

Name:

Enrolment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
Assignment for End Sem. Exam, July 2020

Programme: M. Tech (PE)
Course: Reservoir Geo Mechanics
Course Code: PEAU 7010

Semester: II
Time: 2hrs. + 24 hrs.
Max. Marks: 100

Instructions: All questions are compulsory

SECTION A

Q 1	The main difference between the UCS and TCS tests is _____ condition. A. Sample B. Loading C. Sample and loading	1	CO4
Q 2	Brazilian test is carried out by applying _____ force on the rock. A. Tensile B. Shear C. Compression	1	CO4
Q 3	Generally, pore pressure of a reservoir is always _____ the minimum Principal Stress. A. Equal to B. Less than C. Greater than	1	CO2
Q 4	When pore pressure is present, effective stress for _____ will change. A. Shear stress B. Normal stress C. Normal and shear stresses	1	CO2
Q 5	Plane stress condition is possible for _____ . A. thin rectangular plate B. circular horizontal tunnel C. any 3D object	2	CO1
Q 6	In Effective stress condition, Mohr's circle of stress will move _____ than original position. A. right B. up C. left	1	CO1
Q 7	Delta strain rosette is measured when strain gauges are placed _____ from each other. A. 30 degree B. 45 degree C. 60 degree	2	CO1
Q 8	In any stress regime, for a stable reservoir _____ has to be the lowest. A. Sh(min) B. Pp	1	CO2

	C. Sv		
Q 9	The only test available on the rock discontinuity is _____ . A. direct shear B. UCS test C. TCS test	1	CO4
Q 10	For a horizontal discontinuity, major principal stress surrounding the rock is aligned to _____ direction. A. vertical B. angular C. horizontal	1	CO1
Q 11	Delta rosette is when the strain gauges are oriented at _____ to one-another. A. 90 degree B. 60 degree C. 45 degree	2	CO1
Q 12	The "end effect" in intact rock testing is related to _____ effect. A. size B. confinement C. shape	1	CO1
Q 13	Slake Durability Index test is a measure of _____ of the rock. A. porosity B. permeability C. weather ability	1	CO1
Q 14	The stress concentration around a borehole is independent of _____ . A. stress condition B. size of borehole C. direction to borehole	1	CO2
Q 15	The drill-induced tensile fracture always lie _____ of borehole. A. at the wall B. inside C. within rock outside	1	CO3
Q 16	In equal angle Stereo net projections, the divisions are marked at _____ interval. A. 5 degree B. 2 degree C. 10 degree	2	CO3
Q 17	Fluid flow through the reservoir is very sensitive to _____ . A. Pressure gradient B. Fluid viscosity C. Discontinuity aperture	1	CO2
Q 18	4-arm Caliper log is used to identify the _____ in rock. A. tensile fractures	1	CO3

	B. breakouts C. shear fracture		
Q 19	At the horizontal boundary of the vertical borehole, only _____ stress exists. A. tangential B. radial C. shear	1	CO3
Q 20	Increasing the mud weight _____ the zone of breakout in the borehole. A. reduces B. increases C. does not effect	1	CO2
Q 21	UCS is can be greater than TCS of rocks. A. TRUE B. FALSE	1	CO1
Q 22	TCS test is not giving the idea of rock strength at field/in-situ condition. A. TRUE B. FALSE	1	
Q 23	The rate of overburden stress is always higher than the rate of hydrostatic stress. C. TRUE D. FALSE	1	CO4
Q 24	Overpressure state is possible for a confined or impervious reservoir. A. TRUE B. FALSE	1	CO2
Q 25	In any Reservoir class, $S_h(\max)$ can never be the lowest one. A. TRUE B. FALSE	1	CO2
Q 26	As slenderness increases, the strength of the rock increases. A. FALSE B. TRUE	1	CO2
Q 27	For a brittle rock, there is no post-peak behaviour A. TRUE B. FALSE	1	CO1
Q 28	Engineering shear strain is half of tonsorial shear strain. C. TRUE D. FALSE	1	CO1
Q 29	Scale effect in rock is mainly depending on presence of discontinuity in zone of study. A. TRUE B. FALSE	1	CO1
Q 30	The reservoir may be compartmentalized leading to the overpressure condition. A. TRUE B. FALSE	1	CO1
Q 31	Stress polygon can show all the conditions for which a reservoir can fil. A. TRUE	1	CO2

