PEARSON EDEXCEL A-LEVEL BIOLOGY B · 9BI0

BIOLOGY



MARK SCHEME

TOPIC 4: EXCHANGE AND TRANSPORT

TRANSFER OF MATERIALS BETWEEN THE CIRCULATORY SYSTEM AND CELLS

SCORE	PERCENTAGE
/22	%

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Mark Scheme

Q1.

Question Number	Acceptable Answer	Additional guidance	Mark
(i)	An answer that makes reference to the following: percentage increase calculated (1)	<u>Example of calculation</u> % increase = 1.85 x 100 / 0.9 = 205.555% = 206%	**(1)**

Question Number	Acceptable Answer	Additional guidance	Mark
(ii)	An explanation that makes reference to the following: • because tissue fluid accumulates and prevents gas exchange (1) • therefore less oxygen uptake and carbon dioxide removal makes patient feel breathless (1)		**(2)**

Question Number	Acceptable Answer	Additional guidance	Mark
(iii)	A description that makes reference to the following: • excess tissue fluid is absorbed by the lymphatic system (1) • lymphatic system drains into the veins (1)		**(2)**

Q2.

Question Number	Answer	Additional Guidance	Mark
	An explanation that makes reference to the following: • blood plasma has higher protein content as the {plasma proteins / named plasma protein / some proteins} are too large to pass out of {capillary / blood} (1) • tissue fluid has less (dissolved) oxygen as it has {diffused into / respired by} the {cells / tissues} (1)	**ACCEPT** converse for tissue fluid **ACCEPT** converse for plasma	(2)

Q3.

Question Number	Answer	Additional Guidance	Mark
	• (high) hydrostatic pressure forces {fluid / plasma} out of the capillaries (at the arteriole end) (1)		(1)

Q4.

Question Number	Answer	Additional Guidance	Mark
(i)	An explanation that makes reference to three of the following points: • there is more protein in plasma than tissue fluid (1) • because plasma proteins are too large to pass out of the capillary (1) • and **oncotic** pressure generated by (plasma) proteins (1) • (so fluid moves in) as {oncotic / osmotic} pressure is greater than hydrostatic pressure (1)	**Accept** converse **Accept** converse	3 exp

Question Number	Answer	Additional Guidance	Mark
(ii)	An explanation that makes reference to four of the following points: • sodium ions are not removed from the **ascending** limb (1) • so the water potential of medullary fluid is higher (1) • therefore less water is removed from the **descending** limb (1) • and less water is removed from the {collecting duct / distal tubule} (1) • (a higher volume of) {dilute / low concentration} urine is produced (1)	**Accept** less negative water potential **Accept** water potential gradient is lower **Accept** osmotic gradient is lower	**4 exp**

Q5.

Question Number	Answer	Additional Guidance	Mark
	An answer that makes reference to the following: • tissue fluid enters the lymphatic (vessels / system) (1) • lymph returns to {the (subclavian) veins / blood} (1)		(2)

Q6.

Question Number	Answer	Additional Guidance	Mark
(i)	An explanation that makes reference to three of thefollowing: • tissue fluid leaves the capillary through pores (1) • because the hydrostatic pressure is greater than the oncotic pressure (1) • plasma proteins are present in the blood but not intissue fluid / more protein in blood plasma (1) • plasma proteins are too large to leave capillary (1)	**Allow** fenestrations / other termsfor pore **Allow** oncotic pressure is lower thanhydrostatic pressure	**3**
(ii)	An explanation that makes reference to two from: • there is less protein in the blood plasma (1) • so that less tissue {fluid / water} enters blood (1) • because the oncotic pressure is less / there is lesscapillary length where oncotic pressure is greater than hydrostatic pressure (1)	**Allow** more fluid leaves than enters	**2**