Code No. 3211

FACULTY OF ENGINEERING

B.E. 4/4 (Civil) I – Semester (Main) Examination, December 2016

Subject: Concrete Technology

Time: 3 Hours **Max.Marks: 75**

Note: Answer all questions from Part A. Answer any five questions from Part B.

PART – A (25 Marks)

1		What is need for the vibration of concrete?	3
2		Explain why the workability is very less in high strength (high grade) concrete.	2
3		What is maturity concept?	2
4		Draw the stress-strain curve for mild and Tor steel.	3
5		Give the IS specifications for the design of mixes.	2
6		Give any three advantages of fly ash concrete.	3
7		What is the role of chemical admixtures in concrete?	3
8		What is light weight concrete?	2
9		Explain any two advantages of fibre reinforced concrete.	2
10		What is self compacting concrete?	3

PART – B (5x10 = 50 Marks)

11	a)	Explain what are the factors that are effecting the workability of concrete.	5
	b)	Discuss long term and short term properties of concrete.	5
12	a)	Explain the different curing methods in concrete.	5
	b)	Discuss the testing methods for the mechanical properties of concrete.	5
13	a)	Differentiate between British and ACI methods of mix design.	4
	b)	Design a mix for M_{40} grade concrete using IS Code method.	6

Standard deviation : 5
Take: Sp. Gr. Of cement : 3.15
Sp. Gr. 'fa' : 2.60
Sp. Gr. 'Ca' : 2.75
Water absorption 'fa" + "Ca' : 0.55% and 0.80%
Percentage of sand : 35%
Assume any data if required.

14	a)	Discuss under what circumstances mineral and chemical admixtures are used in concrete.	5
	b)	Explain the durability aspects of fly ash concrete.	5
15	a)	Discuss the advantages and disadvantages of ready mix concrete.	5
	b)	Explain durability aspects of ready mix concrete.	5
16	a)	Explain the utility and applications of recycled aggregate concrete.	5
	b)	Discuss the practical applications of high performance concrete.	5
17	a)	Explain the importance of high strength and high density concrete.	5
	b)	How do you control the quality in fibre reinforced and self compacting concrete.	5

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Code No. 3229

FACULTY OF ENGINEERING

B.E. 4/4 (Inst.) I - Semester (Main) Examination, December 2016

Subject : Analytical Instrumentation

Time : 3 Hours **Max. Marks: 75**

Note: Answer all questions from Part-A and answer any five questions from Part-B.

PART – A (25 Marks)

1	Define absorption.	(2)
2	Name the various types of gas analyzers.	(3)
3	Discuss about dropping mercury electrode.	(2)
4	What is Globar?	(3)
5	Draw Michelson's interferometer.	(2)
6	Explain how herbidity of water is measured.	(2)
7	What are the limitations of Beer Lamberts law?	(3)
8	Explain the principle of NMR.	(2)
9	Define resolution of mass spectrometer.	(3)
10	Explain basic components of AI.	(3)

PART – B (50 Marks)

11	(a) Describe the sources of errors and calibration of spectrophotometer.	(5)
	(b) Explain Bio-sensors with neat diagram.	(5)
12	(a) Explain basic mass spectrometer with neat diagram. Also explain the types briefly.	(7)
	(b) What are the application of Mass spectroscopy?	(3)
13	Explain principle of NMR spectroscopy. What are different types of NMR?.	(10)
14	(a) With the help of diagram, explain Electro-chemical cell.	(5)
	(b) Explain pH meters with relevant diagram.	(5)
15	(a) Write about air pollution monitoring instruments.	(5)
	(b) Explain the working of gratings.	(5)
16	(a) Write short notes on Infra-red gas analyzer.	(5)
	(b) Explain any two amplifier used in spectrophotometers.	(5)
17	Write short notes on the following: (a) Sample handling techniques (b) Paramagnetic Oxygen analyzer	(10)

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Code No. 3246

FACULTY OF ENGINEERING

B.E. 4/4 (Mech./Prod.) I – Semester (Main) Examination, December 2016

Subject: Finite Element Analysis

Time: 3 Hours **Max.Marks: 75**

Note: Answer all questions from Part A. Answer any five questions from Part B.

PART – A (25 Marks)

1 Write the shape functions of quadratic element.
2 What are elimination and penalty approach for imposing boundary conditions?
3 Write the transformation matrix of a line element rotated by an angle '¯' in ACW.
4 Determine the equivalent load vector of beam element subjected to a trapezoidal transverse element.
5 For plane stress, determine the state of a stress at a point if E=200 GPa, ¬ =0.3 and strain matrix is $\{0.01, 0.02, 0.03\}^T$.
6 For anisymmetric element, write the matrial matrix.
7 Write the shape functions of4-noses quadrilateral element.
8 What is numerical integration and Gaussian quadrature?
9 What are:
  i) Eigen values and eigen vectors and
  ii) The lumped and consistant masses
10 Explain convergence criterian.

