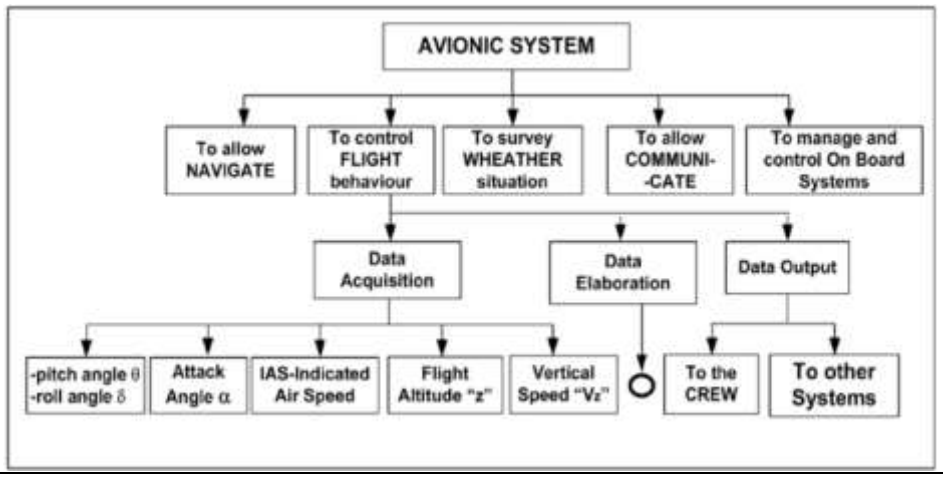
**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**
**End Semester Examination, May 2022**

**Course: Avionics System Design** **Semester: VIII**
**Program: ASE+AVE** **Time : 03 hrs.**
**Course Code: AVEG 4007** **Max. Marks: 100**

**Instructions:**

**SECTION A**
**(5Qx4M=20Marks)**

| S. No. | | Marks | CO |
|---|---|---|---|
| Q 1 | Discuss the term Autopilot and its types | **4** | **CO1** |
| Q 2 | What are generalized error coefficients? | **4** | **CO2** |
| Q 3 | Define positional constant | **4** | **CO3** |
| Q 4 | List the time domain specifications. | **4** | **CO4** |
| Q 5 | Sketch the response of a second order under amped system. | **4** | **CO4** |
| | **SECTION B**<br>**(4Qx10M= 40 Marks)** | | |
| Q 6 | For the system with following transfer function , determine type and order of the system<br>(1) $G(s)H(s) = \frac{K}{s(s+1)(s^2+6s+8)}$ (2) $G(s)H(s) = \frac{20(s+2)}{s^2(s+3)(s+0.5)}$<br>(3)$G(s)H(s) = \frac{(s+4)}{(s-2)(s+0.25)}$ (4) $G(s)H(s) = \frac{10}{s^3(s^2+2s+1)}$ | **10** | **CO2** |
| Q 7 | A unity feedback system has a open loop transfer function of $(s) = \frac{10}{(s+1)(s+2)}$ . Determine the steady state error for unit step input. | **10** | **CO3** |
| Q 8 | The characteristic polynomial of the system is , $s^7 + 9s^6 + 24s^5 + 24s^4 + 24s^3 + 24s^2 + 23s + 15 = 0$, Determine the location of the roots on s- plane and hence the stability of the system. | **10** | **CO 4** |
| Q 9 | The characteristic polynomial of the system is , $s^7 + 9s^6 + 24s^5 + 24s^4 + 24s^3 + 24s^2 + 23s + 15 = 0$, Determine the location of the roots on s- plane and hence the stability of the system. | **10** | **CO4** |
| | **SECTION-C**<br>**(2Qx20M=40 Marks)** | | |
| Q 10 | Construct the routh array and determine the stability of the system whose characteristic equation is $s^6 + 2s^5 + 8s^4 + 12s^3 + 20s^2 +$ | **20** | **CO1** |

| | | | |
|---|---|---|---|
| | $16s + 16 = 0$ . Also determine the no of roots lying on the left half of the s-plane, right half of the s- plane, on the imaginary axis. | | |
| Q 11 | Describe each blocks mentioned in the Figure below<br>  <br> | **20** | **CO 3** |