of importance of mitosis and meiosis***Suggested Answer:**F1: Mitosis produce no variation, while meiosis produce variationP1: caused by crossing over during Prophase I in meiosis | 11 | 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 pigmentationP2: in autosomesP2: controlled by recessive allelesP3: skin cells unable to synthesis (melanin) pigment // no (melanin) pigment *Any 3* | 1111 | 3 m |
|  | **Total** | **12** |

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| **Num** | **Mark Scheme** | **Mark** |
| 4(a) | *Able to name corectly R dan S* **Answer**:R : TendonS : Ball and socket joint  | 11 | 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 relaxesP2 : to transfer the force by tendon / R tissue to the boneP3: (Tendon is inelastic and tough) pulled the ulna bone downward (and caused the forearm is straighten) | 1111 | Max 3 |
| 4 (c) | *Able to explain why muscle work in pairs to produced movement***Suggested answer:**F: The muscle can only contract / pull outP: It has to be extended back to it original lenght (to contract again) by the contraction of another muscle | 11 | 2 |
| 4 (d) | *Able to state the importance of skeletal part in movement***Suggested answer:**P1: provides surface area for muscle attachmentP2: form the joints that enable the bone to move and allowing movementP3: support the body / forearm weight | 111 | Max2 |
| 4( e ) | *Able to explain what happened if the tissue R torn***Suggested answer :**F: the forearm cannot bend / straightensP1: when the muscle X or Y contractP2: the pulling force (produced by contraction of muscle) is not transmit to the radius / ulna | 111 | 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 machineP3: blood has higher concentration of urea and salts P4: urea and salts diffuse out through the semipermeable tube into dialysis fluidP5: dialysis fluid contain lower concentration of urea and salts compare to the bloodP6: the blood is returned back in the body through vein in the same armP7: concentration of urea and salts in the blood // blood osmotic pressure back to normal range | 1111111 | 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 increaseP2: more ADH secretes by pituitary glandP3: wall of nephron in kidneys become more permeable to waterP4: more water reabsorb into blood capillary by osmosis | 1111 | 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 capillaryP2: at proximal convoluted tubules | 11 | 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 cavityDuodenumIleum / Small intestine | 111 | 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 starchP2 (In oral cavity) saliva contains enzyme salivary amylaseP3 To hydrolysis starch to maltose //  Salivary amylaseStarch + (Water) MaltoseP4 Duodenum receive pancreatic amylase from pancreas P6 Pancreatic amylase completes the digestion of starch to maltose // Pancreatic amylaseStarch + (Water ) MaltoseP7 (In ileum) intestinal juice contains maltase (erepsin, sucrase, lactase)P8 (Maltase) hydrolysis maltose to glucose //  MaltaseMaltose + Water GlucoseP9 Glucose diffuse into the epithelial cells and absorbed into the capillaries (villus)P10 Capillaries drain glucose into hepatic portal vein, which leads to the liverP11 Glucose is distributed throughout the body by the circulatory systemP12 (When the glucose molecules reach the cells) glucose are oxidised to release energy (during cellular respiration) | 111111111111 | 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 glycogenP2 stored in the liverP3 (When the blood sugar level falls) the stored glycogen is converted back to glucoseP4 (When the glycogen stored in the liver is full) excess glucose is converted into lipid (by liver) | 11111 | 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 appetiteP1: reduce food intakeP2: 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 | 11111 | Max5 |
|  | 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 IE2: 2 cell stage of pollen cell (haploid) is formE3: 2 cell stage undergo meiosis IIE4: tetrad stage is formE5: after the secretion of cell wall, the pollen is form | 111111 | max4 |
| 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 ovuleE2- The sugar solution (sucrose) secreted by the stigma stimulates the pollen grain to germinate and form a pollen tubeE3- The generative nucleus divides by mitosis to form two male  gamete nucleiE4- The male gamete nuclei move down the pollen tube led by the  tube nucleusE5- When the pollen tube reaches the ovary, it penetrates the  ovule through the micropyleE6- The tube nucleus degenerates, leaving a clear passage for the  male nuclei to enter the embryo sacE7- 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) | 11111111 | Max6 |
| 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 xylemE4:primary xylem pushed towards the pith  E5:and primary phloem pushed towards the epidermisE6:the walls of secondary xylem will be thickened with lignin E7:this give tissues mechanical strength to support the plantE8: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 theactivity of cork cambium  F3:cork cambium divides tangently E11:form secondary cortex/inner cell and cork/ outer cell  | 11111111111111 | max6 |
| 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 supportP2: Produces secondary xylem called wood to support and strengthen the growing plantP3: Produces more secondary phloem and secondary xylem to accommodate the increase in demand for water, mineral and organic nutrientP4: produced new phloem and xylem tissues to replace old and damaged onesP5: 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 fungiP6: Increase the opportunities to produce seeds and propagate as plant that undergo secondary growth live longerP7: produce large quantities of fruit for local consumption and export | 1111111 | 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

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|  | 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

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|  | 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* | 1111111 | 2 m2m |
| 8(b) | *Able to explain the used of biotechnology in the waste treatment process* **Sampel answer:**P1 - rich in organic matters, bacteria / microorganismP2 - the sewage is decomposed by aerobic bacteriaP3 - in the presence of oxygenP4 - (Decomposed sewage /sludge) settled to the bottom of the  pondP5 - Fermentation takes place (at sedimentation tanks)P6 - Using anaerobic bacteriaP7 - Produce methane / carbon dioxide / mineralsP8 - Digested sludge used as fertilisers*Any 6* | 11111111 | 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 reproduceC2 - the presence of nucleic acids**The characteristics of non-living things**:-C3 - do not respireC4 - Do not feedC5 - Do not excreteC6 - Can be crystallised *Any 2***Transmission of Microorganism Q**T1 - microorganism Q is virus HIVT2 - enters the body through the transfer of body fluids / blood /  semen / vagina fluidsT3 - from infected pregnant mother to the foetus (across the  placenta) // from infected mother to the baby by breast  feedingT4 - contaminated needles used to inject drugs / for tattooT5 - unprotected sex with infected personPrevention disease from spreadingP1 - type of disease : AIDSP2 - blood produces used should be treated to detect the virusP3 - 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 personP4 - do not share (contaminated) needles / syringesNote* 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
 | 11111111111111 | Max10M |
| ***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 weightExample of discontinuous variation: ABO blood groupDifferences:

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| 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 environmentP2: variation are essential to the survival of species / to survive more successfullyP3: variation be able to organism explore a new habitatP4: to ensure organism survival from predatorAny 3 | 111111111111 | 2Max 53 |
| 9(b) | *Able to explain how genetic factors cause the variation among the organism***Sample answer:**F1: meiosisP1: produce varies gamete with different genetic contentP2: through homologous chromosomes random assortment during metaphase IF2: crossing overP3: two homologous chromosomes are paired up / synapsis during prophase IP3: crossing over occurs between non-sister chromatids at the chiasmaP4: chromatids break and rejoin in such a way that segments of chromatids are exchange // causing a genetic recombinationP5: genes in the chromosomes is altered and gametes with various combinations of chromosomes are producedF3: FertilizationP6: random fertilization between sperm and ovumP7: produce zygote with varies genetic material | 11111111111 | Max 10 |
|  | **JUMLAH** | **20** |