K.E.Society's
Rajarambapu Institute of Technology, Rajaramnagar.
(An Autonomous Institute)
End Semester Examination- December 2013
First Year M. Tech. Civil Construction Management SEMESTER – I
Construction Project Management (CEC501)

Day and Date: Monday, 2/12/2013

Time: 2.30 pm to 5.30 pm

Max Marks- 100

Instructions:

1) All questions are compulsory.
2) Assume suitable data where ever necessary.

Q.1 Attempt any two.

a) Discuss the scope of construction market at international as well as domestic level. (8)

b) Describe main causes of project failure with suitable examples. (8)

c) Project management is an art and science of converting vision in to reality. Comment. (8)

Q. 2 Attempt any two.

a) Construct a bar chart based on your knowledge of construction for at least ten activities. (8)

b) Compare bar chart scheduling with network scheduling. (8)

c) For the following project draw the network diagram, calculate project duration and find all types of floats. (8)

Activity	1-2	2-3	2-4	3-6	3-7	4-5	4-6	5-7	6-7
Duration in days	3	2	5	2	1	2	0	4	3

Q.3

a) Activity durations and precedence relationships between the activities of a project are given below. Draw the PDM network and indicate activity timings. Also calculate TF and FF (12)

Activity	A	B	C	D	E	F	G	H
Duration	6	3	4	8	5	5	3	5

Precedence relationships

$S_A S_B = 2$ $S_A S_C = 4$ $F_A S_E = 2$

$S_B S_E = 0$ $F_B S_D = 2$ $F_C S_F = 2$

$F_D S_G = 0$ $F_E F_D = 0$ $F_E S_G = 1$

$F_F S_G = 0$ $F_G S_H = 2$

b) Compare Precedence network with CPM network. (6)

OR

b) Discuss how the understanding of float on construction activities can improve project management practices. (6)

Q4.
a) Following table indicates normal duration, normal cost, crash duration and crash cost for a project. Compress the network in steps. Overhead cost of the project is Rs. 1100.00 per week. Determine the optimum project duration and cost. (12)

Activity	Duration in weeks		Cost in Rs.	
	Normal	Crash	Normal	Crash
1-2	7	5	4000	6000
1-3	11	11	5000	5000
1-4	19	16	7500	9000
2-3	6	5	2500	3250
3-4	8	6	6000	8500
3-5	14	12	4500	6000
4-5	13	9	10000	15000

b) Describe how a project's earned value can be used to better manage projects. (6)

OR

b) Discuss how cost slope is useful for crashing the network. (6)

Q. 5 Attempt any two.
a) Describe the procedure of creating a new calendar for a project in MSP 2007 and converting a default holiday in to a working day. (8)
b) Describe the procedure of adding activities, its duration, relationship and resources in MSP 2007 (8)
c) Discuss about lean construction practices and principles. (8)

Q. 6. Attempt any two.
a) Discuss the importance of lean construction theory in construction management. (8)
b) How do you provide safety on construction sites? (8)
c) Which type of accidents occurs on site and how it can be avoided? (8)

Rajarambapu Institute of Technology, Rajaramnagar.
(An Autonomous Institute)
First Year of M. Tech. (F.Y. M. Tech.)
End Semester Examination (ESE) Sem-I Year 2013-14

ENR..No

Q. P. Code

EM267

Program : Civil-Structure

Course & Course Code : Analysis of Structures
CST   501

Day/Date : Monday, 2/12/13   Time : 2.30 pm – 5.30 pm   Max. Marks :100

Instructions :

01 *All questions are compulsory*

02 *Figures to the right indicate full marks*

03 *Assume suitable data ,if required and mention it clearly*

Q.1a) Define ILD and state its uses   5

b) Construct influence line diagram for horizontal thrust and bending moment at a   12
section 6m from left hand support of the two hinged parabolic arch of span 20m
and central rise 5m

Q.2 A beam ABC is bent in plan such that AB=BC=6m, $\angle$B=90° carries a concentrated   16
vertical load of 50 kN at midpoint of span AB. It is fixed at supports A and C. If the
torsional rigidity for the members is 0.8 times their flexural rigidity, draw the
B.M.D.

OR

Q.2 Derive equations for deflection, pressure, slope, bending moment and shear force   16
for long beam on elastic foundation subjected to concentrated load Po at one end
which is hinged. Also draw their corresponding diagrams.

Q.3 beam- column fixed at the ends is subjected to an axial compressive force P at the   17
both ends and a lateral concentrated load W at midspan. Determine maximum
deflection. Also find magnification factor for deflection.

