Nepal Engineering Council Registration Examination
MODEL QUESTION
for
Petroleum Engineering (APtE)

Section A (60*1=60)

1. Which type of fault is characterized by horizontal movement of the fault blocks? [Option]
   a) Normal fault
   b) Reverse fault
   c) Strike-slip fault
   d) Thrust fault

2. Identify the metamorphic rock formed by thermodynamic method of metamorphism.
   a) Slate
   b) Gneiss
   c) Schist
   d) Marble

3. The angle at which a sedimentary bed is inclined from the horizontal is called the _____.
   a) Anticline
   b) Strike
   c) Syncline
   d) Dip

4. Which mineral group is abundantly found in the earth's crust?
   a) Mica group
   b) Felspar group
   c) Oxide group
   d) Silicate group

5. In seismic refraction method, the radiating shock waves are picked up by …..
   a) Geophone
   b) Wave buoy
   c) Thermometer
   d) Cohesive soils

6. What is a significant challenge in surveying offshore oil and gas platforms? [Option]
   a) High humidity
   b) Wave and current effects on equipment
   c) Excessive heat
   d) High altitude

7. In micropaleontology, what is the primary use of foraminiferal fossils?

[Option]

a) Determining the age of sedimentary rock layer
b) Mapping ancient landforms
c) Analyzing large scale climate changes
d) Identifying volcanic activity

8. In which temp range does the oil window typically occur?
[Option]
a) 50°C to 100°C
b) 70°C to 150°C
c) 100°C to 200°C
d) 150°C to 250°C

9. Which type of rock is commonly associated with cap rocks?
[Option]
a) Sandstone
b) Limestone
c) Shale
d) Granite

10. In which type of trap do faults create a barrier that can hold oil and gas?
[Option]
a) Anticline trap
b) Salt dome trap
c) Fault trap
d) Stratigraphic trap

11. What is “Scale” in map compilation?
[Option]
a) The process of adjusting map colours
b) The ratio of distance on the map to the actual distance on the ground
c) The size of the map’s legend
d) The number of map symbols used

12. What significant event marks the end of Mesozoic era?
[Option]
a) The formation of Himalayas
b) The extinction of dinosaurs
c) The developments of early mammals
d) The breakup of Pangaea

13. What major challenge does Nepal face in Petroleum Exploration?
[Option]
    a) High Risk of natural disasters.
    b) Lack of sufficient geological data
    c) Limited availability of modern drilling technology
    d) High transportation costs

14. Which type of well log provides information about porosity of rock?
[Option]
    a) Resistivity Log
    b) Gamma Ray Log
    c) Sonic Log
    d) Neutron Log

15. What is the primary purpose of Caliper log?
[Option]
    a) To measure the density of the formation
    b) To assess the borehole diameter and shape.
    c) To determine the porosity of the rock
    d) To record the natural gamma radiation of the formation

16. What type of calibration is crucial for maintaining log accuracy?
[Option]
    a) Sensor Calibration
    b) Depth Calibration
    c) Temperature Calibration
    d) Pressure Calibration

17. What principle underlies the operation of sonic log?
[Option]
    a) Measurement of gamma Radiation
    b) Detection of electrical resistance
    c) Propagation of acoustic waves through the formation
    d) Measurement of magnetic fields

18. Which of the following is not typically function of mud logging?
[Option]
    a) Monitoring the drilling rate.
    b) Identifying formation pressure
    c) Measuring the formation's sonic velocity
    d) Analyzing gas levels in the mud

19. What is added to natural gas to make it detectable by smell?
[Option]
a) Sulphur
b) Nitrogen
c) Mercaptan
d) Methane

20. Relative permeability is defined as
[Option]
a) The ratio of effective permeability to absolute permeability
b) The ratio of absolute permeability to porosity
c) The ability of the rock to transmit a single fluid only
d) The product of permeability and fluid viscosity

21. At what point does the bubble point pressure occur in a fluid system
[Option]
a) When gas first starts to evolve from the liquid
b) When the gas phase dominates the system
c) At the minimum reservoir pressure
d) When the temperature is the lowest

22. Darcy's Law assumes the flow of fluid is:
[Option]
a) Laminar
b) Turbulent
c) Transient
d) Chaotic

23. What is the primary method used to measure reservoir pressure?
[Option]
a) Core sampling
b) Wire line formation testing
c) Seismic survey
d) Logging while drilling