	B. FALSE		
Q 32	Breakdown pressure is same as Major Principal Stress. E. TRUE F. FALSE	1	CO2
Q 33	Limiting stress concept of reservoirs based on the frictional theory of rock. A. TRUE B. FALSE	1	CO3
Q 34	Angle Beta in Mohr-Coulomb criteria is always greater than angle of Internal Friction. A. TRUE B. FALSE	1	CO2
Q 35	Hydraulic fracture in rock always occurs inside the borehole. G. TRUE H. FALSE	1	CO2
Q 36	The dip of a fault plane can only be plotted on stereo net after aligning the fault azimuth with Equator, A. TRUE B. FALSE	1	CO2
Q 37	Hoop stresses generated in wall of a borehole always normal to the radius and axis of borehole. I. TRUE J. FALSE	1	CO3
Q 38	The stress concentration around a borehole is independent of elastic constants. A. TRUE B. FALSE	1	CO3
Q 39	Hydraulic fracture test can be used to estimate Sh(max). A. TRUE B. FALSE	1	CO2
Q 40	Bi-lateral constraint is related to Poisson's ratio. A. TRUE B. FALSE	1	CO3
Q 41	Test / Output Parameters A. UCS Test B. Rock Strength, Young's Modulus, Poisson's ratio C. TCS Test D. Cohesion, Angle of Friction E. Point Load Test F. Rock Strength G. Brazilian Test H. Tensile Strength	Point Load Test Rock Strength Brazilian Test Tensile Strength	CO3
Q 42	Stress Magnitude / Reservoir Condition A. $S_v > S_h(\max) > S_h(\min)$ B. Normal Fault C. $S_h(\max) > S_v > S_h(\min)$	2	CO4

	<ul style="list-style-type: none"> D. Strike Slip Fault E. $S_h(\max) > S_h(\min) > S_v$ F. Reverse Fault G. $S_v = S_h(\max) = S_h(\min)$ H. Hydrostatic 		
Q 43	<p>Hydraulic Fracturing Test Set-up / Parameters Assumptions</p> <ul style="list-style-type: none"> A. Borehole length of 1 m B. Fracture free C. Water pressure D. Measured at surface E. Fracture orientation F. Normal to minor principal stress G. Borehole axis H. Parallel to a principal stress orientation 	2	CO2
Q 44	<p>Elastic constants / Definition</p> <ul style="list-style-type: none"> A. Young's Modulus B. Ratio of axial stress to axial strain C. Poisson's Ratio D. Ratio of lateral strain to axial strain E. Shear Modulus F. Ratio of shear stress to shear strain G. Bulk Modulus H. Unit volume expansion with applied pressure 	2	CO3
Q 45	<p>Mohr's circle orientation / Stress condition</p> <ul style="list-style-type: none"> A. Circle touches origin at left B. Uniaxial Compression C. Circle lying right side of origin D. Biaxial Compression E. Circle lying right side of origin but size increases F. Triaxial Compression G. Centre of the circle is at origin H. Pure Shear 	2	CO1
Q 46	<p>Type of Discontinuity / Definition</p> <ul style="list-style-type: none"> A. Joint B. Discontinuity with no relative movement C. Foliation D. Mineral bands or parallel orientation of platy minerals E. Bedding planes F. Surface parallel to deposition G. Fault 	2	CO2

	H. Discontinuity with relative movement		
Q 47	Failure criteria / Principle A. Mohr-Coulomb B. Limiting friction angle C. Hoek-Brown D. Empirical criteria on strength E. Drucker-Prager F. Yield function on plastic soils G. Griffith H. Surface energy needed to the onset of crack	2	CO1
Q 48	Stress Polygon Zone / Stress Condition A. Sv point on 45 deg line B. Hydrostatic C. Lower left area from Sv point D. Normal Faulting E. Upper left part of Sv point F. Strike Slip G. Upper right part of Sv point H. Reverse Faulting	2	CO3
SECTION B			
Q 1	Design the conditions and steps to estimate the induced stresses by examine 2D.	10	CO4
Q 2	Illustrate the process to estimate the limits of in-situ stress from friction of faults.	10	CO2
Q 3	Examine the stress changes and deformation in Depleting Reservoirs.	10	CO3
Q 4	Propose the assumptions to estimate the stress concentration across a wellbore.	10	CO2