

Name:

## BIOLOGY REVIEW EXEMPLAR

/135

\*\* The following are responses made by science students. Analyze their responses and fill-out the Strengths, Weaknesses, Improvements, Mark (SWIM) chart. Include a total mark out of 98, within 5 marks = +5, within 7 = +3, within 9 = +1\*\*

Identify the term that best matches the definition or statement given.

- a. mitochondrion      d. cell membrane
- b. cell wall            e. chloroplast
- c. nucleus

S:

W:

1. a makes sugar and oxygen from water, carbon dioxide, and sunlight [ /5]
2. c contains the chromosomes
3. e releases energy in the cell
4. b provides support for the cell
5. d controls what enters the cell

I:

M:

Identify the term that best matches the definition or description given. [ /10]

- a. stem                  f. vascular tissue
- b. leaf                  g. terminal bud
- c. mesophyll      h. cuticle
- d. chloroplast      i. root hairs
- e. taproot            j. guard cells

S:

W:

6. b absorbs water and nutrients from the soil
7. e consists of xylem and phloem
8. d the site of photosynthesis inside the cell
9. a holds the leaves up high into the sunlight
10. j open and close the stomata
11. f acts like an umbrella to absorb light
12. c has spaces that hold water vapour, oxygen, and carbon dioxide
13. a waxy layer that limits the water lost through evaporation
14. h the growing part of the stem
15. i roots that reach deep into the ground

I:

M:

Identify the human organ system that best matches the function described. [ /10]

- a. circulatory                  g. endocrine
- b. digestive                  h. reproductive
- c. respiratory              i. integumentary
- d. excretory                  j. nervous
- e. immune                  k. skeletal
- f. muscular

S:

W:

I:

M:

16. c exchanges gases in the lungs
17. j detects changes in the environment
18. b absorbs nutrients
19. a transports blood, nutrients, gases and wastes
20. e defends the body from infections
21. k supports the body and helps to move it
22. f helps move parts of the body
23. h produces offspring
24. d removes wastes from the body
25. g releases hormones to control the body

26. List **three ways** that cancer cells differ from healthy cells? [ /3]

- cancer cells can divide when they are separated
- cancer cells don't tend to stick to other cancer or normal cells which allows them to move throughout the body.

27. Explain how vascular tissue connects a plant's root system and shoot system. [ /2]

- vascular tissue connects the roots to the leaves
- roots collect the water & nutrients needed by leaves for photosynthesis
- sugar produced by photosynthesis is then transferred throughout the plant, including to the roots, to support growth

28. How do guard cells control the size of the stomata? [ /2]

- stomata open when the guard cells are full of water
- guard cells are relaxed when water vapour levels are low. This closes the stomata.

29. a) Where in the body are valves found? [ /2]

- heart & lungs

b) How do valves help control the flow of blood? [ /1]

- doesn't allow blood to flow backwards

30. The human heart represents the mammalian heart structure: there are four chambers

List the four chambers of the heart. [ /4]

- left atrium, left ventricle
- right atrium, right ventricle

S:

W:

I:

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S:

W:

I:

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S:

W:

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S:

W:

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S:

W:

I:

M:

✓ - vascular tissue  
✓ connect roots  
✓ - vascular tissue  
✓ connect shoots

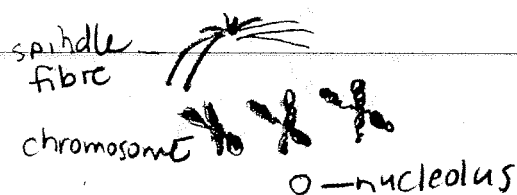
✓ - valves find  
✓ - valves find  
✓ - valves find  
✓ - valves find

✓ - valves help

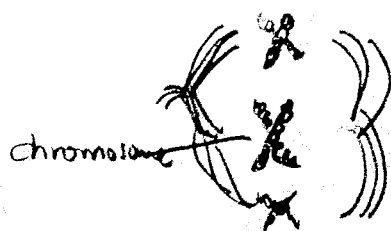
x 4

35. Make a series of diagrams outlining the steps of mitosis. Show the chromosomes, spindle fibres, and nucleus where appropriate. [ /5]