24. Which drive mechanism is most effective at maintaining reservoir pressure during production?
[Option]
a) Solution gas drive
b) Water drive
c) Gravity drainage
d) Depletion drive

25. What component of the sucker rod pumping system converts the rotary motion of the motor into reciprocating motion?
[Option]
a) Stuffing box
b) Traveling valve
c) Walking beam
d) Down hole pump

26. What is the primary purpose of hydraulic fracturing in oil and gas reservoirs?
[Option]
a) To clean the wellbore
b) To increase the permeability of the reservoir rock
c) To remove water from the formation
d) To reduce well pressure

27. Which of the following is NOT a primary function of the Christmas tree?
[Option]
a) Control the flow of oil or gas from the well
b) Regulate well pressure
c) Aid in well fracturing operations
d) Support the drill string during drilling

28. What is the main benefit of using compressed air in well activation?
[Option]
a) It increases the oil viscosity
b) It helps maintain reservoir pressure
c) It is readily available and inexpensive
d) It can improve the permeability of the reservoir

29. What is paraffin deposition in oil wells primarily caused by?
[Option]
a) High gas-to-oil ratio
b) Low reservoir temperature
c) Cooling of oil as it moves up the wellbore
d) High water cut in the production fluids

30. What is the primary advantage of using a Jack-up Rig for offshore drilling?
[Option]
a) Ability to operate in deep water
b) Mobility and ability to adjust its elevation relative to the sea floor
c) Large storage capacity for crude oil
d) Permanent installation on the seabed

31. What is the primary advantage of Directional Drilling?
[Option]
a) It can drill vertical wells only
b) It allows drilling at multiple angles and along curved paths

c) It is the fastest drilling method available
d) It is used for shallow well applications

32. Which term describes the time it takes for the cement slurry to set and harden after being pumped into the wellbore?
[Option]
a) Setting time
b) Pumping time
c) Curing time
d) Flow time

33. Which of the following is a primary goal of directional drilling in offshore operations?
[Option]
a) To avoid drilling through formations with high pressure
b) To reduce the length of the wellbore
c) To minimize the environmental impact by drilling from a single location
d) To increase the number of wells in the area?

34. Which type of casing is typically used to provide the initial structural support for the wellbore?
[Option]
a) Production Casing
b) Intermediate Casing
c) Surface Casing
d) Liner Casing

35. Which method is commonly used for onshore disposal of drill cuttings to minimize land use?
[Option]
a) Deep well injection
b) Land farming
c) Incineration
d) On-site burial

36. Which type of packer is typically used in production wells to prevent fluid flow between different zones?
[Option]
a) Retrievable Packer
b) Permanent Packer
c) Drillable Packer
d) Liner Packer

37. How does increasing the pressure in a pipeline typically affect the flow of fluids?
[Option]
a) It decreases the flow rate
b) It has no effect on the flow rate
c) It increases the flow rate

d) It makes the fluid more viscous

38. What is the key characteristic of a centrifugal compressor?
[Option]
a) It uses a piston to compress gas
b) It compresses gas by converting kinetic energy to pressure energy through the use of rotating impellers
c) It operates at low speeds with high volumetric flow rates
d) It uses sliding vanes to trap gas

39. In pigging operations, what is the pig launcher used for?
[Option]
a) To inspect the pipeline for leaks
b) To inject the pig into the pipeline for its journey
c) To clean the pig after use
d) To remove debris from the pipeline

40. Which of the following is not a stage of oil recovery?
[Option]
a) Primary Recovery
b) Secondary Recovery
c) Quaternary Recovery
d) Enhanced Oil Recovery

41. One advantage of using CO_2 flooding is:
[Option]
a) The ability to use it in shallow reservoirs
b) The reduction of greenhouse gases by sequestering CO_2
c) The increase in water cut
d) Its low cost compared to water flooding

42. MEOR is considered an environmentally friendly technique because:
[Option]
a) It uses CO_2 to dissolve oil
b) It injects chemicals that degrade quickly
c) It utilizes naturally occurring or engineered microorganisms instead of chemicals
d) It involves thermal processes

43. In gasoline production, the blending process is used to achieve:
[Option]
a) A higher flash point
b) The correct octane rating for various grades of fuel
c) Increased water content in the fuel
d) A lower freezing point

