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KATHMANDU UNIVERSITY
End Semester Examination
June/July, 2018

Level : B.E.
Year : IV
Course : MEPP 430
Semester: II

Exam Roll No. :
Time: 30 mins.
F. M. : 10

Registration No.:
Date JUL 01 2018

SECTION "A"
[10 Q × 0.5 = 5 marks]

Choose most appropriate answer of the following:

1. Boundary conditions associated with primary variable are called
   a. primary boundary conditions
   b. secondary boundary conditions
   c. natural boundary conditions
   d. essential boundary conditions

2. In shape function N_i and N_j for a linear polynomial are for one dimensional element are
   a. structural property
   b. dependent on both field variable & structure
   c. dependent upon field variable
   d. independent of both structure & field variable

3. Interpolation function
   a. gives the value of field variable at nodal
   b. gives the value of field variable at neighbor node
   c. gives the value of field variable at neighbor node
   d. calculate the value of field variable inside an element

4. Domain approximation error in finite element solution is due to
   a. error in arithmetic error
   b. error in approximation solution
   c. error in order of geometry
   d. error in choosing approximation

5. The elements in which order of polynomial and the order of geometrical approximation are same and are known as
   a. isoparametric elements
   b. hermite elements
   c. triangular elements
   d. serendipity elements

6. The number of nodes on an element that has polynomial basis functions of order n is
   a. n
   b. 2n
   c. n-1
   d. n+1

7. Petrov Gelarkin Method is
   a. direct method
   b. variation method
   c. weighted integral method
   d. weighted residual method

8. The governing equation for beam deflection v(x) in terms of modulus of elasticity E, moment of inertia I, external loading W(x) as function of axial coordinate x is
   a. $EI\frac{d^4v(x)}{dx^4} = w(x)$
   b. $E\frac{d^4v(x)}{I\,dx^4} = w(x)$
   c. $EI\frac{d^4v(x)}{dv(x)^4} = w(x)$
   d. $\frac{E}{I}\frac{d^4v(x)}{dx^4} = w(x)$

9. Which of the following is the most difficult aspect of the analytic method?
   a. Too many variables
   b. The high order of equations
   c. The low accuracy of the result
   d. Complex geometries and difficulties in dealing with boundary conditions

10. Consider a one-dimensional finite element problem that you have discretized into number of linear elements (Nel). If you have applied only Direchlet boundary conditions on this problem, than you need to solve for the following number of unknowns.
   a. Zero b. Nel c. Nel -1 d. Nel +1a.

SECTION "B"
[5 Q × 1 = 5 marks]

Fill in the blanks with appropriate word or sign(s).

11. For a system of springs at any node the sum of reaction forces must be equal to .....

12. The element in which order of polynomial and the order of geometrical approximation are same and are known as .....

13. FEM divides the structure into elements and nodes is called .....

14. The truss member is ..... element when viewed in the local coordinate system.

15. Degrees of freedom are defined as the values of a primary variable at .....points.

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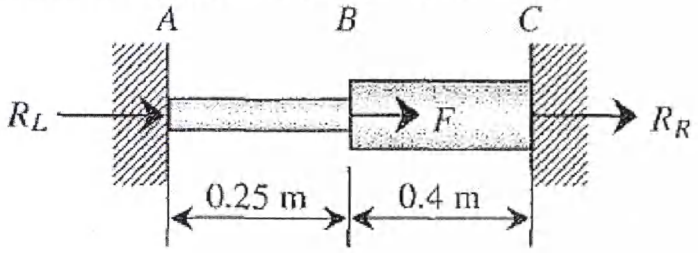
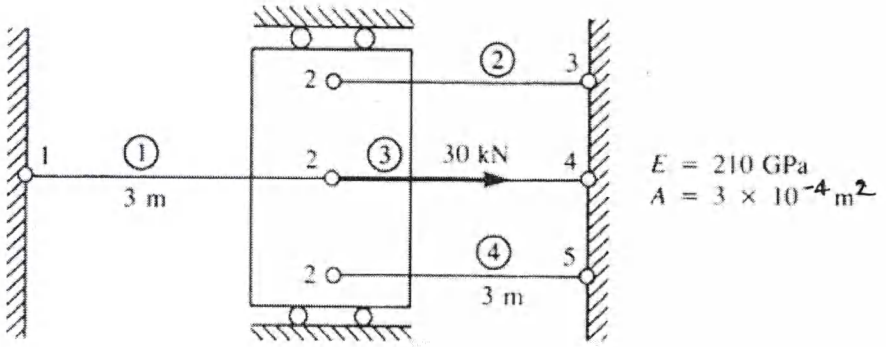
SECTION "C"
[6Q × 5 = 30 marks]

Attempt *ALL* questions. Assume suitably if any data missing. Donot change the node and element number if specified.

