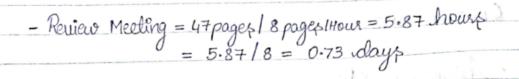CALCULATIONS:-

• Assuming 8 hours works per day.

[Effort] Duration (hours) = Amount of work (pages) / productivity rate.
Duration (days) = $\frac{\text{Duration (hours)}}{\text{Work Hours per day.}}$
                        [Effort]

Project Plan -

• Write plan = 31 pages / 3 pages/hour = 10.33 hours
              = 10.33 / 8 = 1.29 days

• Review plan :
      - preparation for review = 31 pages / 5 pages/hour = 6.2 hours
                              = 6.2/8 = 0.78 days
      - Review Meeting = 31 pages / 5 pages/hour = 6.2 hours
                       = 6.2/8 = 0.78 days

• Rework = 22 defects / 4 defects/hour = 5.5 hours
         = 5.5/8 = 0.69 days

Risk Mitigation and Contingency Plan -

• Write plan = 47 pages / 4 pages/hour = 11.75 hours
             = 11.75/8 = 1.47 days

• Review plan
      - preparation for review = 47 pages / 4 pages/hour = 11.75 hours
                              = 11.75/8 = 1.47 days

- Review Meeting = 47 pages / 8 pages/Hour = 5.87 hours
  = 5.87 / 8 = 0.73 days

- Rework = 45 defects / 5 defects 1Hour = 9 hours
  = 9/8 = 1.12 days

Requirement -

- Write requirements = 112 Req / 5 Req 1Hour = 22.4 hours
  = 22.4/8 = 2.8 days

- Write Use Case Model = 46 usecases / 1.5 usecase 1Hour = 30.66
  ↳ 3 usecase / 2 hours
  = 3/2 = 1.5 use case / hour

  = 30.66/8 = 3.83 days

- Review Requirements / Use case Model -
  - Preparation for review =
    ~~Requirement~~ → Requests = 112 requests / 18 req 1Hour = 6.22 hou
      = 6.22/8 = 0.78 days
    → Use case = 46 usecases / 4 use cases / hour = 11.5 hours
      = 11.5/8 = 1.44 days
  - Review Meeting =
    → Requests = 112 Requests / 28 Requests/Hour = 4 hours
      = 4/8 = 0.5 days
    → Use case = 46 usecases / 6 usecases 1Hour = 7.66 hours
      = 7.66/8 = 0.96 days

- Rework = 136 defects / 10 defects 1hour = 13.6 hours
  = 13.6/8 = 1.7 days

Analysis -

- Write Analysis document = 66 pages / 5 pages/hour = 13.2 hours
$$= 13.2 / 8 = 1.65 \text{ days}$$

- Review Analysis document -
    - Preparation for Analysis document = 66 pages / 4 pages/hour = 16.5 hours
    $$= 16.5 / 8 = 2.06 \text{ days}$$
    - Review Meeting = 66 pages / 9 pages/hour = 7.33 hours
    $$= 7.33 / 8 = 0.92 \text{ days}$$

- Rework = 123 defects / 6 defects/hour = 20.5 hours
$$= 20.5 / 8 = 2.56 \text{ days}$$

Design -

- Write DD = 89 pages / 5 pages/hour = 17.8 hours
$$= 17.8 / 8 = 2.22 \text{ days}$$

- Review DD
    - Preparation for DD = 89 pages / 4 pages/hour = 22.25 hours
    $$= 22.25 / 8 = 2.78 \text{ days}$$
    - Review Meeting = 89 pages / 8 pages/hour = 11.12 hours
    $$= 11.12 / 8 = 1.39 \text{ days}$$

- Rework = 188 defects / 5 defects/hour = 37.6 hours
$$= 37.6 / 8 = 4.7 \text{ days}$$

- Write Data Model (DM) = 28 pages / 0.25 = 112 hours
$$1 \text{ page } 1/4 \text{ hour} \qquad = 112 / 8 = 14 \text{ days}$$
$$= 0.25 \text{ page/hour}$$

- Review DM
  - Preparation for DM = 28 pages / 4 pages/hour = 7 hours
    $$= 7/8 = 0.87 \text{ days}$$
  - Review Meeting = 28 pages / 5 pages/hour = 5.6 hours
    $$= 5.6/8 = 0.7 \text{ days}$$

- Rework = 88 defects / 6 defects/hour = 14.66 hours
  $$= 14.66/8 = 1.83 \text{ days}$$

Coding and unit test -

- Write Code = 3800 SLOC / 5 SLOC/hour = 760 hours
  $$= 760/8 = 95 \text{ days}$$

- Unit Testing =
  - prepare/execute test cases = 256 testcases / 10 testcases/day = 25.6 days
  - fix found defects = 179 defects / 8 defects/day = 22.37 days
  - Test fixed defects = 179 defects / 12 defects/day = 14.92 days

- Code Inspection -
  - preparation for code inspection = 3800 SLOC / 113 SLOC/hour = 33.62 hours
    $$= 33.62/8 = 4.20 \text{ days}$$
  - code Inspection Meeting = 3800 SLOC / 189 SLOC/hour = 20.10 hours
    $$= 20.10/8 = 2.51 \text{ days}$$
  - Rework = 188 defects / 5 defects/hour = 37.6 hours
    $$= 37.6/8 = 4.7 \text{ days}$$

Testing –

- Write Test plan (TP) = 166 pages / 5 pages/day = 33.2 days

- Review TP
  - preparation for TP = 166 pages / 4 pages/hour = 41.5 hours
    - = 41.5/8 = 5.19 days
  - Review TP Meeting = 166 pages / 8 pages/hour = 20.75 hours
    - = 20.75/8 = 2.59 days
  - Rework = 255 defects / 7 defects/hour = 36.42 hours
    - = 36.42/8 = 4.55 days

- Execute TP (test cases) = 215 test cases / 9 test case/day = 23.89 days

- Fix found Defects = 213 defects / 14 defects/day = 15.21 days

- Test fixed Defects = 213 defects / 17 defects/day = 12.52 days

Documentation –

- User documentation = 134 pages / 4 pages/hour = 33.5 hours
  - = 33.5/8 = 4.19 days

- Review UD –
  - preparation for UD Review = 134 pages / 5 pages/hour = 26.8 hours
    - = 26.8/8 = 3.35 days
  - Review UD Meeting = 134 pages / 7 pages/hour = 19.14 hours
    - = 2.39 days
  - Rework = 174 defects / 6 defects/hour = 29 hours
    - = 29/8 = 3.62 days

4) If it is scheduled to start on 9/16/24 then the earliest finish date for the project is 12/17/24, as we can see in MS project early finish column.

5) If we are not allowed to use more than 20% of the resources available at any point of time for this project, then the earliest finish date for this project if it is scheduled to start on 9/16/24 would be 12/23/25, as we can see in MS project early finish column.

Additional Assumptions -

• Requirement and Risk Mitigation and contingency Plan both start simultaneously after Project plan.

• I assumed that document completion means writing the document.

• Requirement Engineers 'RE' are responsible for writing requirements.

• Programming/software Engineers for are responsible for writing code.

• Documentation Engineers are responsible for documentation phase.