**QUESTION 1**

a.

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| Crude type | Specific gravity | APIg | % sulphur |
| Bonny light | 0.8398 | 37° | 0.14% |
| Brass river | 0.8063 | 44° | 0.07% |
| Bonny medium | 0.8934 | 26° | 0.28% |

b. 1. For planning the most effective utilization of a crude oil in the refining system

2. For assessing its potential sales value in world markets

3. To provide data for forward planning studies and future plant construction

4. For assessing the suitability of a crude oil for the manufacture of specialty products

c. i. Physical property measurements ; density or specific gravity, viscosity e.t.c

ii. Chemical analysis ; sulphur ,nitrogen, trace metals

iii. Composition data ; individual saturates to C3 like methane, ethane e.t.c aromatics to C10, n- paraffins to C30or above

d. i. gravity

ii. Sulphur content

iii. Wax and pour point

e. Under the condition of temperature and pressure occurring underground ,reservoir contains oil paraffin wax in suspension or solution in the crude. As oil flows from the reservoir to the surface there is reduction of temperature, pressure, and the amount of dissolved gas contained in the oil. Reduction of temperature of gas outbreak have shown to be factors causing reduced solubility of the paraffin crude. Hence, as the oil flows up the well tubing, it cools and at some point, up the tubing the tubing wall temperature is equal to the wax saturation. Temperature of the oil ,at this point in the system the temperature falls below the oil cloud point and deposition of wax begins.

**QUESTION 2**

1. (i) Oil field is a natural hydrocarbon accumulation in the pores of the underground porous rocks which are called Reservoir rocks or Reservoirs

(ii) Displacement efficiency is the production of the oil that remains in part of the reservoir already swept by displacing fluid

(iii) Sweep efficiency is the production of the oil that remains in the part of the reservoir not swept by the displacing fluid.

1. Hydrocarbons are recovered from the field by means of wells drilled from the surface on to the reservoir .The initial pressure in the fluids occupying the pore space in a reservoir is very often higher than the hydrostatic pressure. By opening a well, therefore, the pressure at its bottom is reduced, thus driving Reservoir fluids towards the well. If the natural pressure drops obtained by opening the well is too small it is possible to operate a pumping system which further decrease which further decreases the pressure.
2. (i) To maintain the pressure in the reservoir

(ii) To push forward the oil contained in the reservoir towards the producing wells