44. Which of the following is a major product of catalytic cracking?
[Option]
a) Asphalt
b) Gasoline
c) Lubricants
d) Coal

45. What are the two main types of petroleum coke?
[Option]
a) Fluid coke and delayed coke
b) Sponge coke and needle coke
c) High-sulphur coke and low-sulphur coke
d) Light coke and heavy coke

46. What is the primary purpose of sulphur recovery in refineries and gas plants?
[Option]
a) To remove sulphur compounds to meet environmental regulations
b) To increase the viscosity of crude oil
c) To convert sulphur into sulfuric acid
d) To lower the carbon content of fuel

47. Which process is used to separate crude oil into its different components based on boiling points?
[Option]
a) Catalytic cracking
b) Distillation
c) Hydrocracking
d) Reforming

48. Which process is commonly used for desulfurizing diesel fuels?
[Option]
a) Fluid catalytic cracking
b) Hydrocracking
c) Hydrotreating
d) Catalytic reforming

49. Chronic inhalation exposure to low levels of petroleum hydrocarbons may lead to:
[Option]
a) Lung cancer
b) Central nervous system depression and dizziness
c) Skin burns
d) Kidney failure

50. In fracturing operations, why are biocides added to the fracturing fluid?
[Option]
a) To increase the pressure inside the formation
b) To prevent bacterial growth that can cause corrosion

c) To enhance the conductivity of the fracture
d) To reduce water content

51. In an automatic shutdown system, which type of signal typically triggers the system to engage?
[Option]
a) Manual override
b) Sensor signals indicating abnormal pressure, temperature, or flow rates
c) Time-based schedule
d) Weather conditions

52. What is the response time of a gas detector?
[Option]
a) The time it takes to calibrate the detector
b) The duration the detector takes to alert after detecting a hazardous gas concentration
c) The lifespan of the detector's sensor
d) The frequency of signal transmission

53. Which type of pollution is directly caused by the disposal of produced water from oil and gas production operations?
[Option]
a) Air pollution
b) Water pollution
c) Light pollution
d) Noise pollution

54. Landfilling as a waste treatment method involves:
[Option]
a) Disposing of waste in open land with no cover??
b) Burying waste in engineered sites designed to prevent environmental contamination??
c) Burning waste in large pits??
d) Separating waste materials for recycling??

55. Standard dimensions (mm x mm) of A3 drawing sheet is
[Option]
a) 11.69 × 16.54
b) 29.7 × 42
c) 297 × 420
d) 420 × 280

56. Which of the following methods of charging depreciation of an asset has increased amount of depreciation as the age of asset increases
[Option]
a) sum-of-year digit
b) sinking fund
c) diminishing balance

d) straight line

57. The process of optimizing the project's limited resources without extending the project duration is known as

[Option]

a) project crashing
b) resource levelling
c) resource smoothing
d) networking

58. The process of composing/raising the required fund from different sources such as equity, preferred stock, bond and debenture is known as

[Option]

a) capital structure planning
b) project financing
c) capital budgeting decision
d) deducing earning per share

59. In which of the following society people used to seek their existence on growing plants for their cattle and domestic animals

[Option]

a) pastoral society
b) tribal society
c) horticultural society
d) agricultural society

60. According to Nepal Engineering Council Act, 2055 (Revised, 2079), all engineering academic institutions shall be …….. in the Council.

[Option]

a) affiliated
b) united
c) recognized
d) associated

Section B (20*2=40)

61. Consider the following mineral deposits:

A. Limestone deposits of Caucasus region of France
B. Manganese deposition of Georgia and Ukraine
C. Phosphate beds of Algeria

Which kind of rocks holds these deposits?

a) Sedimentary rocks
b) Igneous rocks
c) Igneous and sedimentary rocks
d) Metamorphic and sedimentary rocks

62. While calculating h2 with reference to h1, line of sight must be _____ m above the point of tangency.

a) 5-6 m
b) 4-5 m

c) 3-4 m
d) 2-3 m

63. What are the key characteristics of Radiolaria?
[Option]
a) Calcium carbonate shells
b) Siliceous skeletons with intricate geometries
c) Fossilized bone fragments
d) Organic carbon remains

