2 Basic components of living systems
Answers to practice questions

Question number	Answer	Marks	Guidance
1	D;	1	
2 (a) (i)	X endoplasmic reticulum / ribosome; Y golgi, apparatus / body; Z vesicle;	1 1 1 3	
2 (a) (ii)	eukaryotic; presence of, nucleus / membrane bound organelle / named (membrane bound organelle);	**2**	
2 (b) (i)	carbohydrases / hydrolytic;	1	
2 (b) (ii)	nucleus; production of mRNA / transcription; ribosome; protein synthesis / translation; golgi apparatus; protein modification / alternative wording (AW); vesicle; transported to cell surface membrane; exocytosis / described;	5	Max 5
2 (c)	vesicle (containing protein); fuses with cell-surface membrane; ATP / energy, required; protein released (from cell);	3	
2 (d)	*vesicles* have role in, transport / secretion; vacuoles have role in storage; *vacuoles* contain mostly water; vacuoles are larger (than vesicles and lysosomes); *lysosomes* contain hydrolytic enzymes; lysosomes have role in digestion;	4	Max 4, 1 mark per organelle extra mark for extra detail.
3 (a)	15 mm=15 000 µm 15 000 / 2.6 Magnification × 5769	2	
3 (b) (i)	ability to see two adjacent points as separate points; higher resolution means more detail can be seen;	2	
3 (b) (ii)	degree by which the size of an image is larger than the size of the actual object;	1	
3 (b) (iii)	magnification is increased without increase in resolution so no more detail is visible;	1	
3 (c)	objective lens magnifies image of object; eyepiece lens magnifies image again;	4	
3 (d)	*dry mount*; sample sectioned / AW; cover slip placed over sample*; wet mount*; sample suspended in liquid; cover slip is placed on at an angle; *squash slide*; wet mount is pressed; smear slide; liquid sample is smeared to produce thin coating;	6	2 marks per technique
4 (a)	object visible in field of view; produced during preparation of sample; e.g air bubble;	2	
4 (b)	*advantages* greater magnification; greater resolution; *disadvantages* sample must be dead; expensive, set up / sample preparation; large; many artefacts; technical skills required; black and white images;	4	
4 (c)	laser; point illumination / described; fluorescence (from components labelled with dye); light from specimen, travels through pinhole / is filtered; (only) light from close to	4	

	focal plane is detected; unwanted radiation does not go through pinhole;		
5 (a)	present; membrane bound and non-membrane bound; cellulose or chitin if present; small / 70s; present;	5	
5 (b)	cell components; organelles / named examples (at least three);	2	
6	*prokaryotic* genes arranged into operons; number of genes controlled together; reduces space needed for control elements; single chromosome; *eukaryotic* more complex DNA packing; supercoiled DNA; DNA wrapped around histones; formation of multiple chromosomes;	6	