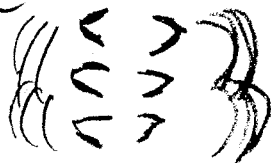
### PROPHASE



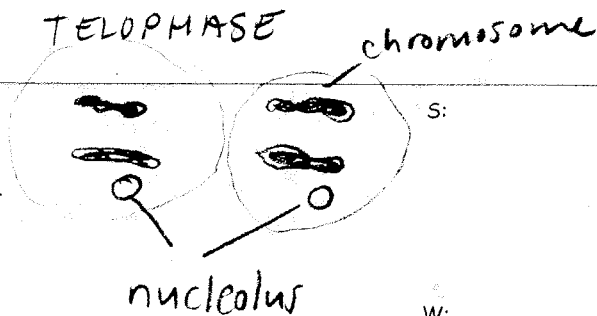
### METAPHASE



### ANAPHASE



### TELOPHASE



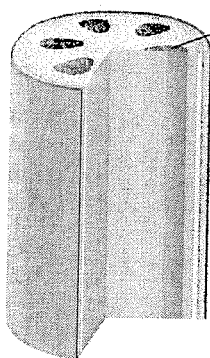
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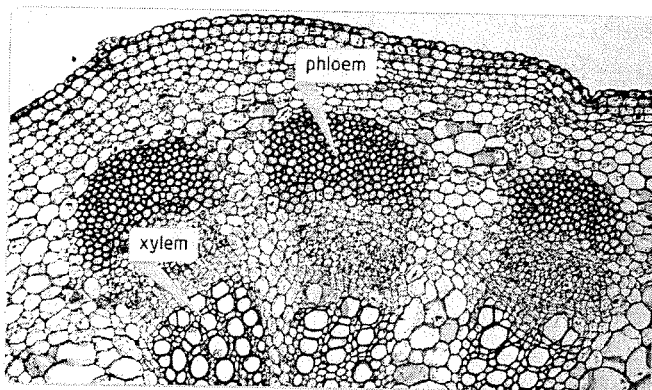
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M:

36. In vascular bundles, the xylem cells lie near the centre and the phloem cells are away from the centre.



vascular bundle



S:

W:

I:

M:

Cross-section of a sunflower stem

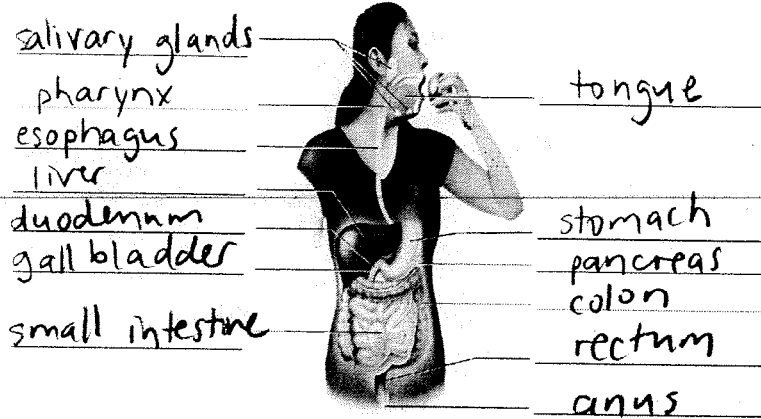
- How is the structure of the xylem cell different from the structure of the phloem cell? [ /2]
  - xylem cell is dead. It is empty, but reinforced w/ lignin.
  - The phloem cells are porous & connected into long tubes
- What is the function of xylem cells? What is the function of phloem cells? [ /2]
  - water moves through xylem cells
  - Sap moves through the phloem tubes

✓-prophase ✓-metaphase ✓-anaphase  
✓-telophase ✓-spindle fibre, nucleolus  
✓-chromosomes

✓-xylem function ✓-xylem structure  
✓-phloem function ✓-phloem structure

DIAGRAMS & CALCULATIONS: Fully label the following diagrams (75)