Q.4 Analyse the frame loaded and supported as shown in fig.1, by using flexibility 16
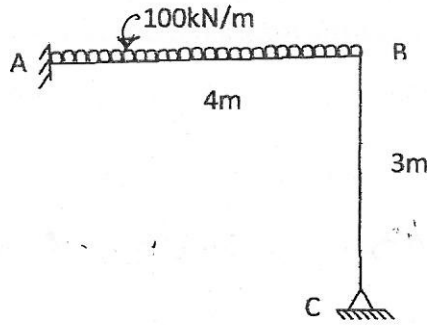matrix method.

100kN/m

A ⌇⌇⌇⌇⌇⌇⌇⌇⌇⌇⌇⌇⌇⌇⌇⌇ B

4m

3m

C ⚓︎ Fig.1.

Q.5 Analyse the beam loaded and supported as shown in fig. 2, by using stiffness matrix 17
method.

12kN

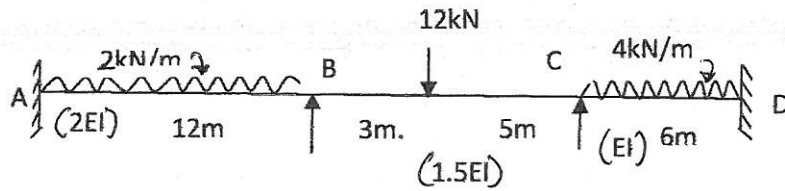2kN/m B C 4kN/m

A (2EI) 12m 3m. 5m (EI) 6m D

(1.5EI)

Fig. 2.

OR

Q.5a) Derive the member oriented stiffness matrix for a member of pin jointed plane 12
frame.

b) What is transformation matrix? State its necessity. 5

Q.6 Analyse the frame loaded and supported as shown in fig. 3. Use stiffness matrix 17
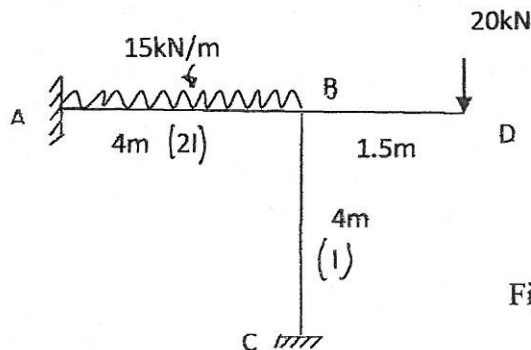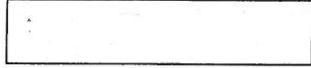method. Draw BMD.

20kN

15kN/m

A ⌇⌇⌇⌇⌇⌇⌇⌇⌇⌇ B

4m (2I) 1.5m D

4m

(1)

Fig.3.

C ▨

K. E. Society's

Rajarrambapu Institute of Technology, Rajaramnagar

(Autonomous Institute)

M.Tech. (Civil-Structures) (Semester – I) Examination, 2013

STRUCTRAL DYNAMICS

Day and Date: Max. Marks: 100

Duration: 3.00 Hrs.

Instructions: a) Solve all questions from each section.

b) Figures to the right indicate full marks.

c) Use of non- programmable calculators is permitted.

d) Assume suitable data if necessary and state it clearly.

Q. No. 1. A) Define the logarithmic decrement. Derive the expression. Explain how this expression is useful in free vibration test conducted on existing structures.   06

OR

Derive the expression for the response of SDOF system subjected to damped force vibration and find the value of dynamic magnification factor.

B) A one storey reinforced concrete building has an effective mass of 200 tones supported on columns with an effective lateral stiffness of 100 KN/mm. This building is excited by a vibration generator which produces a harmonic force with an amplitude of 12 p^2, p is the frequency of rotation of the generator which in rad/sec. When the vibration generator runs at the natural frequency of the building, the amplitude of roof acceleration is measured to be 0.015g. Determine the damping in the structures.   12

Q. No 2 A machine of mass 1000 Kg is supported on a vertical flexible mounting, modeled as a single degree of freedom system. The mounting has a total stiffness 50 KNm^{-1} but negligible damping. Any horizontal motion of the system should be ignored. In normal operation the machine is subjected to a vertical force $F = F_0 \sin \omega t$, where the amplitude F_0 is 2500 N. Calculate the response amplitude and the force transmitted to the foundations when the driving frequency is 20 Hz.   18

Q No 3   An elevated water tank weight 1000KN, when full with water and 400 KN when empty. The lateral stiffness of supporting system is 4025 KN/m. If the tank is modelised as SDOF. Determine maximum response of tank under both full & empty condition if it is subjected to a horizontal rectangular impulse of magnitude 25 Kn for duration of 0.4 sec. neglect damping.   16

Q. No. 4   A) Derive the orthogonality conditions for modes with respect to the mass and stiffness matrices.   06

B) Determine the frequencies and mode shapes of the system as shown in figure no. 1 by first principle. Take m_1= 100KN and m_2 = 150KN   10

