UNIVERSITY OF TORONTO
Faculty of Applied Science and Engineering

FINAL EXAMINATION, DECEMBER 8, 2008
First Year - Programs 1,2,3,4,6,7, 8 and 9

CIV 100F - MECHANICS
Examiner: Staff in Civil Engineering

FAMILY NAME: _____ **GIVEN NAMES:** _____

(Please **print clearly**)

STUDENT NUMBER: _____

CIRCLE THE NAME OF YOUR LECTURER AND YOUR GROUP LETTER

A	Kuhn, Eva	D	El-Diraby, Tamer	G	Riahi Dehkordi, Azadeh
B	Zhang, Jinyue	E	Zhang, Jinyue	H	Kamaleddine, Fouad
C	Briggs, Scott	F	Nahrvar, Shayan	J	Seica, Michael

CIRCLE MODEL NUMBER OF CALCULATOR

CASIO 260 SHARP 520 TI 30

NOTES:

1. Be sure you have all 7 sheets of this examination paper. Page 7 is blank. If you need more space for a question please use the back of the preceding question. In all cases indicate clearly where your calculations are continued.
2. Answer all 5 (five) equal-valued questions.
3. No other paper will be accepted for marking nor allowed on the desk.
4. The permissible calculators are listed above.

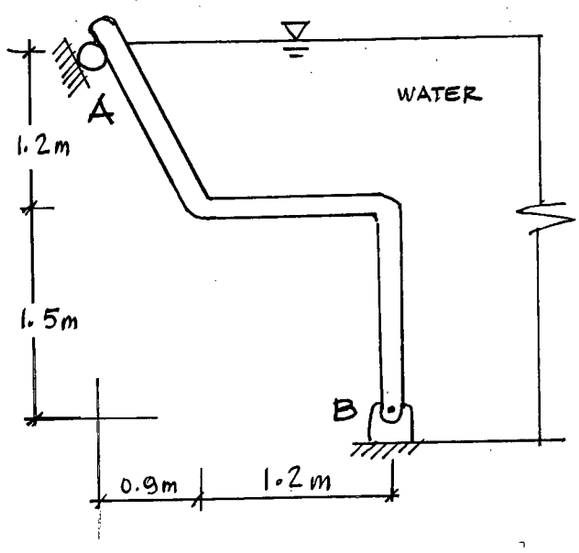
DO NOT WRITE IN THIS SPACE.

1.	/12
2.	/12
3.	/12
4.	/12
5.	/12
TOTAL	/60

 Name _____

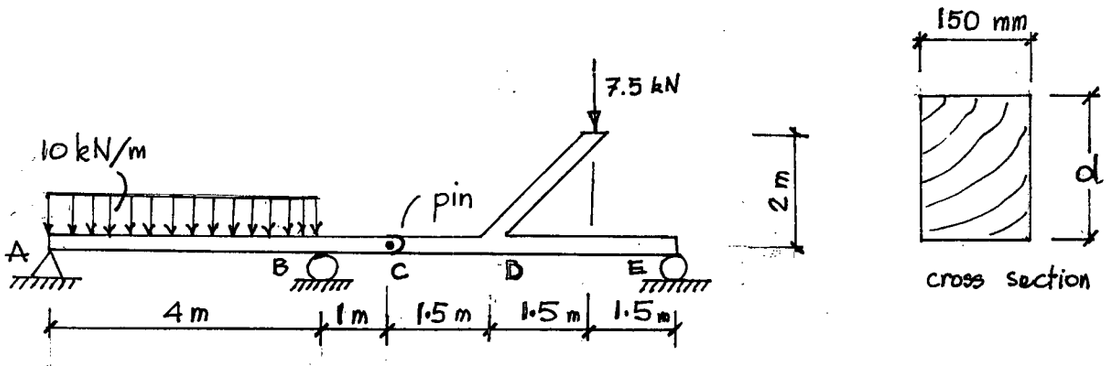
1. **AB** represents the cross section of a 3 m wide dam that has fresh water of depth 2.7 m on one side. Neglecting the weight of the dam calculate the reactions at **A** and **B**.