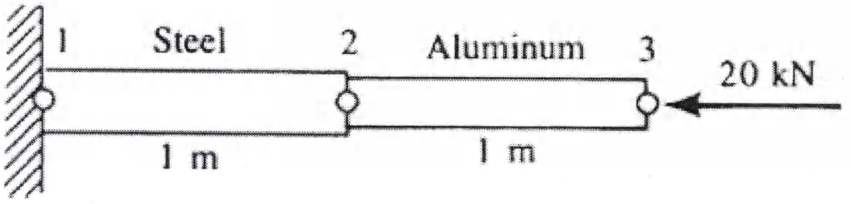
1. Determine the axial force P in each portion, AB and BC, of the uniaxial bar shown in figure. What are the support reactions? Young's modulus is E= 100GPA; area of cross sections of the two portions AB and BC are 1×10^{-4} m^2 and 2×10^{-4} m^2 respectively, and F=10000 N. The force is applied at the cross section at B.



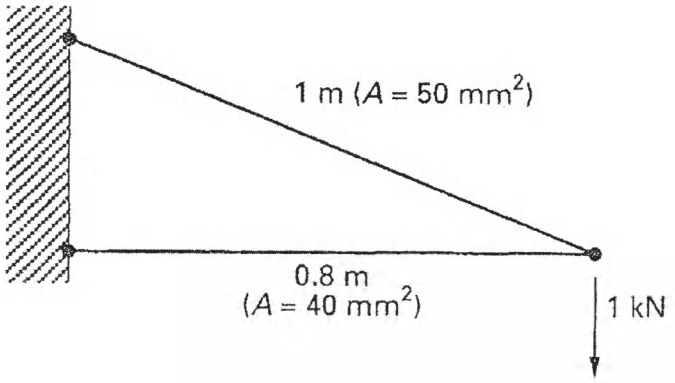
2. For the spring assemblages shown in figure, determine the nodal displacements, the forces and the reactionsby using **variation method**.



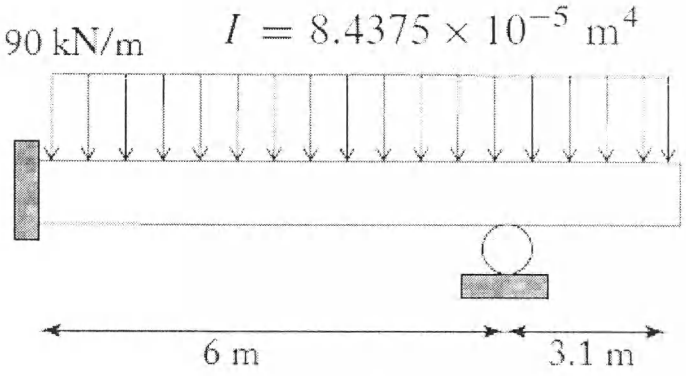
3. A compound axial member is subjected to the loads shown in figure. Given,E_{st} =200GPa, E_{al} =70GPa 100 MN/m^2, L_1=1 m, L_2= 1 m, A_{st}=4 × 10^{-4}m^2, and A_{al}= 2 × 10^{-4} m^2. Determine (i) reaction force at points 1 and (ii) displacements at nodes 2 and 3usingtwo bar elements model.



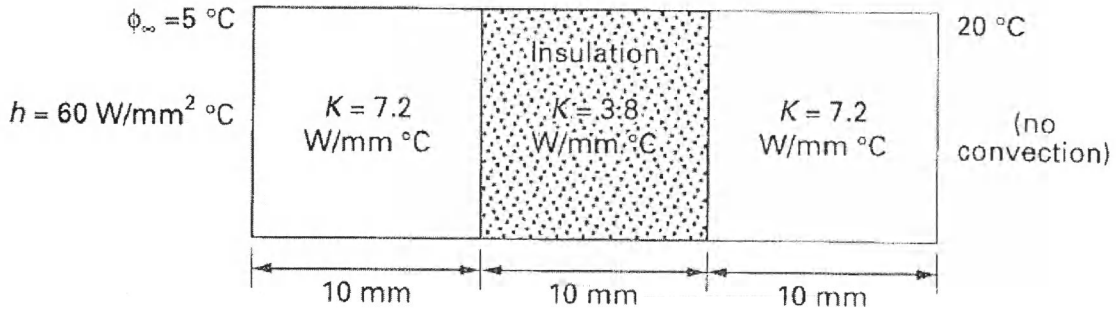
4. Find the axial force in the two member of the simple truss shown in figure. Each member has Young's modulus of 200×10^3MPa.



