

**www.FirstRanker.com**

**SECTION-B**

2. Applying Routh's criterion, find the range of K for stability for a system whose characteristic equation is given by

$$\lambda^4 + 20 K \lambda^3 + 5 \lambda^2 + 10 \lambda + 15 = 0$$

3. How addition of poles and zeros affect the stability characteristics of a closed loop system?
4. Illustrate the first order system response to step, ramp and impulse input with the help of examples.
5. Discuss the physical devices used for system compensation.
6. Write short note on 'M & N Circles'.

**SECTION-C**

7. Write short notes on following: (5,5)
- (a) Nyquist stability criterion
- (b) PID controller
8. Determine whether the characteristic equation given below has stable or unstable roots. Comment on the location of the roots. (5,5)
- (a)  $\lambda^3 + 20\lambda^2 + 9\lambda + 100 = 0$
- (b)  $\lambda^4 + 6\lambda^3 + 21\lambda^2 + 36\lambda + 20 = 0$
9. What are transfer function models? Explain models for mechanical and electrical systems with the help of examples. (2,4,4)