Draw the free body diagram in the space bellow:



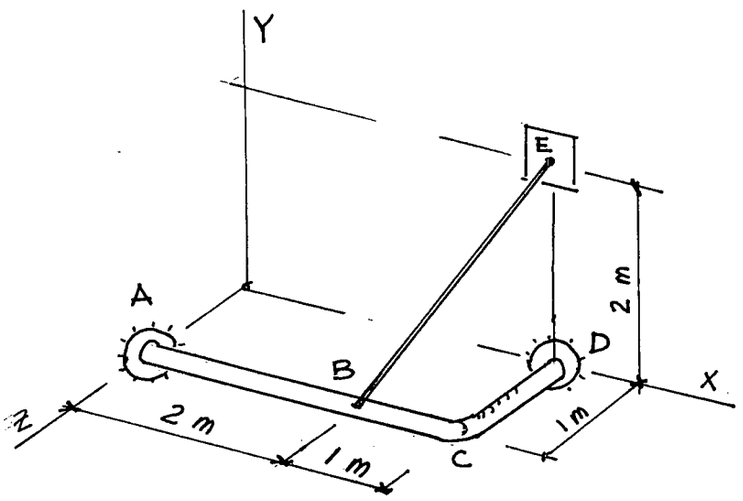
 Name _____

2. In the space provided plot the shear force and bending moment diagrams for the wood beam **ABCDE** and show all key values. The failure stress for the material in compression and tension is 8 MPa and the load (safety) factor is 1.9. Determine the required depth **d** for the rectangular cross section of the beam shown. Depths are available in increments of 10 mm.



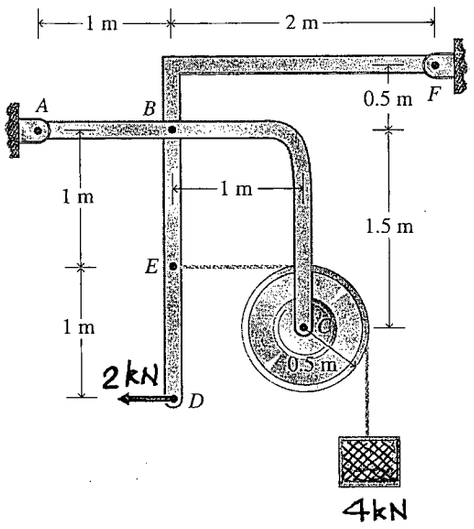
 Name _____

3. An L-shaped pipe bracket is supported by a ball-and socket at **A**, by a ball-and socket at **D** which has been modified to permit movement in the **z** direction, and by cable **BE**. The mass of the pipe segment **AC** is 2 kg/m whereas the mass of segment **CD** can be neglected. Determine the tension in cable **BE** and the components of the reaction at **D**.



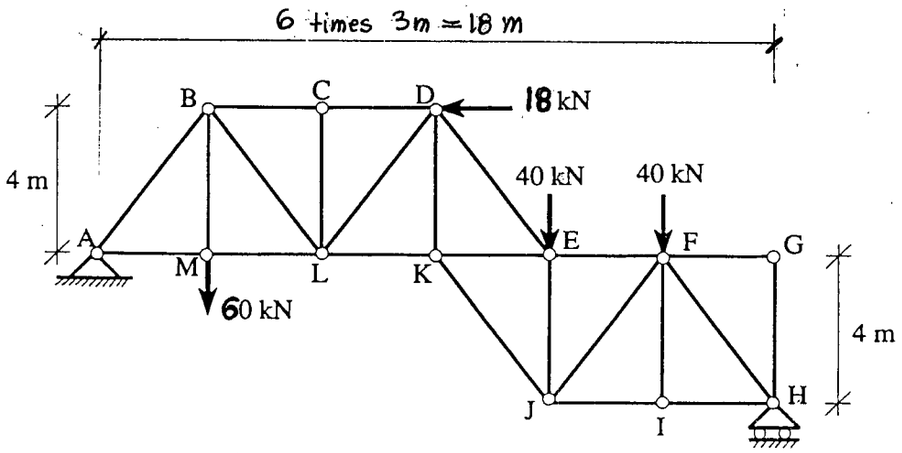
 Name _____

4. The pulley on the pin-connected frame has a radius of 0.5 m.
a) Determine the components of the forces at the three pins on member **ABC**. Show your answers on a separate the sketch of **ABC**.
b) Determine the reaction components at **F**.



 Name _____

5. For the given truss shown supported by a pin at **A** and a roller at **H**,
   a) determine the forces in members **EJ**, **LK** and **IF**,
   b) determine the cross section of member **LK** if the failure stress for the material is 100 MPa and the load (safety) factor is 1.8. Assume a square cross section,
   c) calculate the elongation of member **BM**. The modulus of elasticity **E**, of the material is 200 000 MPa.



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