5. A steel cantilever beam is subjected to a uniformly distributedload as shown in Figure. The beam has a width of 15 cm and a height of 30 cm. By taking the modulus of elasticity of material as 190 GPa andmoment of inertia as 8.4375×10^{-5} m^4, determine:
   a) Deflection under load
   b) Reactions at supports



6. A composite wall is shown in Figure. Find the temperature distribution in the wall using a **Galerkin Method** for each of the two materials and calculate the heat flow through the wall thickness.



KATHMANDU UNIVERSITY
School of Science/ School of Engineering
End-Semester Examinations
August, 2018

Examination Time: 11:00 A.M. to 2.00 P.M.

Date	Day	I - II	II – II	III-I	III – II	IV – I
August 8	Wednesday	PHYS 102 ARCH 161			EEEG 309 MEEG 309 MEEG 317 COMP 302 GEOM 315 CIEG 308 ENVS 335 PHAR 311 BIOT 306 PHYS 311 CHEG 305	MGTS 403
August 9	Thursday		MATH 208 ENVS 224 PHAR 214 BIOT 210 HBIO 213 PHYS 213	MGTS 301		
August 10	Friday	ENVE 101 CHEM 102			GEOM 307 ENVS 306	
August 12	Sunday	MATH 106			ETEG 301 EPEG 301 MEEG 318 COMP 314 CIEG 309 MGTS 302 BIOT 307 PHYS 312 CHEG 310 CHEM	COMP 401
August 13	Monday		EEEG 214 MEEG 207 COMP 232 GEOM 206 CIEG 208 ENVS 204 BIOL 206 BIOT 208 HBIO 215 PHYS 212 CHEG 211	COMP 307	ENVS 318 ENVS 345	
August 14	Tuesday	ENGG 112 ENVS 101 PHAR 111 BIOT 101 STAT 101				

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KATHMANDU UNIVERSITY
School of Science/ School of Engineering
End-Semester Examinations
August, 2018

Date	Day	I - II	II – II	III-I	III – II	IV – I
August 15	Wednesday	ARCH 112			EPEG 315 ETEG 303 MEEG 302 COMP 306 MATH 322 GEOM 319 CIEG 312 ENVS 303 ENVE 311 PHAR 313 BIOT 308 PHYS 313 CHEG 312	COMP 472
August 16	Thursday		EEEG 215 MEEG 202 COMP 231 CEEG 201 CIEG 206 CHEM 212 HBIO 212 PHYS 211 CHEG 213	COMP 315		
August 17	Friday	MATH 104 MATH 102 MATH 103				
August 19	Sunday	ENGT 102 NEPT 101			MEEG 308 COMP 304 COMP 409 CIEG 314 GEOM 306 ENVS 337 MEEG 306 PHAR 315 BIOT 309 PHYS 314 CHEG 313	COMP 421
August 20	Monday		MCSC 202 PHYS 207 CHEM 203 BIOT 207	COMP 316	EPEG 318 ETEG 304	

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KATHMANDU UNIVERSITY
School of Science/ School of Engineering
End-Semester Examinations
August, 2018

Date	Day	I - II	II – II	III-I	III – II	IV – I
August 21	Tuesday				CHEG 314 GEOM 313	
August 22	Wednesday		BIOL 207		MGTS 303	COMP 478
August 23	Thursday	COMP 116 COMP 102	COMP 204 CIEG 207 PHAR 212	COMP 317	COEG 301 ETEG 305 ENVS 331 ENVE 399 BIOT 305	
August 24	Friday		COMP 201 MEEG 206 BIOT 209 INAN 211 STAT 221 CHEG 210		COMP 341 GEOM 310 CIEG 313 CIEG 318 CHEG 315 CHEG 323 PHAR 316	
August 27	Monday		MATH 207 GEOM 204 CIEG 209 ENVE 205 BIOT 206 MATH 217 CHEG 212	COMP 342	COMP 342 COMP 323 CIEG 310 ENVS 336 INAN 301	COMP 484

Note: *Examinations will be conducted as per this schedule and under no circumstance the dates and times will be changed unless the University publishes prior notice.*

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KATHMANDU UNIVERSITY

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Dhulikhel, P.O. Box 6250, Kathamandu, Nepal
Tel: (011) 661399,Fax: 977-11-663199, e-mail: controllerofexaminations@ku.edu.np

Date: July 13, 2018

NOTICE

Fourth year Second semester End-Semester Examination of **B.Tech. in Environmental Engineering** will be held as per the following schedule.

