Enroll No.	K. E. Society's **Rajarambapu Institute of Technology, Rajaramnagar** (An Autonomous Institute affiliated to S.U.K.) End Semester Examination, Dec .2017	Q. P. Code EB 1111

F. Y. M. Tech. (Civil Structural Engineering) Semester– I

Course Name: Advanced Engineering Mathematics **Code:** SHP511

Day & Date: Sat, 23/12/2017

Time : 2.30 – 4.30 pm Max. Marks –50

Instructions: *i) All questions are compulsory.*
ii) Figures to the right indicate full marks.
iii) Use of non-programmable calculator is allowed.

Q.1 Attempt **any one** of the following.

a) Estimate numerically the solution of CO_2 **[10]**

$$x^3 + 9x^2 - 18 = 0$$

by Horner's method correct to two decimal places.

b) Evaluate the quadratic factor of the polynomial CO_2 **[10]**

$$x^4 + 5x^3 + 3x^2 - 5x - 9 = 0.$$

Q.2 Attempt **any two** of the following:

a) Solve the following system of equations by LU-decomposition CO_3 **[10]**

$$\begin{aligned} 4x_1 + 3x_2 + 3x_3 - 4x_4 &= 4 \\ x_1 + x_2 - x_3 + 3x_4 &= -2 \\ 2x_1 + 2x_2 - 4x_3 + 6x_4 &= 6 \\ 8x_1 - 2x_2 + x_3 + 4x_4 &= 1. \end{aligned}$$

b) Using Gauss-Jordan method solve the system of linear equations given below CO_3 **[10]**

$$\begin{aligned} 2x_2 + x_4 &= 0 \\ 2x_1 + 2x_2 + 3x_3 + 2x_4 &= -3 \\ 4x_1 - 3x_2 + x_4 &= -7 \\ 6x_1 + x_2 - 6x_3 - 5x_4 &= 6. \end{aligned}$$

c) The natural period, T, of vibrations of a building is given by CO_3 **[10]**

$$T = \frac{2\pi}{\sqrt{-\lambda}}$$

where λ is the eigen value of a given matrix:

(i) $A = \begin{pmatrix} -15 & 5 \\ 10 & -10 \end{pmatrix}$

(ii) $B = \begin{pmatrix} -20 & 10 \\ 10 & -10 \end{pmatrix}$.

Determine T for A and B.

Q.3 Attempt **any two** of the following.

a) Show that the curve is catenary for which the area of surface of revolution is minimum when revolved about y-axis. CO_4 **[10]**

b) Using variational notation δ as $\delta = \frac{\partial}{\partial \varepsilon} d\varepsilon$, derive the Eule-Lagrange equation satisfied by $y(x)$ for which the integral CO_4 **[10]**

$$I[y(x)] = \int_a^b F(x, y, y')dx$$

has extremum value, where $y(x)$ is twice differentiable function satisfying $y(a) = y_1$ and $y(b) = y_2$.

c) Determine the stationary function for an isoperimetric problem for CO_4 **[10]**

$$I[y(x)] = \int_a^b (y' + x^2)dx$$

subject to the conditions that

$$\int_0^1 y^2 dx = 2$$

and $y(0) = 0, y(1) = 0$.

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Enroll No	

K.E.Society's

Rajarambapu Institute of Technology, Rajaramnagar

(An Autonomous Institute, affiliated to SUK)

End Semester Examination Nov/Dec 2017

F.Y.M.Tech. Civil Structure SEMESTER- I

Q.P.Code
EB 1093

Course : Advance Structural Analysis **Course Code**: CES1011

Day & Date: ....Tue., 19/12/2017

Time : ...2 hrs 2.30 – 4.30 pm Max Marks: 50

Instructions: 1) All **questions** are **compulsory**
2) Make suitable assumptions **wherever** necessary and **mention** it clearly
3) Figures to the **right** indicates **full** marks
4) Use of **non programmable** calculator is allowed

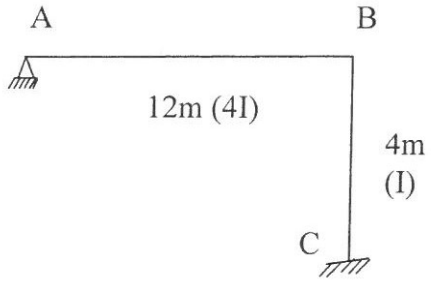
Q.1 **Solve any two**

(a) A semicircular beam in plan has radius R is simply supported on three equally spaced supports. The beam is subjected to uniformly distributed load of intensity w/m run over entire circular length. Show that maximum positive bending moment is $0.152\ wR^2$ — 9 CO3

