

100

Name PATHAPALLI THANUJ

1. (12 points) Select the letter of the figure shown below that best depicts the amplifier or amplification function listed in the following.

E bipolar junction transistor

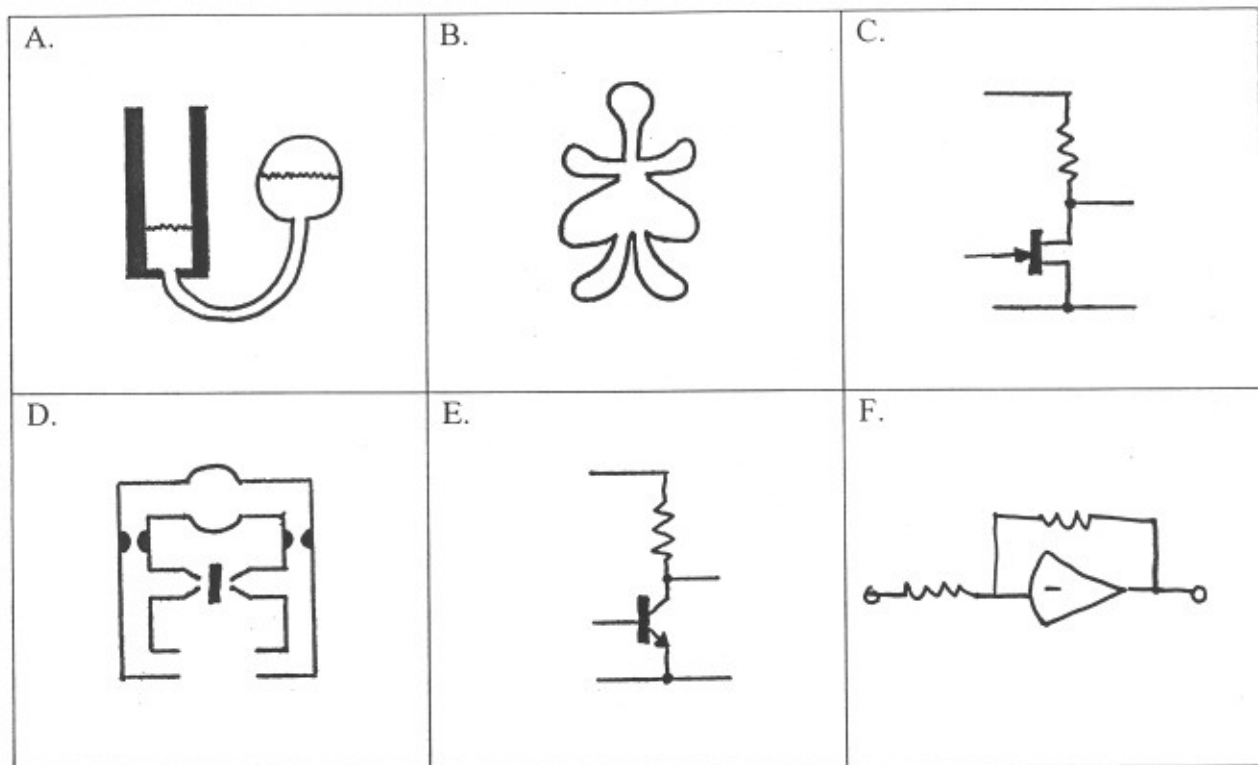
D flapper-nozzle valve

A thermic amplifier

C FET transistor

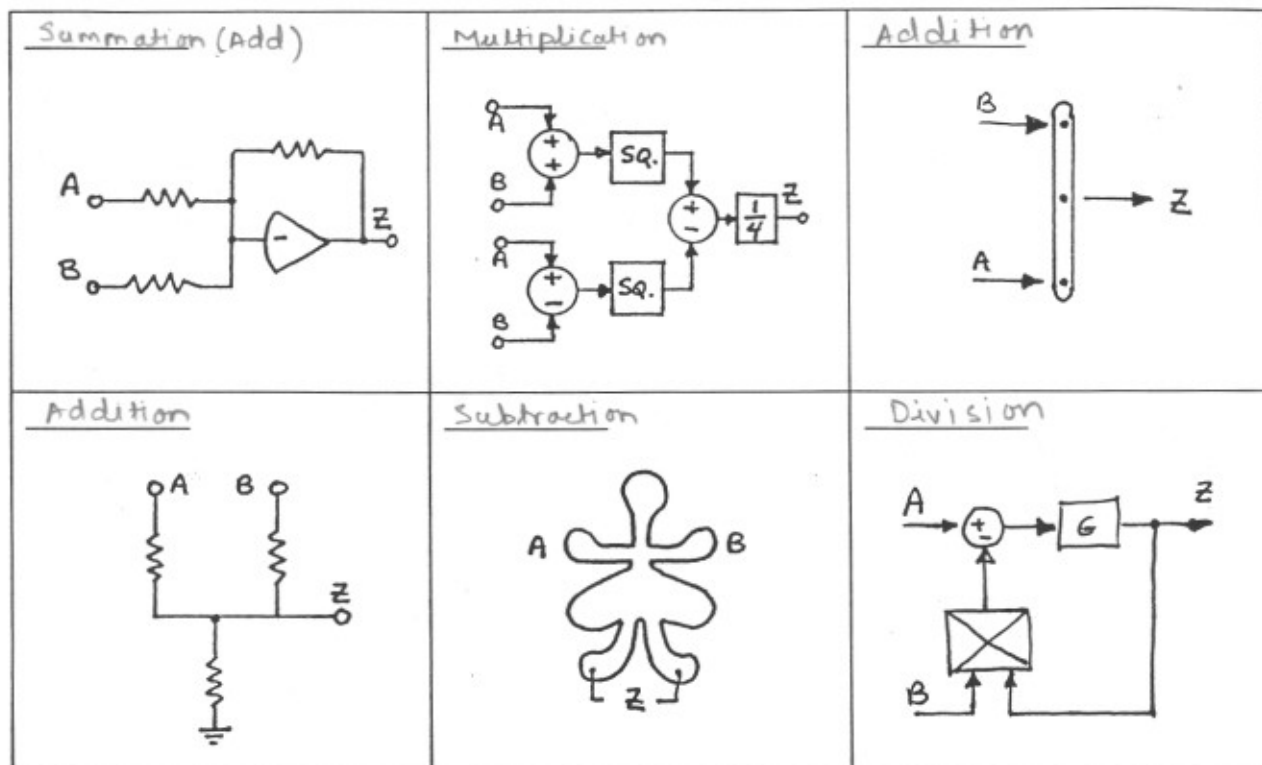
F op-amp

B planar fluidic amplifier



G. Not Shown

2. (12 points) Shown below are several computation techniques that perform some computation using the variables A and/or B that give an output Z . Identify the computation function associated with each illustration (e.g., ADD, SUB, GAIN CHANGE, MULT, DIV, etc.).

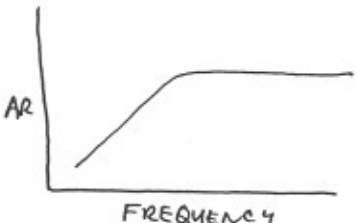
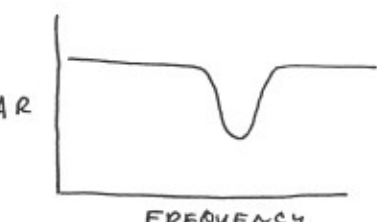
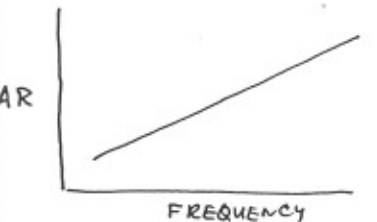

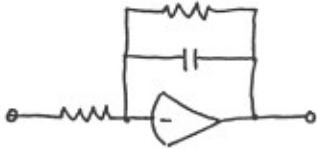



