Homework, blood pressure

1. How the left ventricle would be affected by an incompetent mitral valve depends upon the effect of the leak on cardiac output. In the absence of compensating factors, the pressure would not go as high as normal, since some blood regurgitates and relieves pressure. During diastole, the valve is open anyway and pressure is unaffected. However, the body may try to compensate low cardiac output by over filling the ventricle and an increase in systemic blood pressure. In this case, the systolic pressure may be as high or higher, and the diastolic pressure may be higher, reflecting higher venous pressure.

2. Strain gauge- ad: simple and cheap, can be printed directly on a diaphragm mounted on the catheter. Disad: requires electrical connection (possible MICROSHOCK)
   Fiber optical reflectance- ad: no electrical connect, disad: requires external lightsource and detector, non-linear and non-monotonic over a large range
   Liquid column movement (just one wild example of many your could chose): ad: no electrical connection, simple, disad: requires a tube of liquid to run full length of catheter, would need to be read manually or complicated system to measure column height outside body, sensitive to gravity (placement of catheter)

3. According to [http://www.healthperfect.co.uk](http://www.healthperfect.co.uk), these machines generally use the oscillometric technique. Quoting:
   “The term "oscillometric" refers to any measurement of the oscillations caused by the arterial pressure pulse. These oscillations are the direct results of the coupling of the occlusive cuff to the artery. This method allowed blood pressure measurement of critical care and intensive care (ICU) patients with muted Korotkoff sounds. These devices do not use microphones. Therefore, cuff placement and external noise are not significant problems. These devices are sensitive to patient movement and do not allow measurement validation. Following is the arterial waveform display by using the oscillometric method:

   ![Arterial Waveform Display](image)

   Unlike auscultatory techniques, which measure systolic and diastolic but estimate mean arterial pressure, oscillometric devices measure the mean but estimate systolic and diastolic. An air-filled cuff is wrapped around the patient's upper arm. The cuff is inflated to occlude the brachial artery. As the cuff is allowed to deflate, pressure data is recorded by the device. Over time, the pressure data looks like a waveform (see above). The point of maximum amplitude is considered mean arterial pressure. Systolic and diastolic are estimated from mean arterial pressure (MAP). Therefore, an erroneous determination of MAP may produce inaccurate values for systolic and diastolic.”