(b) A machine foundation comprises of I-beams having overall depth of 75 mm and 8m long supported on springs spaced at 800 mm centers. It transmits a concentrated load of 10 kN acting at the mid span of beam. Estimate the maximum deflection and the bending stress in the beam. Take K=120N/mm, $E = 70\ kN/mm^2$ and $I = 10^6\ mm^4$ — 9 CO4

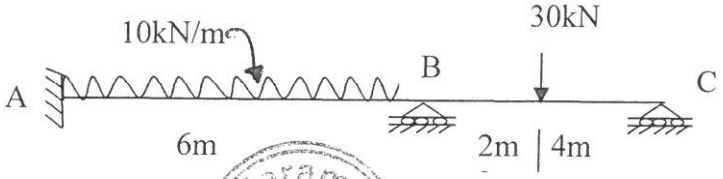
(c) A beam- column simply supported at the ends is subjected to an axial compressive force P at the both ends and a transverse load W at center. Compute maximum deflection, in the beam column. Also determine magnification factor for maximum deflection. — 9 CO5

Q.2 (a) Generate the flexibility matrix [F] for the frame shown in figure — 3 CO6

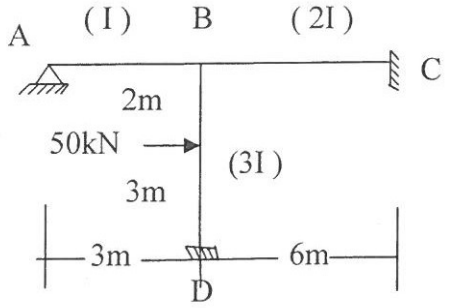


Q.2 (b) The continuous beam ABC is loaded and supported as shown in figure. During loading support B sinks by 25mm. Analyze the beam by using stiffens matrix method. Construct B.M.D. Take $EI = 3800kNm^2$ — 13 CO6

OR



Q.2 (b) Analyze the frame loaded and supported as shown in figure, by using stiffness matrix method. Construct B.M.D. 13 CO6

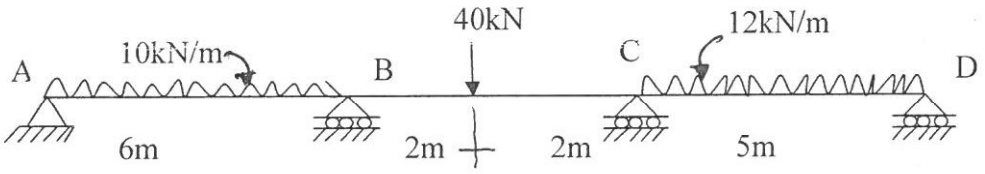


Q.3 (a) Explain in brief- the structure oriented and member oriented stiffness method. 3 CO6

OR

(a) How Semi-Band width is calculated? Explain with suitable example the ways to minimize it. 3 CO6

Q.3 (b) Analyze the continuous beam loaded and supported as shown in figure, by using flexibility matrix method. Construct BMD. Take EI = constant. 13 CO6



QP code:
EB 1102

K. E. Society's

Rajarambapu Institute of Technology, Rajaramnagar

(Autonomous Institute)

M. Tech. (Civil-Structural Engineering) (Semester – I) Examination, 2017

End Semester Examination

STRUCTRAL DYNAMICS CES 1021

Day and Date: Thu, 21/12/2017 Max. Marks: 50

Duration: 2.00 Hrs. 2.30 - 4.30 pm

Instructions: a) Solve all three questions. 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.

e) IS 1893- 2016 is permitted.

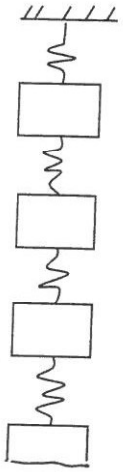
Q. 1. A) A machine weighing 17 N is mounted on spring having stiffness K = 1100N/cm. A piston within the machine weighs 2N has a reciprocating motion with a stroke of 7.5 cm and a speed of 6000rpm. Assuming the motion to be S.H. Determine a) amplitude of the machine. b) Force transmitted to ground. Take $\xi = 0.2$. 08 L2

B) Derive equation of motion for force vibration system by Duhamel's Integral. The force is acting as per following details.