Examination Center : Kathmandu University, Dhulikhel.
Examination Time : 11:00 A.M. to 2:00 P.M.

Date	Day	Course
July 19, 2018	Thursday	GEOM 403

Professor PANNA THAPA, PhD
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Date: June 25, 2018

NOTICE

Fourth year Second semester End-Semester Examination of Bachelor in Electrical & Electronics Engineering will be held from July 13, 2018 as per the following schedule.

Examination Center : Kathmandu University, Dhulikhel.
Examination Time : 11:00 A.M. to 2:00 P.M.

Date	Day	Courses
July 13, 2018	Friday	ETEG 432, EPEG 415
July 16, 2018	Monday	ETEG 433, EPEG 423, EPEG 409
July 19, 2018	Thursday	MGTS 402
July 22, 2018	Sunday	ETEG 417, COEG 402

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Date: July 3, 2018

NOTICE

Fourth year Second semester End-Semester Examination of **B.Sc. in Applied Physics** and **B.Tech in Biotechnology** will be held from July 16, 2018 as per the following schedule.

Examination Center : Kathmandu University, Dhulikhel.
Examination Time : 11:00 A.M. to 2:00 P.M.

Date	Day	Courses
July 16, 2018	Monday	PHYS 412
July 19, 2018	Thursday	PHYS 421
July 22, 2018	Sunday	PHYS 431, BIOT 417
July 25, 2018	Wednesday	MGTS 402
July 29, 2018	Sunday	BIOT 414

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Date: July 4, 2018

NOTICE

Fourth year Second semester End-Semester Examination of **Bachelor of Pharmacy** will be held from July 19, 2018 as per the following schedule.

Examination Center : Kathmandu University, Dhulikhel.
Examination Time : 11:00 A.M. to 2:00 P.M.

Date	Day	Courses
July 19, 2018	Thursday	PHAR 414
July 22, 2018	Sunday	PHAR 411
July 25, 2018	Wednesday	PHAR 412
July 29, 2018	Sunday	PHAR 417, PHAR 419
July 31, 2018	Tuesday	PHAR 416
August 03, 2018	Friday	PHAR 422

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Date: July 5, 2018

NOTICE

Fourth year Second semester End-Semester Examination of **B.E. in Computer Engineering** and **B.Sc. in Computer Science** will be held from July 22, 2018 as per the following schedule.

Examination Center : Kathmandu University, Dhulikhel.
Examination Time : 11:00 A.M. to 2:00 P.M.

Date	Day	Courses
July 22, 2018	Sunday	MGTS 402
July 29, 2018	Sunday	COMP 486, COMP 473, COMP 476

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Date: July 5, 2018

NOTICE

Fourth year Second semester End-Semester Examination of **B.E. in Computer Engineering** and **B.Sc. in Computer Science** will be held from July 22, 2018 as per the following schedule.

Examination Center : Kathmandu University, Dhulikhel.
Examination Time : 11:00 A.M. to 2:00 P.M.

Date	Day	Courses
July 22, 2018	Sunday	MGTS 402
July 29, 2018	Sunday	COMP 486, COMP 473, COMP 476

Professor PANNA THAPA, PhD
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Date: June 11, 2018

NOTICE

Fourth year Second semester End-Semester Examination of Bachelor in Mechanical Engineering will be held from June 21, 2018 as per the following schedule.

Examination Center : Kathmandu University, Dhulikhel.
Examination Time : 11:00 A.M. to 2:00 P.M.

Date	Day	Course No.	Course Title
June 21, 2018	Thursday	MEPP 408	Maintenance Engineering
June 25, 2018	Monday	MGTS 402	Engineering Entrepreneurship
June 28, 2018	Thursday	MEPP 428	Renewable Energy
July 01, 2018	Sunday	MEPP 430 MEPP 438	Finite Element Techniques Machine Vision

Prof. Panna Thapa, Ph. D.
Controller of Examinations