PART – B (5x10 = 50 Marks)

11 a) Using potential energy approach evaluate the stiffness matrix.
  b) Describe Galerkin's principle.

12 a) Sketch the shape functions of
    i) Axial element and
    ii) Beam element
  b) Derive the stiffness matrix of a frame element.

13 a) Derive the global stiffness matrix and evaluate the stress in the element of 2D truss element.
  b) Derive the stiffness matrix of a beam element.

14 For plane stress problem of triangular plate shown in Fig. 1. Determine the
  i) Strain displacement
  ii) Matrix and
  iii) Equivalent load vector. Assume thickness 0.5 mm.

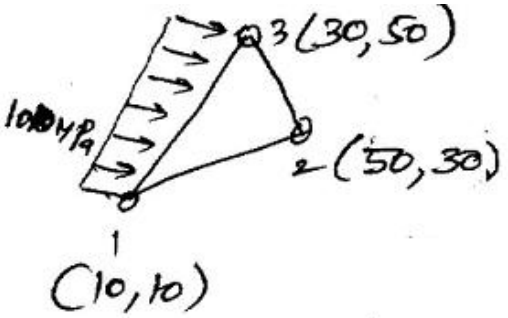
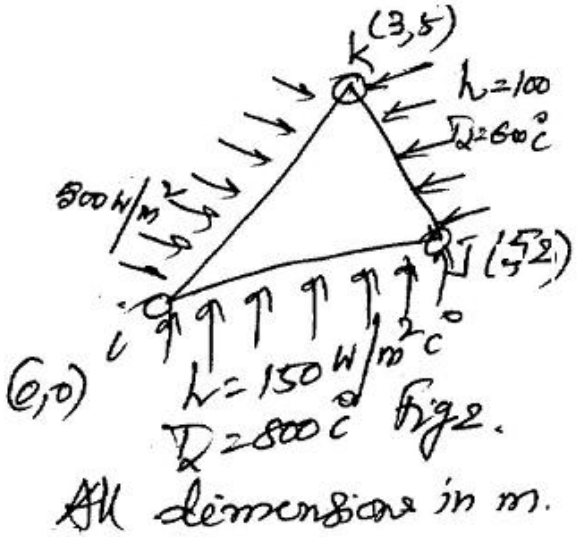


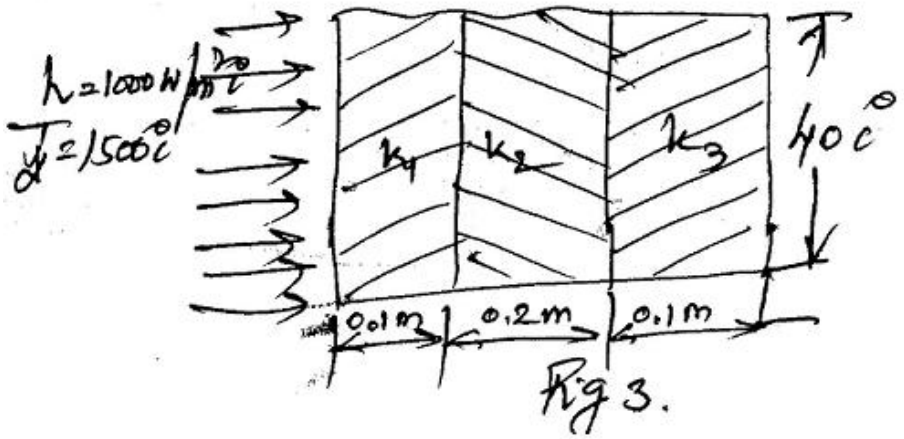
Fig. All dimensions in mm.

…2.

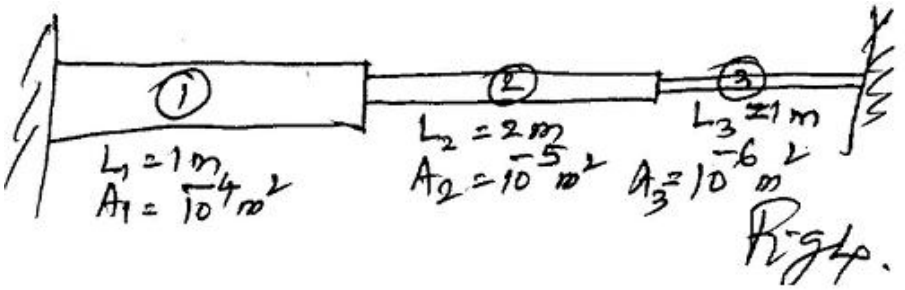
15 Evaluate the temperature distribution in 2D thermal solid subjected to a heat flux as shown in Fig. 2. k = 50 W/m^{0}C.



16 Determine the temperature distribution in the composite wall as shown in Fig. 3, if $k_1=2k_2=3k_3=300$ W/m^{o}C.



17 Determine the natural frequencies and mode shapes of stepped bar as shown in Fig. 4. Take E = 200 GPa, density = 3000 W/m^3, by using consistant mass.



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