$F(t) = F_0(1 - t/t_d)$ for $t \leq t_d$

$F(t) = 0$ for $t \geq t_d$ 10 L3

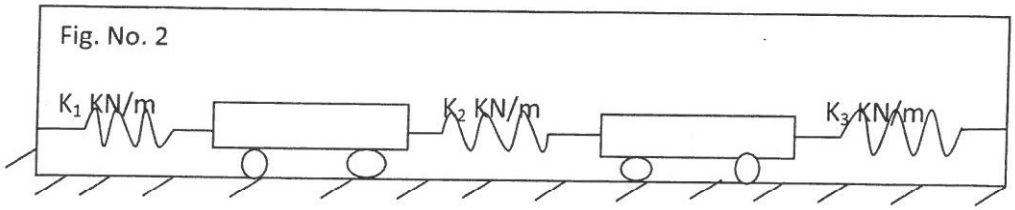
Q. 2. A) Use Holzer's method or any suitable method to find the its natural frequency of the spring –mass system having four masses are connected in series and mass M_4 is freely suspended and others are interconnected as shown in figure 1. Take $K_1 = 3$ K, $K_2 = 2K$, $K_3 = 2$ K and $K_4 = K$ and K= 100 N/cm, $M_1 = m$, $M_2 = 2m$, $M_3 = 3m$ and $M_4 = 4m$ and m= 2kg. 10. L4



2. B) Calculate the fundamental frequency of the beam with one end hinged and other end is roller support. The span of beam is L m and loaded with uniformly distributed load w per meter length. The beam has constant stiffness EI and linear mass m. 04 L2

OR

B) Determine the frequency and mode shape of the system as shown in figure no 3 by first principle. Take W_1= 100KN, W_2= 125KN, K_1= 20KN/m, K_2= 30 KN/m and K_3 = 10 KN/m. 12 L3



Q. 3. A) Explain phenomena, causes of earthquake and measurement of earthquake. 06 L5

B) Evaluate lateral forces developed for four story RCC framed structure as per following details. 10 L5

- The location of structure : New Delhi
- Number of bays in x and y direction : 4
- Spacing columns in x direction : 4.5m
- Spacing of columns in y direction : 4.0 m
- Sizes of beams and columns : 0.3m x 0.45m
- Types of soil : medium stiff.
- Thickness of slab : 150mm
- In filled walls along periphery : 200mm
- Height of all floors : 3.5m.
- Assume additional suitable data if required.

Draws shear force and bending moment diagrams.

K. E. Society's

Rajarambapu Institute of Technology, Rajaramnagar

(An Autonomous Institute affiliated to SUK)

EB 1125

End Semester Examination, 2017

F. Y. M. Tech Structural Engineering, Semester I

Course: Advanced Design of Steel Structures, Course Code: ~~CST 506~~ CES 1031

Date & Day: 26-12-2017, Maximum Marks: 50

Time: 2.30 - 4.30 pm

Instructions: *1. All questions are compulsory.*
2. Use of non-programmable calculator is allowed.
3. Use of IS:800-2007, IS:801-1975, IS:875(Part 3)1987, IS:811-1987, IS:11384-1985, IS: Hand book/ Steel table is allowed

1	a	Design a simply supported composite beam for a building 12.5m × 40m with beams spaced at 4m center to center. It has to support a slab of thickness 125mm. Consider floor finish load of 0.5kN/m^2 and live load of 2.5kN/m^2. Use M20 grade concrete and steel with f_y= 250N/mm^2. Assume that the propped method of construction is used. Checks for shear and deflection are not required.	CO3	10
		OR		
	a	Design a rectangular hollow light gauge cold formed beam for a span of 4m and carrying a uniformly distributed load of 1.2kN/m. Checks for shear and deflection are not required.	CO3	10
	b	A two span continuous beam ABC is fixed at left end A, continuous over support B and simply supported at right end C. Span AB=12m is subjected to ultimate UDL of 20kN/m and span BC=24m is subjected to ultimate concentrated loads of 24kN at D & 36kN at E. BD=DE=EC=8m. The capacity of span AB is M_p and that of span BC is $2M_p$. Calculate M_p.	CO2	04
	c	A propped cantilever beam is fixed at left end A and propped at B. Right end C of the beam is free. Span AB= ℓ is subjected to udl 'w'per unit length. Overhang BC= $\ell/4$and a concentrated load '$w\ell/5$'is acting at free end. Determine ultimate load w_u.	CO2	04
2	a	A rectangular portal frame ABCDE is fixed at A and E. Beam BCD is subjected to vertically downward concentrated load 5P at C. BC=3L and CD=L. A horizontal concentrated load P is acting rightwards at B. Columns AB=ED=4L. Compute the ultimate load P_u. Draw BMD.	CO2	08
	b	A building 12m × 40m is to be covered by rectangular portals to be placed at 5m c/c. The floor consists of 150mm RCC slab with finishing load 1kN/m^2. The live load on the frame is 5kN/m^2. The effect of wind can be considered by applying a working horizontal force of 12kN at the slab level. Height of columns is 5m with fixed at base and span of beam is 12m. Carry out design load combinations and then find collapse moment.	CO2	08
3	a	A portal frame ABCDE is fixed at A and E. Left column AB is vertical with length ℓ. Right column DE is inclined at an angle of 45° with horizontal. Beam BD of span ℓ is subjected to vertical concentrated load P acting at C, center of beam BD. Show that in the composite mechanism the ultimate load is given by $20M_p/3\ell$.	CO2	04
	b	A frame of a pre-engineered building has to be designed for ultimate load of 6.3kN/m due to combination of dead load and live load. The span of gable frame is 30m, height of columns upto eaves level is 6m. The slope for gable beam is 1:10. Design the frame.	CO3	12

Enroll. No.	