37. Digestion [ /13]



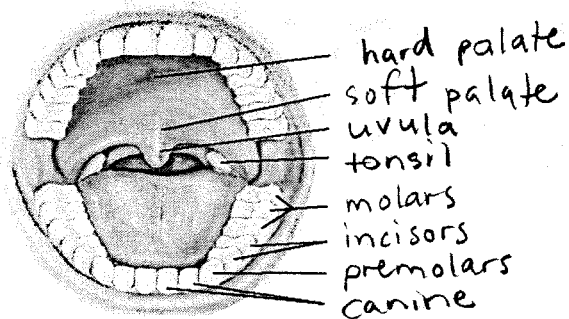
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38. The mouth [ /8]



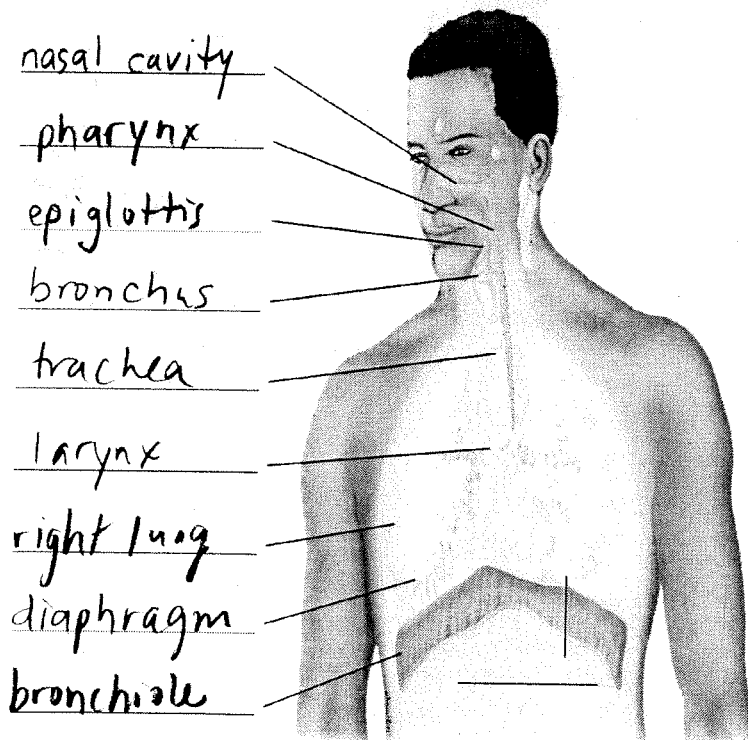
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M:

39. Respiration [ /9]



S:

W:

I:

M:

31. The right ventricle sends blood to the pulmonary system (the lungs). What happens to the blood here? Where does it go next? [ /2]

- blood gets reoxygenated @ lungs
- blood then goes to brain

32. One way to treat cancer is to interfere with mitosis. When people have cancer, somatic cells (body cells) go through unchecked growth and division. The chemotherapy drug Taxol (generic name Paclitaxel) prevents spindle fibres from forming properly.

a) Explain how this drug prevents the growth of more cancer cells. [ /2]

without proper spindle fibres, cells will not replicate/split properly making it difficult for cancer cells to reproduce.

b) An additional chemical, retinoic acid, can affect the way Taxol works. Consider the data in the chart below. Would you recommend that retinoic acid be combined with Taxol?

Cells surviving after Taxol or Taxol + retinoic acid has been applied

Amount of Taxol used ( $\mu\text{M}$ )	Number of cancer cells surviving	
	Taxol	Taxol + retinoic acid
0	100	100
1	80	50
10	57	27
50	47	22