3. (10 points) State the two main reasons that hydraulics is preferred over electromechanical actuation in high-power servo systems.

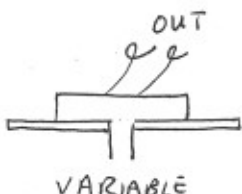
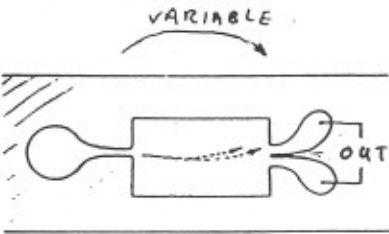
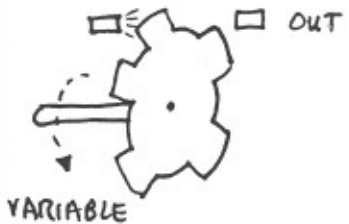
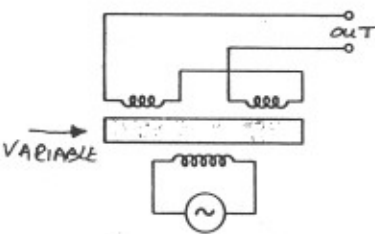
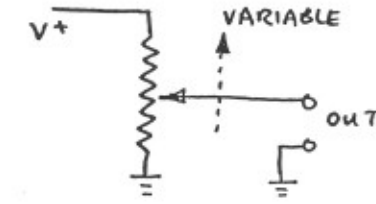
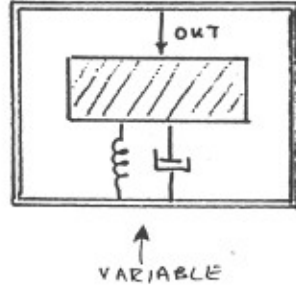
- Hydraulics is preferred over EM actuation because of:
- i) The power to volume or power to density ratio is more in Hydraulics than in electromagnetic actuation ✓
 - ii) Hydraulic systems perform better at higher temperatures since they have a built in cooling system, whereas EM system fail to perform well at high temperatures
 - iii) Hydraulic systems are self lubricated.

Inference → Hydraulic systems are more compatible, durable and reliable than EM systems.