64. What is the main function of a cap rock in hydrocarbon accumulation?
[Option]
a) To act as a source rock
b) To provide porosity
c) To prevent the upward migration of hydrocarbons
d) To provide thermal energy for hydrocarbon generation

65. What is the basic formula for calculating porosity (ϕ) using a density log?
[Option]
a) $\phi = (\rho b - \rho ma) / (\rho f - \rho ma)$
b) $\phi = \rho f / (\rho ma - \rho b)$
c) $\phi = (\rho ma - \rho f) / (\rho b - \rho ma)$
d) $\phi = \rho b * \rho ma * \rho f$

66. In formations where hydrocarbons replace water, how does the travel time (Δt) of the sonic log change?
[Option]
a) Increases
b) Decreases
c) Remains unchanged
d) Becomes highly variable

67. Which of the following is true regarding the sulphur content of crude oil?
[Option]
a) Sweet crude oil has low sulphur content (<0.5%)
b) Sour crude oil has low sulphur content (<0.5%)
c) Sweet crude oil has high sulphur content (>1%)
d) The sulphur content does not affect the classification of crude oil

68. In a well, the formation pressure is measured as 3,800 psi. If the depth of the well is 9,000 ft, what is the pressure gradient?
[Option]
a) 0.42 psi/ft
b) 0.35 psi/ft
c) 0.25 psi/ft
d) 0.85 psi/ft

(Pressure gradient = Formation pressure / Depth = 3800 psi / 9000 ft = 0.42 psi/ft)

69. What is the role of proppant in hydraulic fracturing?
[Option]
a) To dissolve the rock formation
b) To create fractures
c) To keep the fractures open after the pressure is released
d) To block fluid flow in the formation

70. Paraffin deposition in oil wells primarily occurs due to:
[Option]
a) High reservoir temperature
b) Low wax content in crude oil
c) Decrease in temperature as oil flows from the reservoir to the surface
d) High gas-to-oil ratio

71. Why is it important to balance the cost and performance of drilling fluids?
[Option]
a) To reduce the overall cost of the well and avoid formation damage
b) To increase wellbore instability
c) To minimize the use of downhole tools
d) To reduce the rate of penetration

72. To isolate two different production zones in the same wellbore, which completion technique is used?
[Option]
a) Gravel packing
b) Installing packers between zones
c) Underbalanced drilling
d) Water shut-off treatments

73. What is the required number of sacrificial anodes if each anode can supply a current of 1.5 A and the total required current is 18 A?
[Option]
a) 10
b) 12
c) 15
d) 18

N = 18 A/1.5A per anode =12 anodes

74. At which reservoir conditions is CO_2 flooding most effective?
[Option]
a) High temperature and high pressure
b) Low temperature and low pressure
c) High temperature and low pressure
d) Low temperature and high pressure

75. Visbreaking and hydrovisbreaking are primarily used to:
[Option]
a) Increase gasoline production
b) Reduce the production of residual fuel oil
c) Convert residual fuel oil into diesel fuel
d) Reduce the viscosity of heavy oils for easier transportation

76. The primary purpose of the Claus process in sulphur recovery is to:
[Option]
a) Convert hydrogen sulphide (H_2S) into sulphur dioxide (SO_2)
b) Convert hydrogen sulphide (H_2S) into elemental sulphur
c) Remove carbon dioxide (CO_2) from natural gas
d) Absorb water vapor from gas streams

77. In the context of sand control, what is the role of a gravel pack?
[Option]
a) To increase sand production
b) To support the formation and prevent sand entry into the wellbore
c) To reduce the viscosity of fracturing fluids
d) To enhance acid dissolution

78. The use of dispersants in oil spill response aims to:
[Option]
a) Increase the size of oil droplets for easier removal
b) Promote the evaporation of oil
c) Break down the oil into smaller droplets to accelerate biodegradation
d) Solidify the oil for easier removal

79. Effective monthly interest rate will be ……., if nominal interest rate of 10% accounted for continuous compounding

[Option]

a) 1%

b) 0.84%

c) 1.2%

d) 2%

80. By considering following activities of a project, the project duration will be

Activity	A	B	C	D	E
Immediate predecessors	-	-	-	C	A, B, D
Duration (days)	4	5	3	7	5

[Option]

a) 9 days

b) 10 days

c) 15 days

d) 24 days