UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, MAY 2019

Course Name: Structural Engineering & vibration in pipelines   **Course Code: CIVL 7011**
Semester: II   **Program: M. Tech [PLE]**
Time: 03 hrs.
Instructions: All questions are compulsory   **Max. Marks: 100**

SECTION A			
S. No.		**Marks**	**CO**
Q.1	Briefly explain different constituent of concrete	**05**	**CO3**
Q.2	How moment area method differs from energy method for analyzing beams.	**05**	**CO2**
Q.3	Explain the difference between propped cantilever & fixed beams	**05**	**CO1**
Q.4	Explain the advantage of welded connection over bolted connection.	**05**	**CO4**
SECTION B			
Q.5	Analyze the propped cantilever beam shown in figure below & determine the deflection under load P	**10M**	**CO1**
Q.6	Calculate the area of steel required for short R.C column 375mm X 375mm in cross section to carry axial load of 1300kN. Assume the grade of Concrete M25 & fe415. Also, draw the ductile reinforcement connections.	**10M**	**CO3**
Q.7	A Timber beam is 200 X 250mm. It carries a uniformly distributed load of 10kN/m over the left half span of beam. The beam supported over a span of 6m. The Modulus of Elasticity is 20Gpa. Determine the deflection at mid-span of beam. Use Unit load method	**10M**	**CO2**
Q.8	Determine the length of weld required to transmit load of 100kN acting on plate 100 X 8mm connected to gusset plate by fillet welding **OR** A tie member of angle ISA 80 X 50 X 8mm with a yield stress of 250Mpa is weld to a gusset plate. Design the weld to transfer the load equal to its full strength.	**10M**	**CO4**

	SECTION-C		
Q.9	A 2 km Steel Oil pipeline proposed to construct with 914mm outer diameter, 8.74mm wall thickness & made up of Fe500 steel. The maximum allowable operating pressure is 5.7Mpa. After five years, the defect found in leakage. Being a pipeline engineer, what remedial measures you will propose to plug up he cracking caused by stress corrosion & thermal fatigue.	**20M**	**CO2**
Q.10	Design the column section to withstand the load of 150 kN. Use M20 Grade of Concrete & Fe415 steel. **OR** Design the column section to withstand the load of 2000 kN. Use M25 Grade of Concrete & Fe500 steel	**20M**	**CO4**

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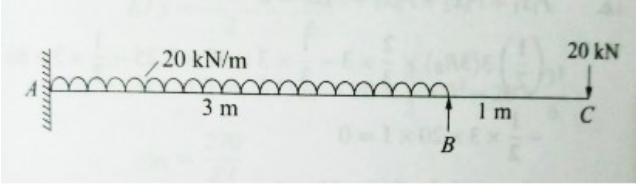## End Semester Examination, MAY 2019

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SECTION A

S. No.		Marks	CO
Q.1	What are the advantages of fixed beams? How it can be made statically determinate	**05**	**CO1**
Q.2	What are the stresses induced due to total strain energy in a beam or frame	**05**	**CO2**
Q.3	How the presence of aggregates influence the strength of Concrete mix	**05**	**CO3**
Q.4	What are the advantages of steel structures over conventional RCC structures	**05**	**CO4**

SECTION B

Q.5	Analyze the propped cantilever beam shown in figure below & determine the deflection under load P 	**10M**	**CO1**
Q.6	Calculate the area of steel required for short R.C column 450mm X 450mm in cross section to carry axial load of 1300kN. Assume the grade of Concrete M30 & fe500. Also, draw the ductile reinforcement connections.	**10M**	**CO3**
Q.7	A Timber beam is 200 X 250mm. It carries a uniformly distributed load of 10kN/m over the left half span of beam. The beam supported over a span of 6m. The Modulus of Elasticity is 20Gpa. Determine the deflection at mid-span of beam. Use moment area method.	**10M**	**CO2**

Q.8	Determine the length of weld required to transmit load of 150kN acting on plate 150 X 10 X 8mm connected to gusset plate by bolting **OR** A tie bar 100 X 10mm is connect to another by fillet weld around the end of bar & inside a machined slot. Allowable tensile stress of $150N/mm^2$ in the tie bar & shearing stress of $110N/mm^2$ in fillet weld. Determine the size of weld	**10M**	**CO4**

SECTION-C			
Q.9	A Steel pipeline proposed to construct under the sea. The pipeline was subjected to side forces of 20kN possibly lifting off its dead weight supports due to extremely transient loads. What precautions you will propose such that change in Bending moments, axial forces, displacements & deformations along the pipeline is minimum. Give your suggestion with critical explanation.	**20M**	**CO2**
Q.10	A tension member of truss consist of 80 X 80 X 8mm. If two angles are welded on either side of a gusset plate at a joint. Axial tension in the member is 220kN.Permissible stress in weld is $110N/mm^2$. Use 6m m fillet weld **OR** A 250mm IS Flat 10mm thick is used as a tie member & is connected to 12mm PDSR. Calculate the connected to 12mm thick plate by 16φ diameter. Calculate maximum force that member can carry if 1. The connection is by bolting. 2. Zig- Zag bolting is used. Take $F_y = 200Mpa$	**20M**	**CO4**