Fig. No. 1
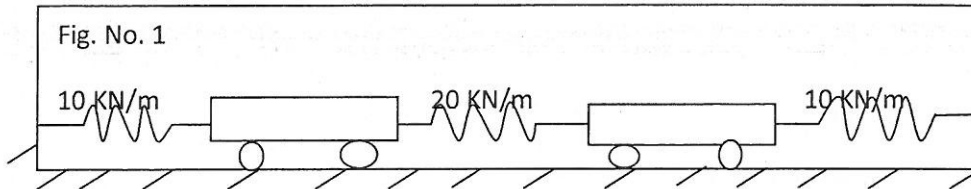
Q. No. 5 A) starting from first principles develop the partial differential equation of motion for a beam in flexure.   08

B) Explain the significance of fundamental mode analysis. Mention different methods of fundamental mode analysis. Discuss any one of the method in detail.   08

OR

B) Explain Dunkarley's method to find fundamental frequency.   08

Q. 6   Use Stodola's method to find the fundamental mode of vibration and its natural frequency of the spring –mass system. Take K_1 = K_2 = K_3 = 30 KN/m, M_1=M_2=M_3=3000kg.   16

K.E. Society's
Rajarambapu Institute of Technology, Rajaramnagar.
(An Autonomous Institute)

Seat No

Q. P. Code No EM281

F.Y. M.Tech Civil Structure Semester –I
End Semester Examination -Year 2013 -14
Course & Course Code: Advanced Solid Mechanics, CST503

Date &Day: 04/12/13, Wednesday
Time:2.30 to 5.30

Maximum Marks: 100

Instructions: 1. Use of Non-programmable calculator is allowed,
2. Figures to the right indicate full marks,
3. Draw neat sketches wherever necessary,
4. Assume suitable data if required and mention it clearly.

1 a Derive differential equation of equilibrium in x-direction only for 3-D elasticity problem in rectangular co-ordinate system. Draw the sketch showing stresses on all the faces of the element. (06)

  b Determine the magnitudes of principal stresses and stress invariants for the following state of stress. σ_x= 10MPa, σ_y= -20MPa, σ_z= 40MPa, τ_{xy}=20MPa, τ_{yz}=-30MPa, τ_{zx}=10MPa. (10)

2 a Discuss plane stress and plane strain problems with suitable examples. (06)

  b Investigate what problem of plane stress is represented by the function, $\frac{3F}{4C}\left[xy-\frac{xy^3}{3C^2}\right]+\frac{P}{2}y^2$, where '2C' is the depth of the beam. (12)

OR

2 An infinitely large, thin flat plate with a small circular hole is subjected to a uniaxial tension in its plane. Determine the state of stress in the vicinity of the hole. Neglect the body forces. (18)

3 a The state of stress at a point is give by σ_x= 100MPa, σ_y= 200MPa, σ_z= -100MPa, τ_{xy}=-200MPa, τ_{yz}=100MPa, τ_{zx}=-300MPa. Determine the invariants of deviatoric stresses. (06)

  b The state of stress at a point is give by σ_x= 50MPa, σ_y= 100MPa, τ_{xy}=-25MPa. If the yield stress is 100 MPa in simple tension, determine whether there is yielding according to Tresca and von-Mises conditions or not. (10)

4 a Discuss theories of elastic failure: i) Tresca and ii) von-Mises. (08)

  b A thick cylinder of outer radius 410mm and thickness 80mm is subjected to internal pressure of 1.0N/mm^2. Find the stress distribution across the cylinder. (08)

5   Derive the expressions for stresses in elliptical prismatic bar subjected to torque. Locate the points where stresses are maximum and minimum.   (18)

     OR

5 a   State the assumptions made in the solution of torsion of straight prismatic bar with non-circular sections.   (04)

   b   b) Derive the expression $T/\theta = GI_p$ for circular cross section subjected to torque 'T' by Prandtl's membrane analogy   (14)

6   Derive the expressions for deflection and bending moments in a simply supported beam of span '**l**' subjected to uniformly distributed load '**w**' per unit length over entire span. Determine the deflection and moment at midspan and compare with exact solution. Use Rayleigh-Ritz method   (16)

Rajarambapu Institute of Technology, Rajaramnagar

(An autonomous Institute)

First year M. Tech. Civil Construction Management Semester I

ESE Examination AY 2013-14

Construction Techniques and Equipments Subject Code: CCM503

Enrol. No.	