→ yes, the combo of the two drugs work better together than separately

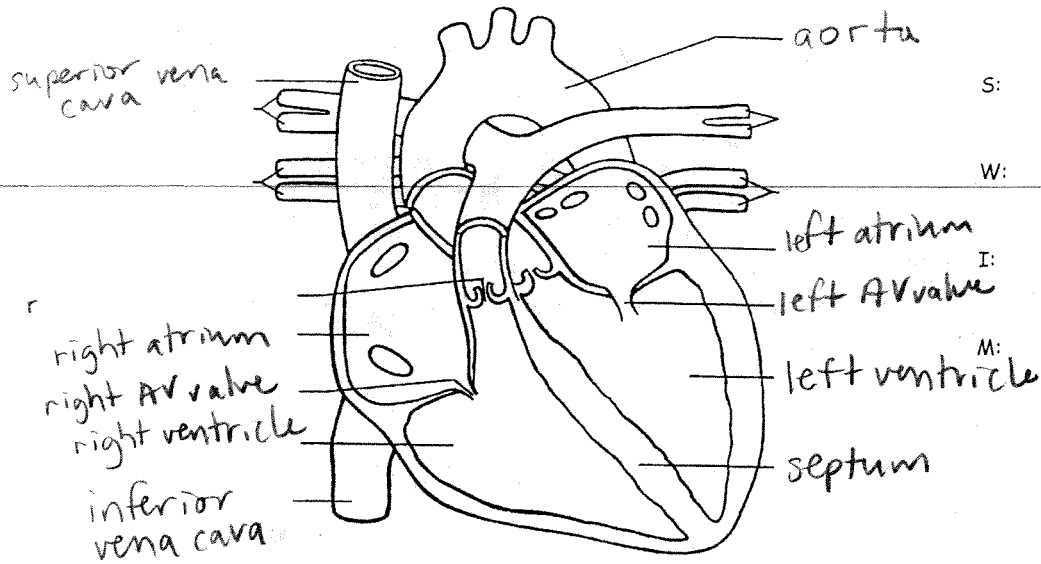
33. Animal cells are different from plant cells. List three differences. [ /3]

plant  
↳ cell wall  
↳ large vacuole  
↳ chloroplasts

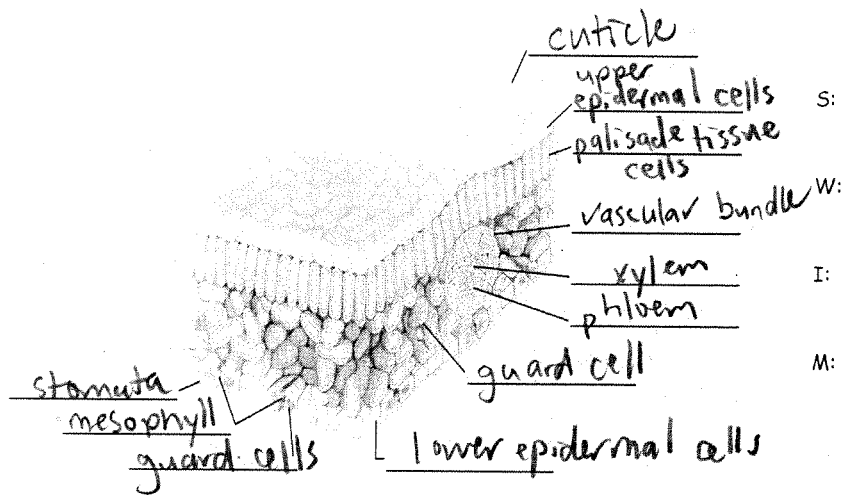
34. List the steps of the cell cycle. [ /5]

☺

40. Circulation [ /15]

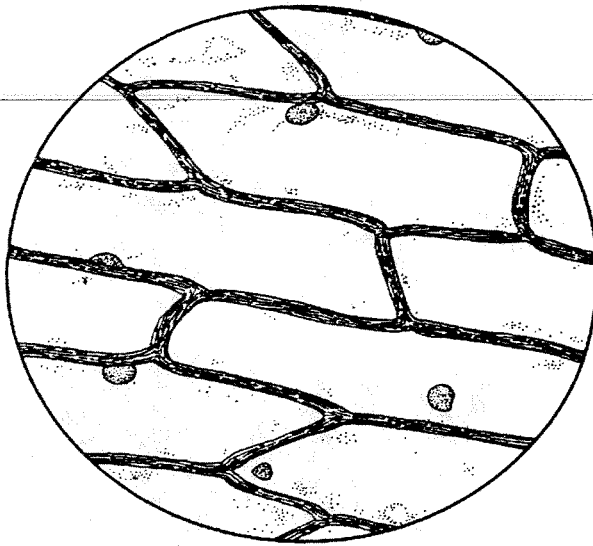


41. Plant Tissue [ /11]



of onion cells stained w iodine

42. Using the diagram below, viewed under high power, answer the following questions.



- a) Calculate the field of view under high power <sup>(40x)</sup> if the field of view under low power is 4000  $\mu\text{m}$  and the low power lens is 4x and the eyepiece is 10x. S:

[ /3]

$$\frac{FV_{HP}}{FV_{LP}} = \frac{M_{LP}}{M_{HP}}$$

W:

$$FV_{HP} = \frac{(40)(4000)}{(400)} = 400 \mu\text{m}$$

I:

M:

$\therefore$  the  $FV_{HP}$  is 400  $\mu\text{m}$ .

- b) Estimate the length of an onion cell below. The cells were observed under high power (40x) using a microscope with an eye piece of 10x magnification S:

[ /3]

$$\begin{aligned} \text{Estimated length} &= \frac{400}{1.5} \\ &= 267 \mu\text{m} \end{aligned}$$

W:

I:

M:

- c) Estimate the width of an onion cell below. The cells were observed under high power (40x) using a microscope with an eye piece of 10x magnification S:

[ /3]

$$\begin{aligned} \text{Estimated width} &= \frac{400}{5} \\ &= 80 \mu\text{m} \end{aligned}$$

W:

I:

M:

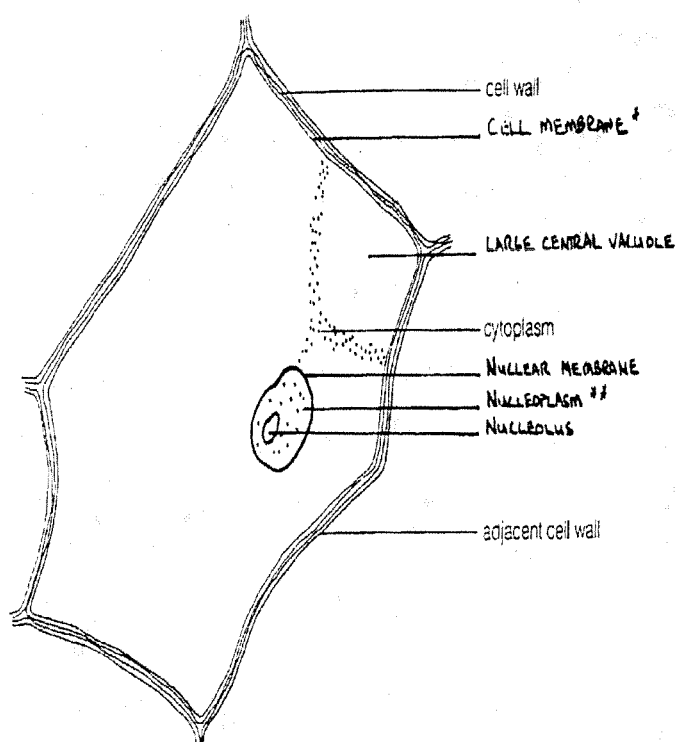
✓ - rearranged eq'n  
✓ - answer w units  
✓ - ::

✓ - est. length eq'n  
✓ - answer w units  
✓ - ::

✓ - est. width eq'n  
✓ - answer w units  
✓ - ::

43. Draw a fully labeled scientific drawing of one onion cell stained with iodine, as viewed under high power. Make sure to include the estimated size and total magnification of the cell. [ /10]

SINGLE ONION CELL SHOWN UNDER HIGH POWER  
WITH IODINE STAIN



S:

W:

I:

M:

NOTES:

- 1.\*CELL MEMBRANE NOT ACTUALLY SEEN,  
TOO THIN, AGAINST CELL WALL.
- 2.\*CHROMOSOMES NOT INDIVIDUALLY VISIBLE  
IN NUCLEOPASM.
- (3. DESCRIPTION OF STAIN COLOUR FOR  
VARIOUS ORGANELLES)

MICROSCOPE MAGNIFICATION:<sup>1</sup>  
DRAWING MAGNIFICATION: 9