ANSWERS: CHAPTER 24

MATCHING
1. o
2. n
3. d
4. c
5. u
6. s
7. k
8. e
9. j
10. f
11. a
12. h
13. b
14. g
15. i
16. p
17. r
18. m
19. q
20. l

IMAGE LABELING
1. CW (continuous wave): A single transducer continuously emits and receives sound. Doppler cannot identify the location of the reflection or image.
2. PW (pulse wave): Short bursts of energy are emitted and received at regular intervals allowing for depth/range discrimination.
3a. toward
3b. away
4a. A/B ratio (S/D ratio)
4b. Resistive index (RI)
4c. Pulsatility index (PI)

MULTIPLE CHOICE
1. d
2. b
3. c
4. b
5. a
6. b
7. a
8. c
9. c
10. d
11. b
12. b
13. a
14. c
15. a
16. b
17. a
18. d
19. a
20. a

FILL-IN-THE-BLANK
1a. velocity
1b. flow
2. Doppler shift
3. angle of insonation
4. Color mapping
5. flow reversal
6. 30° to 60°
7. notching
8. independent
9. Wharton’s jelly
10. greater
11. lateral
12a. spectral
12b. 2-D
13. three
14a. umbilical vein
14b. IVC
15a. breathing
15b. bradycardia
16. rapid
17. congestive
18a. force
18b. vessel
19. right atrium
20a. color
20b. grayscale
20c. spectral

SHORT ANSWER
1. Color power Doppler is useful when the interventricular septum is oriented perpendicular to the ultrasound beam. It is useful for identifying the presence or absence of blood flow within the arterial and ventricular chambers of the fetal heart, as well as the relationships of the right and left outflow tracts in difficult-to-image patients and fetuses. Color power Doppler has also been used to determine the number of umbilical arteries seen adjacent to the urinary bladder.

2. 

<table>
<thead>
<tr>
<th>Quantitative measurements</th>
<th>Measures blood velocity and flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qualitative measurements</td>
<td>Identifies the direction of blood flow and detects flow disturbances such as stenosis or turbulence; views characteristics of waveforms providing an indirect approximation of flow and flow resistance (S/D ratio, RI, PI)</td>
</tr>
</tbody>
</table>

3. Uterine and arcuate artery blood flow can be detected and followed by serial Doppler flow studies. Vessels or the uterus may remain constricted and offer increased resistance, placing a pregnancy at risk for IUGR and preeclampsia.

4. Place the patient in a semierect position. Locate the placental cord insertion site or a midcord loop if the placental location is not identified. Obtain a strong signal. Adjust gain to clearly distinguish the waveform. Wall filters should be as low as possible.

5. The arterial signal should be visualized on one side of the baseline, with the steady nonpulsatile venous flow in the opposite direction.

5. Using duplex sonography, image the fetal cranium in a BPD view. The middle cerebral artery is visualized anterior to the thalamus bilaterally at the level of the bifurcation into the middle and anterior cerebral arteries.

IMAGE EVALUATION/PATHOLOGY
1. Aliasing is seen in the image. The systolic peaks are displaying “wraparound” (open arrows). The small arrow positioned in the upper image is pointing to the gate. The sample volume is within the gate. Aliasing of the image could be alleviated by increasing the scale or by selecting a different transducer.

2. This dual image is demonstrating a Doppler image of the two umbilical arteries lateral to the fetal bladder.

3. A normal umbilical artery is under examination. Note that the gate width includes arterial and venous vessels. The waveform displays clear systolic peaks of the artery with the arrow indicating the diastolic
trough above the baseline. Below the baseline is normal continuous venous flow (open arrow).

4. This is normal triphasic flow seen in the IVC proximal to the termination into the right atrium. #1, systole; #2, AV valves opening; #3, late diastole, reverse flow.

5. The image displays a fetal cranium and normal middle cerebral artery waveform. The MCA is high-resistant vessel with high systolic peaks and low diastolic troughs. With IUGR or hypoxic stress, brain sparing commences, which allows protection and conservation of the brain by shunting blood from vital organs to the brain. This creates a low-resistance stage.

**CASE STUDY**

1. The fetal descending aorta is being investigated at the level of the diaphragm, which is the correct level for Doppler testing. The test demonstrates a rapid deceleration from peak systole to end diastole, which is normal.

2. The image reveals that the cord is located at the placental umbilical cord insertion; RI is 0.65 and the S/D ratio is 2.9. Automatic tracing decreases inter- and intraoperator measurement variation.