Day & Date: 4/12/2013, Wednesday

Time: 2.30 pm — 5.20 pm

Max Marks: 100

Instructions:

i. All questions are compulsory.
ii. Figures to the right indicate marks.
iii. Use separate answer sheet for each section
iv. Use of non-programmable calculators allowed
v. Assume suitable data wherever necessary

Q.1 a) A contractor has both a 3-cy and 5-cy shovel in the equipment fleet. Select the minimum size of shovel that will excavate 250,000 bank cubic yard (bcy) of clay earth having a percent swell of 30% in a minimum of 100 working days of 8 hours each. The average height of excavation will be 12 ft, and the average angle of swing will be 150 degrees. The 3-cy shovel has a maximum digging height of 20 ft and the 5-cy machine's maximum digging height is 30 ft. Optimum digging height is 40% of maximum digging height. The efficiency factor is 50 min/hour. Approximate size haul units can be used with either shovel. How many days will it require to complete the work?
Cycle time: 3 cy = 17sec & 5 cy = 24 sec   **12**

TABLE 9.1 Fill factors for front shovel buckets.

Material	Fill factor* (%)
Bank clay; earth	100–110
Rock-earth mixture	105–115
Rock—poorly blasted	85–100
Rock—well blasted	100–110
Shale; sandstone—standing bank	85–100

*Percent of heaped bucket capacity.
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**TABLE 9.2** Factors for height of cut and angle of swing effect on shovel production.

Percentage of optimum depth	Angle of swing (degrees)						
	45	60	75	90	120	150	180
40	0.93	0.89	0.85	0.80	0.72	0.65	0.59
60	1.10	1.03	0.96	0.91	0.81	0.73	0.66
80	1.22	1.12	1.04	0.98	0.86	0.77	0.69
100	1.26	1.16	1.07	1.00	0.88	0.79	0.71
120	1.20	1.11	1.03	0.97	0.86	0.77	0.70
140	1.12	1.04	0.97	0.91	0.81	0.73	0.66
160	1.03	0.96	0.90	0.85	0.75	0.67	0.62

(

| | | 12 |

b) A track type CAT 824S dozer with a power shift transmission and straight blade is to be used to push a material that weighs 150pcf in the bank state using normal dozing method during a clear sunny day. It is estimated that material will swell 20% from bank to loose state. This dry, Non-cohesive soil is to be moved an average distance of 250 ft up a 12% grade. The operator is new with poor skills; job efficiency estimated is 45 min/hr. assuming 0.36 coefficient of traction. Calculate direct cost of the proposed earthmoving operation per bcy. The O&O cost of dozer is $47.30 per hour and operator's wage is &8.76 per hour plus 34% for fringes. Assume ideal production of 350 lcy/hr and material wt correction factor of 0.68 or there are 27 cf/cy

TABLE 7.2 Caterpillar job condition correction factors for estimating dozer production.

	Track-type tractor	Wheel-type tractor
Operator		
Excellent	1.00	1.00
Average	0.75	0.60
Poor	0.60	0.50
Material		
Loose stockpile	1.20	1.20
Hard to cut; frozen		
with tilt cylinder	0.80	0.75
without tilt cylinder	0.70	—
cable-controlled blade	0.60	—
Hard to drift; "dead" (dry, noncohesive material) or very sticky material	0.80	0.80
Rock, ripped or blasted	0.60–0.80	—
Slot dozing	1.20	1.20
Side-by-side dozing	1.15–1.25	1.15–1.25
Visibility		
Dust, rain, snow, fog, or darkness	0.80	0.70
Job efficiency		
50 min/hr	0.83	0.83
40 min/hr	0.67	0.67
Direct-drive transmission		
(0.1-min fixed time)	0.80	—
Bulldozer*		
Adjust based on SAE capacity relative to the base blade used in the estimated dozing production graphs		
Grades—see the graph		

% Grade vs. Dozing Factor
(−) Downhill
(+) Uphill
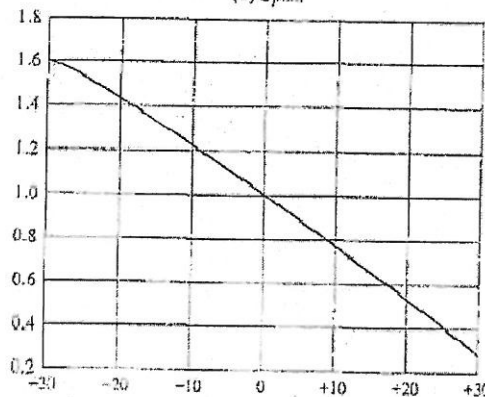
*Note: Angling blades and cushion blades are not considered production-dozing tools. Depending on job conditions, the A blade and C blade will average 50–75% of straight-blade production.

