JHARKHAND Rai University
RANCHI

End Semester/Reappear (Semester V) Examination December, 2024

Programme:B.Tech (MiE)
Course:Rock Mechanics **Full Marks: 70**
Course Code: 8PCCMiE304 **Time: 3 Hrs.**
Enrolment no. _____

Q.No.	Questions	CO	Bloom Taxonomy Category	Marks
	Section I			
1	**Short Answer type questions.**			**4 x 5 = 20**
a	Compare the isotropic and anisotropic properties of rock.	CO1	Remember	
	or			
	What do you understand by Strength of rocks? Compare between compressive and tensile strength of rock.	CO1	Understand	
b	When the hanging wall side appears to have moved relatively downwards in comparison with the adjoining footwall side, what type of fault will induce? Use a suitable diagram.	CO2	Analyze	
	or			
	Enlist the different types of constant used in stress analysis.	CO2	Remember	
c	Define the term Failure with respect to Rocks. Briefly explain any one failure criteria of rock.	CO3	Understand	
	or			
	State rupture, brittle fracture, and shear fracture.	CO3	Remember	
d	Explain permeability of rocks. Write down the experimental determination of permeability of rocks methods.	CO4	Understand	
	or			
	Memorise the deformability and creep of rock.	CO4	Remember	
	Section II			
Long Answer type questions. Answer any three.				**3 x 10 = 30**
2	What do you understand by term “Cohesion” in rock mechanics? A series of triaxial compression tests conducted on sandstone samples reveals the following relationship between major and minor principle stresses $\sigma1=50+3\sigma3$ Calculate the Cohesion in MPa and angle of internal friction in degree of sandstone?	CO2	Evaluate	
	or			
	Critique the primary and secondary wave speed through the rock mass.	CO2	Remember	
3	Discuss the Hoek- Brown Criteria also explain the hoek – brown criteria in principle plabe : Two dimensions.	CO3	Understand	
	or			
	Give the formulated expression for stresses around circular opening along with the graph distribution of stresses around mine opening.	CO3	Analyze	
4	If a tunnel passes through a syncline fold, the maximum pressure expected at which points of the tunnel? Explain with suitable diagram.	CO2	Analyze	
	or			
	Derive the expression for the total volumetric strain under uniform loading condition.	CO2	Apply	
	Section III			
	Application based questions.			**1 x 20 = 20**
5	A Bar of 30 mm is subjected to a pull of 60 KN the measured extension on gauge length of 200mm is 0.1mm and change in diameter is 0.004mm , calculate the youngs modulus, poisson’s ratio and bulk modulus .	CO1	Apply	
	or			
	Explain the Poisson ratio. Calculate the shear modulus if a weak sandstone has a modulus of elasticity of 1000 MPa and Poisson’s ratio is 0.25.	CO1	Evaluate	

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Course Outcome:
On the completion of the Course, the students will be able to:
CO1: Understand the basic knowledge of rock mechanics for understanding, formulating and solving strata control problem in any underground mine.
CO2: Explain the various physico mechanical properties of rock in respect to mining.
CO3: Acquire knowledge and hands-on competence in applying the concepts of rock failure theories.
CO4: Evaluate the dynamic properties of rock, creep theory and rock mass by various Laboratory test & in situ test.