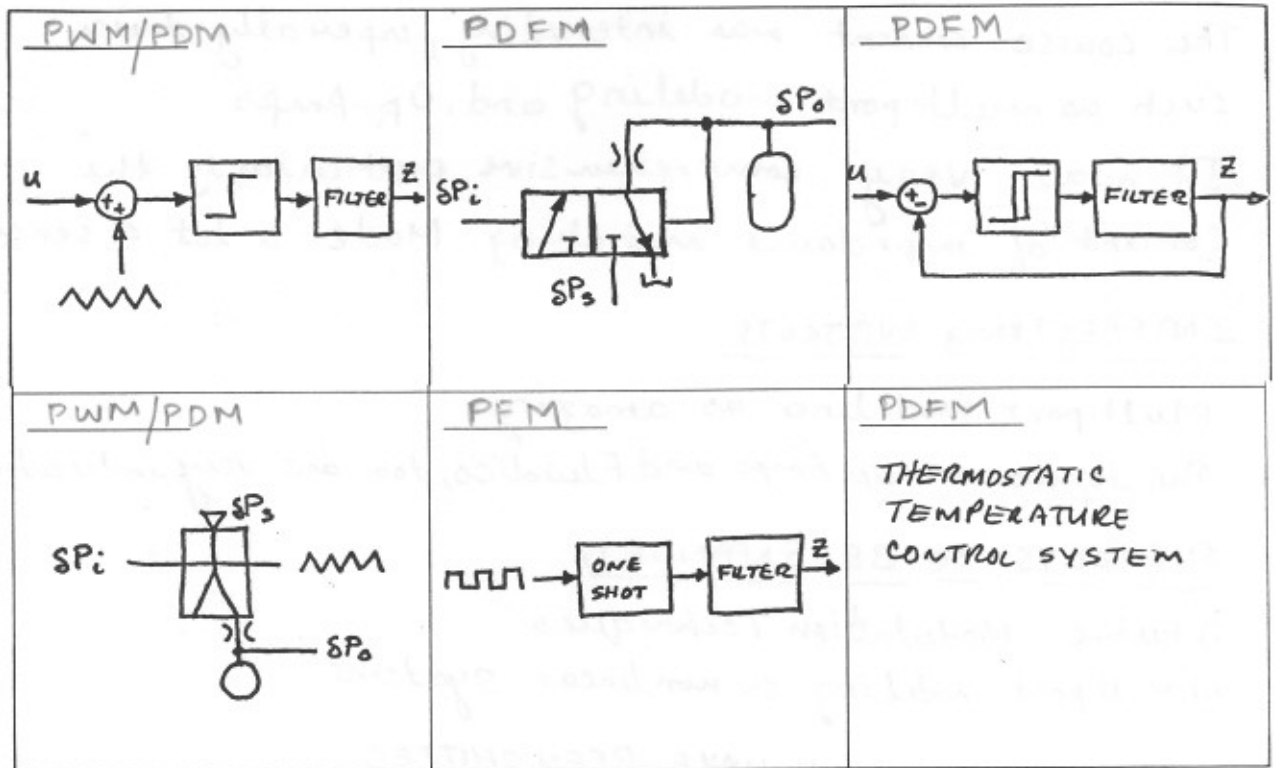
4. (12 points) Shown below are various figures that represent filters or dynamic compensation effects or devices. Identify the filter as to LOW-PASS, HIGH-PASS, BANDPASS, NOTCH, INTEGRAL, DERIVATIVE, etc.

<p><u>High Pass</u></p> 	<p><u>Notch</u></p> 	<p><u>Derivative</u></p> 
<p><u>Derivative</u></p> 	<p><u>LOW PASS</u></p> 	<p><u>LOW PASS</u></p> 

5. (12 points) Shown below are several sensors used in the various control technologies to give an output, "OUT", in response to the indicated "VARIABLE" being sensed. In each figure, identify the "variable" being sensed.

<p><u>Pressure</u></p>  <p>OUT</p> <p>VARIABLE</p>	<p><u>Angular Rate</u></p>  <p>VARIABLE</p> <p>OUT</p>	<p><u>Speed of the shaft</u></p>  <p>OUT</p> <p>VARIABLE</p>
<p><u>position</u></p>  <p>OUT</p> <p>VARIABLE</p>	<p><u>position</u></p>  <p>VARIABLE</p> <p>OUT</p> <p>V+</p>	<p><u>acceleration</u></p>  <p>OUT</p> <p>VARIABLE</p>

6. (12 points) Identify the pulse modulation technique used in each of the figures or systems shown below (e.g., PHM, PFM, PWM, PDFM, etc.)



7. (10 points) State some of the reasons or conditions that pulse modulation systems are used or are attractive.

- i) Amplifier Cost is Low
- ii) Pulse modulation systems are power efficient
- iii) Plants could be operated at full ON/OFF positions ✓
- iv) Compatible with digital electronics
- v) Accommodates building computation functions
- * vi) LINEARIZES NON LINEAR SYSTEMS

8. (20 points) On the back of this page, state your opinions of the course content and conduct. Which subjects were more interesting to you? Which subjects should be expanded? Which subjects could have been omitted? What would you suggest to change for next semester?