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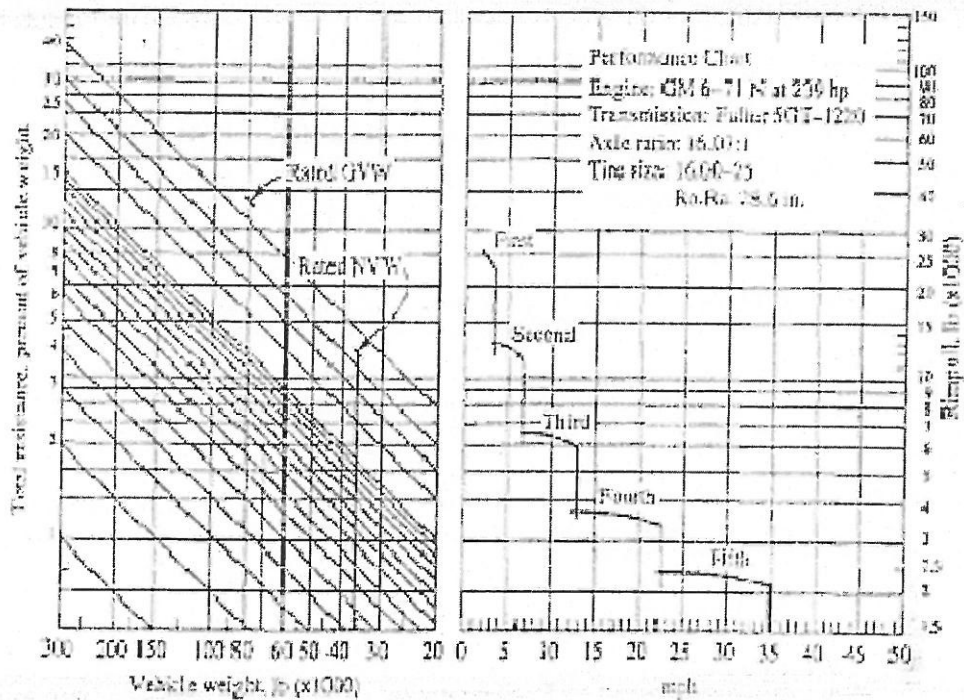|		
Q.2	**Answer any two**	
a)	What are the factors you will consider for calculating production of a hauling unit?	6

b)	Write in brief the characteristics, types and use of following equipments.
	    i. Dozer
	    ii. Excavators
	    iii. Dumpers
		6

c)	Explain with functions and operations various components of the grader.	6
Q.3 a)	Bring out the factors to be considered for selection of crushing equipment. **OR** To produce artificial sand which and how many crushing units needs to be used? Justify.	6

b)	Write a note on *(any three)*
	    i. Crusher
	    ii. RMC Plant
	    iii. Pavers
	    iv. Earth work
		9

Q.4	**Solve any one**	
a)	A state highway presently used as two lanes is to be widened to four lanes. Length of the road to be widened is 25M. Extra width works out to be 7 meters. The stretch of the road is in filling with average earth filling of 1.5 meters. The road specifications are: sub base 1.5 earth filling, 15 cm soling; 20 cm roller compacted concrete; 3 cm bituminous concrete. Average lead of material is 10 KM. The work needs to be completed in 3 months. Work out the construction equipments required. Supplement your answer with approximate calculations and capabilities of the construction equipments.	15

b)	Rear-dump trucks with specifications as follows are used to haul sandy clay waste material. The performance chart shown in Fig. 10.8 is valid for these trucks. The trucks will be loaded by a hydraulic hoe having a 3-cy bucket. The haul route from the loading point to the waste site is a 3-mile downhill grade of 1%. After turning off the city streets, the haul route will be on earth, poorly maintained. Use the rolling resistance for that condition (6%) as most of the travel is off of the city streets. Dump time will average 2 min because of expected congestion on the waste site. The hoe should be able to cycle in 20 sec. The sandy clay has a loose unit weight of 2,150 lb/cy. A realistic efficiency estimate for this work is a 50-min hour. Compute the production.
	
	Capacity
	   Stuck, 14.7 cy
	   Heaped, 2: 1, 18.3 cy
	Net weight empty = 36,860 Ib
	Payload = 44,000 Ib
	Gross vehicle weight = 80,860 Ib
		15

FIGURE 10.8 Performance chart for a 22-ton rear-dump truck.

Q.5	Solve any two	
a)	Which are the special equipments used in construction of roads? Explain operations performed by them in brief.	7
b)	Concrete is second largest consumed material in construction; it is manufactured and placed in different ways. Explain in detail operations involved in concreting and various methods used.	7
c)	Write process of construction of new highway. Tabulate different activities and aligned equipments used for them.	7
Q.6	Solve any two	
a)	Your firms weighted cost of capital is 8% compounded annually. Due to the current economic downturn your financial advisor informs you that you will require a loan amount of $50000 today to continue construction operation USING Caterpillar D9 dozer. The machine is already mortgaged and will have additional loan of $50000. Terms of the 50000$ loan as outlined requires to pay all principal and interest back at the end of 5th year. What is the total amount of interest on the $50000 loan at the end of 5th year?	10
b)	Enlist and explain various methods used for underwater concrete placing.	10

c)	Write short notes on
	  1. Boom placer
	  2. Tremie method
	  3. Equipment selection
	  4. Construction services
		10

