



**SECTION A (40 MARKS)**

|       |       |       |       |
|-------|-------|-------|-------|
| 1. A  | 11. B | 21. D | 31. D |
| 2. A  | 12. A | 22. B | 32. C |
| 3. C  | 13. B | 23. B | 33. A |
| 4. D  | 14. D | 24. C | 34. B |
| 5. B  | 15. C | 25. D | 35. C |
| 6. B  | 16. C | 26. C | 36. D |
| 7. D  | 17. C | 27. A | 37. D |
| 8. A  | 18. B | 28. B | 38. D |
| 9. A  | 19. A | 29. A | 39. D |
| 10. C | 20. A | 30. D | 40. C |

**Each = 1 mark**  
**Total = 40 marks**

**SECTION A (40 MARKS)**

41. (a) Rate of immigration decreases with increase in number of species; because of decrease in the number of ecological niches available on the island;  
**1 mark@**  
 Extinction rate increases with increase in competition for resources on the islands; high immigration rate; high extinction rate due to limited resources on the island;
- (b) Rate of immigration; Extinction rate  
 $\frac{1}{2}$  **mk @**  
 Island size;  
 Amount of resources; **02 marks**
- (c) Availability of resources; food, space, shelter, water  
 Reduced competition;

No predation;

Island size;

**Any 3 1 mark @ 03marks**

**T.T 10marks**

42. (a) Formation of new genetic combinations/ the rearrangement of genes that occurs when reproductive cells /gametes are formed; it results from the random/independent assortment of parental sets of chromosomes; and exchange chromosomal material/crossing over during meiosis; and also at fertilization which two gametes join;
- (b) A source of genetic variation; on which natural selection operates to bring about evolution;
- (c) The number of chromosomes and hence genes involved/ size of the gene pool;

**Any 5 @ 1 mark**

**05**

The frequency of crossing over at meiosis;

The amount of gene flow between populations;

The length of the generation time;

The type of breeding; self or cross fertilization, single versus multiple breeding.

The length of the chromosome;

The positioning of the chiasmata relative to the sequence of alleles.

**TT = 10 Marks**

43. (a) Diaphragm muscle relaxes; forming adomeshape; increases pressure; decreasing volumes; forcing air out of the lungs; to the atmosphere;

**½ mark @ = 03**

- (b) Extend the curve/ graph; until it reaches maximum; read off the value at the y-axis;

**1 mark @ = 03**

- (c) Total volume of air breathed out is higher in B than A; the inhaler contains substances that dilate bronchioles; this increases the total volume of air.

Passed out in an asthmatic; than without the inhaler; in A the bronchioles are narrower; due to contracted muscles; less air is able to pass through;

**½ mark @ = 04**

**T.T 10 marks**

44. (a) (i) Broad lamina;  
A thin epidermis;

**Any 3 1 mark @ (03)**

Numerous, large intercellular spaces;

Numerous stomata;

Moist intercellular spaces;

- (ii) Broad lamina to increase surface area to volume ratio for diffusion of carbon dioxide;  
Numerous stomata to allow numerous passing for carbon dioxide and thus increases rate of diffusion;  
Thin epidermis to reduce diffusion distance; **Any 3 @1 mark**  
Numerous intercellular spaces to permit faster diffusion between the cells;

**(03)**

- (b) Cuticle can be permeable;

Stomata can close;

**any 1 @ mark = 01**

- (c) Absence of light; hence no ATP formation and reduced NADP; needed for CO<sub>2</sub> fixation.

**(03)**

45. (a) (i) From 0 – 30 a.u; rate of reaction Increase rapidly; then from 30 – 40 a – u increases gradually; and remains constant; from 40 – 70 a. u.;  
**any 1 @ mark = 03 max**

- (ii) Enzyme concentration; As Enzyme concentration increases, the rate increases;

**any 1 @ mark = 02**

- (iii) All active sites are occupied/saturated; limiting the formation of products;

**any 1 @ mark = 02**

- (b) (i) On the graph below the original curve;

**any 1 @ mark = 01**

- (c) Drug has similar shape / structure as the substrate; binds to/ fits to the active site; less substrate binds to the active site; reducing product formation;

**any 1 @ mark = 02**

**T.T = 10 marks**

46. (a) (i) Similarities.  
Risk of high blood pressure increases with increase in age; Risk of heart attack increases with increase in age; No heart attack before the age of 35 years;

**any 1 @ mark = 02**

- (ii) Differences.  
Females are more likely to develop high blood pressure while males are less likely;

**any 1 @ mark = 02**

- Females have lower risk of heart attack as they get older/ past 55 years while males have higher risk of heart attack;

(b) Smoking

- Raises concentration of fibrinogen in blood increasing risk of clotting;
- Increases viscosity of blood;
- Nicotine in some causes platelets to stick together/ causes vasoconstriction;
- Carbon monoxide is associated with plaque formation;
- Reduced ability of arteries to dilate/reduce elasticity;

Cholesterol

- Fatty streaks/ deposits adhere to wall of arteries;
- Atheroma/ atherosclerosis/plaque occurs which narrows lumen of artery.
- Damages endothelium;
- Can lead to formation of thrombus / blood clot;

(c) Formation of cell membrane;

**any 1 @ mark = 01**  
**T.T. = 10 marks**

**END**