# UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
## End Semester Examination, May 2023

**Programme Name:** B.Tech., APE GAS        **Semester** : VI

**Course Name** : Production Engineering-II      **Time** : 03 hrs

**Course Code** : PEAU 3004            **Max. Marks :** 100

**Nos. of page(s)** : 1

**Instructions:** 1. Assume any data missing.

                2. Maintain a minimum of three decimal accuracy.

| SNo | SECTION A (5*4=20M) | Marks | CO |
|---|---|---|---|
| Q 1 | Define total formation volume factor. | 4 | CO1 |
| Q 2 | Define emulsion and mention its significance in oil-water separation. | 4 | CO2 |
| Q 3 | Classify various types of oil and gas storage tanks | 4 | CO4 |
| Q 4 | Classify various types of subsurface pumps of an SRP | 4 | CO5 |
| Q 5 | Write the principle of working of a gas lift technique | 4 | CO6 |
| | **SECTION B (4*10=40M)** | | |
| Q 6 | Elaborate with a neat sketch the working of a two-phase horizontal separator. | 10 | CO2 |
| Q 7 | Compare and contrast between various metering devices used in oil and gas metering | 10 | CO3 |
| Q 8 | Classify various types of pump based artificial lift methods. Explain their principle of working. | 10 | CO5 |
| Q9 | Illustrate with a neat diagram the components of a pressure operated gas lift valve. | 10 | CO6 |
| | **SECTION-C (2*20=40M)** | | |
| Q10 | i. Illustrate with a neat diagram the working components of a sucker rod pump.<br>ii. Illustrate with a neat diagram the working of an electrical submersible pump. | 20 | CO5 |
| Q11 | A valve with a bellow area of 1.0 sq.in. and a port area of 0.1 sq.in is located at 6000 ft. The pressure in the dome is 700 psi and the tubing pressure is 500 psi at 6000 ft. The injection gas has a specific gravity of 0.7 at an average temperature at surface $100^0$F. Assuming $Z_{injection\ air}$=0.8, Calculate<br>i. the casing pressure at 6000 ft required to open the valve.<br>ii. the casing pressure at 6000 ft required to close the valve.<br>iii. the tubing effect.<br>iv. the spread of the valve.<br>v. the test rack opening pressure. | 20 | CO6 |