Rajarambapu Institute of Technology, Rajaramnagar

(An autonomous Institute)

First year M. Tech. Civil Construction Management Semester I

ESE Examination AY 2013-14

Human Resource Management in Construction Subject Code: CCM509

Day & Date: Monday, 9|12|2013

Time: 2.30 pm – 5.30 pm   **Max Marks: 100**

Instructions:

    i.   *All questions are compulsory.*

    ii.   *Figures to the right indicate marks.*

    iii. *Use of non-programmable calculators allowed*

    iv. *Assume suitable data wherever necessary*

Q.1 a) Answer as ***Yes or No*** format. Each question carries two marks.   20

    1. The practice of HRM is only concerned with how people are employed but not how they are management

    2. HRM does have an ethical dimension

    3. Strategies define short-term goals but they are more concerned with how those goals should be achieved.

    4. HR strategies set out what the organization intends to do about its human resource management policies and practices, and how they should be integrated with the business strategy and each other.

    5. HR planning should aim to meet the needs of the key shareholders involved in people management in the firm.'

    6. HRM promises more that it could deliver is one of the reservations about HRM

    7. The role of the HR function and the practice of human resource management vary immensely in different organizations.

    8. Broadly, the larger the organization, the higher the ratio of employees to HR practitioners

    9. Fear and money are long term motivators that significantly influence employee performance

    10. The activities carried out within an HR function can be divided into two broad categories

Q.2   **Answer any two**   15

  a) Which factors influence the manpower planning?

  b) Write notes on

    1. Job analysis

2. Job Design

3. Job Evaluation

4. Demand forecasting

c) What is an organization? What are the different types? Explain the advantages and disadvantages of each type.

Q.3 **Answer any two** 15

a) How one does makes the training effective?

b) What are the various theories of Motivation? List them and explain any two in detail?

c) Explain

1. Vroom's Expectancy model

2. ERG theory of motivation

Discuss the merits and demerits of each.

Q.4 a) Write note on: 10

1. ESOP for employees

2. Group insurance

3. EPF and GPF

4. Incentive scheme

b) Write a note on: 10

1. Wages and salary

2. Compensation

3. Fringe benefits

4. Discipline and discharge

Q.5 **Answer any two** 15

a) Can one establish a correlation between welfare and productivity? Explain.

b) What do you understand by "Equal Employment Opportunity"?

c) Define the term welfare. Bring out the arguments for and against welfare.

Q.6 **Answer any two** 15

a) Explain; What is safety program on a site for construction of bridge? What steps are to be taken to formulate a safety plan? Write in detail.

b) What are the various methods of performance appraisal? List these and explain any two in details.

c) What are difficulties in performance appraisal? Who do you think should appraise the performance? Why?

Rajarambapu Institute of Technology Rajaramnagar
(An Autonomous Institute).
M Tech Civil (Structures) SEM – I
Program Elective –I Design Of Foundation
Subject code –CES-511

Instructions : -   *i) All questions are compulsory*
ii) Figures to the right indicate full marks
iii) Assume suitable data wherever necessary
iv) Use of non-programmable calculator, IS codes allowed

1   a) State and explain IS recommendations for various types of foundations   5
    b) What is the criteria for design of foundation for structures under sea   5

2   Design a Raft footing for six columns spaced in two rows. Centre to centre distance
    between two row is 4 m. Outer 04 Columns carries load of 700 KN each and 450 x
    450 mm in size. The inner 02 Columns carries load of 1000 KN each and 500 x 500
    mm in size. The safe bearing capacity of soil is 100 KN/m^2 .Use M20 and Fe 415.
    Also use Limit State Design.   20

OR

2   Design a combined trapezoidal footing for two columns A and B spaced 4 m
    centre to centre. Column A is 400 x 400 mm in size and transmit 800 KN. Column
    B is 500 x 500 mm in size and transmit a load of 1000 KN. The maximum length
    of footing is restricted to 8 m. The safe bearing capacity of soil is 110 KN/m^2 .
    Use M20 and Fe 415. Also use Limit State Design.   20

3   a) Briefly explain design criteria for reciprocating type machine foundation   5
    b) A rotary machine has following data   15
       Weight of machine - 200 KN
        base area 2.50 x 2.50 m
       Vertical excitation force – 70 KN
       Coefficient of restitution 0.60
       Allowable amplitude 0 .10 mm
       Allowable bearing pressure 150 KN/m^2
       Modulus of subgrade 50 MN/m^3
       Design the foundation with M20 and Fe 415

4   Design a well foundation using M20 and Fe 415 with following data   18
    Bridge pier of 2.5 x 6 m is transmitting a vertical load of 20 MN.
    Diameter of shaft – 12 m
    Depth of scour – 15 m
    Bearing capacity – 1800 KN/m^2
    Top of well – 3 m above bed level
    Depth of well below scour – 9 m
    Maximum water level- 12 m above bed level
    Lowest water level- 2 m above bed level
    High flood level- 33 m above bed level
    Density of soil – 18 KN/m^2
    Active earth pressure coefficient – 0.30
    Passive earth pressure coefficient – 3.60
    Assume any other data if necessary

5   Design a pile under a column transmitting an axial load of 600 KN. It is driven to
    a hard strata available at depth of 10 m. If The 02 piles are spaced 1 m apart, and
    carries 600 KN load each, design pile cap for above pile group .Use M 20 and
    Fe 415.   20

                                    OR

5   Design a bored pile group with cap in clayey soil under total axial load of 1500 KN.
    Weight of soil is 18 KN/m^3· K for soil is 1.75. $\varphi = 25^0$. Use M20 and Fe 415.   20

6   a) State and briefly explain different types of softwares used in foundation design. 6
    b) Write on software modeling   6

Rajarambapu Institute of Technology, Rajaramnagar

Enrol.
No.

(An autonomous Institute)

First year M. Tech. Civil Construction Management Semester I

ESE Examination AY 2013-14

Project Management Subject Code: IE505

Day & Date: Wednesday, 11/12/2013

Time: 10.00 am – 1.00 pm

Max Marks: 100

Instructions:

    i.   *All questions are compulsory.*
    ii.   *Figures to the right indicate marks.*
    iii. *Use separate answer sheet for each section*
    iv. *Use of non-programmable calculators allowed*
    v.   *Assume suitable data wherever necessary*

Q.1	a)	Multiple Choice questions. *Each carry two marks*	20
	1	Scope Definition is necessary for all of the following EXCEPT: a) Evaluating the project at its completion b) Improving the accuracy of cost, duration and resource estimates. c) Defining a baseline for performance measurement and control d) Facilitating clear responsibility and assignments	
	2	The scope management process is challenging and many times can involve a project review board to make the final determination in order to minimize scope creep. During what scope management process are SMEs first utilized? a) Scope verification b) Scope planning c) Scope definition d) Initiation	
	3	As an experienced project manager, you know there is an inherent amount of risk with any project. During what phase of the project life cycle is the highest level of risk and uncertainty? a) Controlling b) Executing c) Planning d) Initiating	
	4	The cost of choosing one project and giving up another is called a) Fixed cost b) Sunk cost c) Net present value d) Opportunity cost	
	5	Which project management process group normally takes the most project time and resources? a) Planning b) Design c) Integration d) Executing	

	6	Which form of organization retains many characteristics of a functional organization and treats the project manager's role as more of a coordinator or expeditor than a manager?
		   a) Projectized
		   b) Functional
		   c) Strong matrix
		   d) Weak matrix	

	7	A project may end for all the following reasons except:
		   a) It is determined that the objectives cannot be met
		   b) The project objectives have been met
		   c) The need for project no longer exists
		   d) Project manager has left the company	

	8	Which of the statements best describes how stakeholders are involved on the project?
		   a) They determine the project schedule, deliverables and requirements
		   b) They help to determine project constraints and deliverables
		   c) They determine the resource needs and resource constraints on the project
		   d) They help provide assumptions, WBS and management plans	

	9	Progressive elaboration means:
		   a) Implementation of the project must progress strictly according to the initial project management plan.
		   b) Project processes are iterated as more detailed, as more information is uncovered throughout the project life cycle.
		   c) Project management plans must be elaborate in order to be effective.
		   d) Distinct processes are developed for each project.	

	10	The skills required for effective project management include knowledge of standards and regulations, understanding the project environment, and:
		   a) Application area knowledge
		   b) Engineering knowledge
		   c) Software knowledge
		   d) Financial knowledge	

Q.2		**Answer any four**	
	a)	Explain with an example "progressive elaboration" with respect to project.	5
	b)	Diagrammatically describe the process group's interaction in a project.	5
	c)	Define project life cycle? State and explain various processes within project life cycle.	5
	d)	Explain the influence of organizational structure on project.	5
	e)	Explain triple constraints and its relation. What are their effects on project?	5
Q.3		**Answer any Two**	
	a)	Bring out project selection methods and explain them in brief.	10
	b)	What does project integrated change control includes?	10
	c)	What are the objectives of project scope management plan? What it includes?	10

Q.4		Answer any two	10
	a)	What are the various "break down structures" required in project management? Explain any two in brief.	
	b)	Environmental Process Assets and Organizational Process Assets are two commonly used inputs to many processes. What is so important about them?	10
		OR	
	c)	In "Project time management" various methods are used for scheduling. List them and explain them in brief.	10
Q.5		Answer any four	
	a)	Which are the "Benefit measurement methods" used for project selection? Explain one in brief.	5
	b)	Describe with example "Plan-Do-Check-Act"	5
	c)	Differentiate in brief among "PO and PMO" office.	5
	d)	What are the major reasons for dispute? Explain the major one in brief.	5
	e)	Differentiate among "CPM and PERT"	5

Rajarambapu Institute of Technology, Rajaramnagar

(An Autonomous Institute)

First Year M. Tech. Institute Elective SEMESTER – I

End Semester Examination

IEO503: Numerical Methods in Engineering

Enroll No:

Q.P. No EM314

Daye & Date: ..Wednesday, 11\12\2013

Time: .....10:00 am – 1:00pm   Max Marks: 100

Instructions: i) All questions are compulsory.

ii) All internal sub questions from Q.1 and Q.4 are compulsory.

iii) Solve any two from sub questions of Q.2 and Q.3.

iv) Solve any one from sub questions of Q.5 and Q.6.

Q1   *All sub questions are compulsory*

a)   The sine function can be evaluated by the following infinite series   (06)

$$\sin x = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \ldots\ldots\ldots + \ldots\ldots n$$

Write an algorithm to implement this equation so that it computes and prints all values of $\sin(x)$ with n number of terms. Write first concise equation describing the equation.

b)   Explain with suitable example Round off Errors   (06)

c)   Determine roots of following non-linear equations using Newton-Raphson method   (06)

$$(x-4)^2 + (y-4)^2 = 4 \quad \text{and} \quad x^2 + y^2 = 16$$

Q2   *Solve any Two*

a)   Use Gauss Elimination method to solve following set of simulations equations.   (08)

4x+y-z = -2;   5x+y+2z = 4;   6x+y+z=6.

b)   Use Gauss Jordern method to solve following set of simulations equations.   (08)

2x+y-z = 1;   5x+2y+2z=-4;   3x+y+z=5.

c)   Use LU decomposition method to find the inverse of following matrix   (08)

$$\begin{bmatrix} 3 & -0.1 & -0.2 \\ 0.1 & 7 & -0.3 \\ 0.3 & -0.2 & 10 \end{bmatrix}$$

Q3   *Solve any Two*

a)   Integrate following function by using trapezoidal rule with step size 4 and compare result with exact value of 4.8333.   (08)

$$\int_1^2 \left(x + \frac{1}{x} \right)^2 dx$$

b) Integrate following function using Simpson's 1/3 rule and compare result with exact using step sizes 4. (08)

$$\int_0^3 xe^{2x}dx$$

c) Integrate following equation by using 6 point Gauss Quadrature technique (08)

$$\int_0^3 \frac{e^x \sin x}{1+x^2}dx$$

Q4 *All sub questions are compulsory*

a) Solve following differential equation using finite difference method with step size 2 with boundary condition $y(0) = 5$, $y(20)=8$. (06)

$$8\frac{d^2y}{dx^2} - 2\frac{dy}{dx} - y + x = 0$$

b) Solve following differential equation using shooting method with step size 2 with boundary condition $y(0) = 5$, $y(20)=8$. (06)
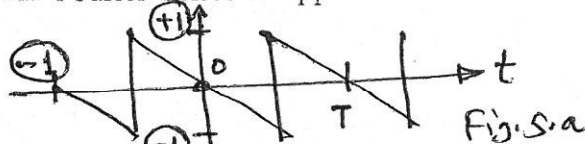
$$8\frac{d^2y}{dx^2} - 2\frac{dy}{dx} - y + x = 0$$

c) Solve the following initial value problem over the interval $x = 0$ to 2 where $y(0) = 1$. Use classical 4th order Runge-Kutta method with $h = 0.5$. Plot the solution. (06)

$$\frac{dy}{dx} = yx^2 - 1.2y$$

Q5 *Solve any One*

a) Use continuous Fourier Series to approximate a Sawtooth curve as shown in Fig. 5.a (16)

Fig. 5.a

b) Use continuous Fourier Series to approximate a square rectangular wave form with a height of 2 and a period $T = 2\pi / \omega_0$. (16)

Q6 *Solve any One*

a) Use power method to find highest Eigen value and corresponding Eigen vector for the following problem. (16)

$$\begin{bmatrix} 2 & 2 & 10 \\ 8 & 3 & 4 \\ 10 & 4 & 5 \end{bmatrix}$$

b) Use power method to find lowest Eigen value and corresponding Eigen vector for the following problem. (16)

$$\begin{bmatrix} 2 & 2 & 10 \\ 8 & 3 & 4 \\ 10 & 4 & 5 \end{bmatrix}$$

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