EB 1141

K. E. Society's

Rajarambapu Institute of Technology, Rajaramnagar

(An Autonomous Institute, affiliated to SUK)

END SEMESTER EXAMINATION, 2017

F. Y. M. Tech. Civil Structures (Semester-I)

MAINTENANCE AND REHABILITATION OF STRUCTURES

(Course Code: CES1061)

Day & Date: 28/12/2017, Thu.

Time : 2 Hrs 2.30 - 4.30 pm Max. Marks : 50

Instructions :

i. All questions are compulsory

Q.1 a State what type of damage has occurred to the RCC beam shown in figure 1 giving its reason? How will you remedy this damaged surface? CO2 04

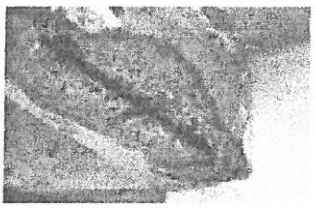


Figure 1

b What general considerations are required to be examined while assessing the damage of a structure? CO3 04

c Discuss how sulfur infiltrated concrete is an alternative to the more expensive polymer impregnated concrete. Compare the properties of sulfur infiltrated concrete with those of ordinary concrete. CO4 06

Q.2 a What is underpinning? What are the various methods of underpinning? Explain the conditions under which each method is adopted. CO5 06

b Figure 2 shows the plan of a load bearing building provided with spread footing. The hard stratum is available upto a depth of 1.5m. The existing footing of this building has weakened and needs to be strengthened. Which method will you recommend to strengthen the footing of this building? Explain the detailed procedure followed in strengthening this footing. CO5 10

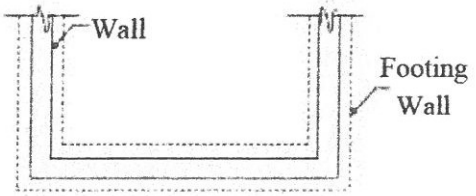


Figure 2

OR

b A 1.8m wide opening is to be created for securing a rolling shutter (door) in the exterior brick masonry wall of 30cm thick of an existing building. Which method you will recommend to carry out this work. Explain the detailed procedure followed in carrying out this work. CO5 10

Q.3 a What is seismic retrofitting? What are the basic objectives of retrofitting? How are the retrofitting techniques classified? 06

b Figure 3 shows a typical RC frame building. What modifications will you recommend to make it seismic resistant? Indicate with sketches. CO6 06

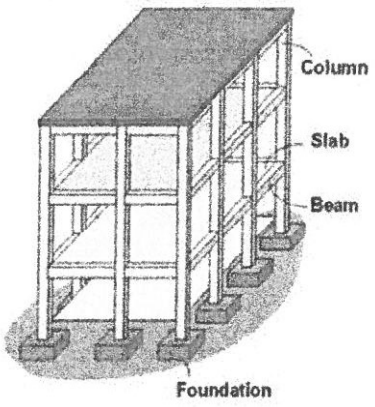


Figure 3

OR

b Figure 4 shows a typical load bearing building (with pitched roof). What modifications you will recommend so as to make it seismic resistant? Indicate with sketches. CO6 06

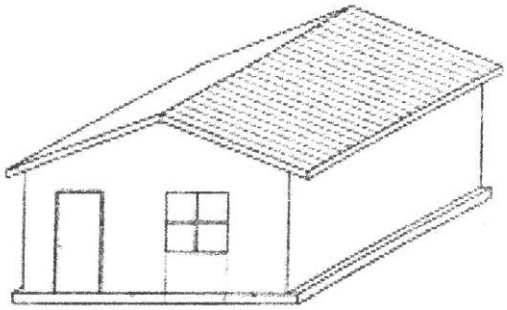


Figure 4

c Figure 5 (a) shows the plan of a large auditorium building located in Zurich city of Switzerland. The building was constructed in 1971 without regard to seismic action. It includes three auditoriums with a total seating for 1200 people over a large entrance hall with access to the cafeteria. Fig. 5(b) shows the front façade of the auditorium. CO6 08

The structural weakness referring to seismic performance of the building is the open entrance hall under the supporting floor of the auditoriums creating a typical weak storey (soft-storey). In addition, there is a very large eccentricity of over 40m between the centre of stiffness of the reinforced concrete walls on the rear side of the ground floor level and the centre of mass of the overlying storeys. As a consequence, the building experiences severe torsional stresses under seismic action.

Recommend the retrofit plan you will adopt for strengthening the building.

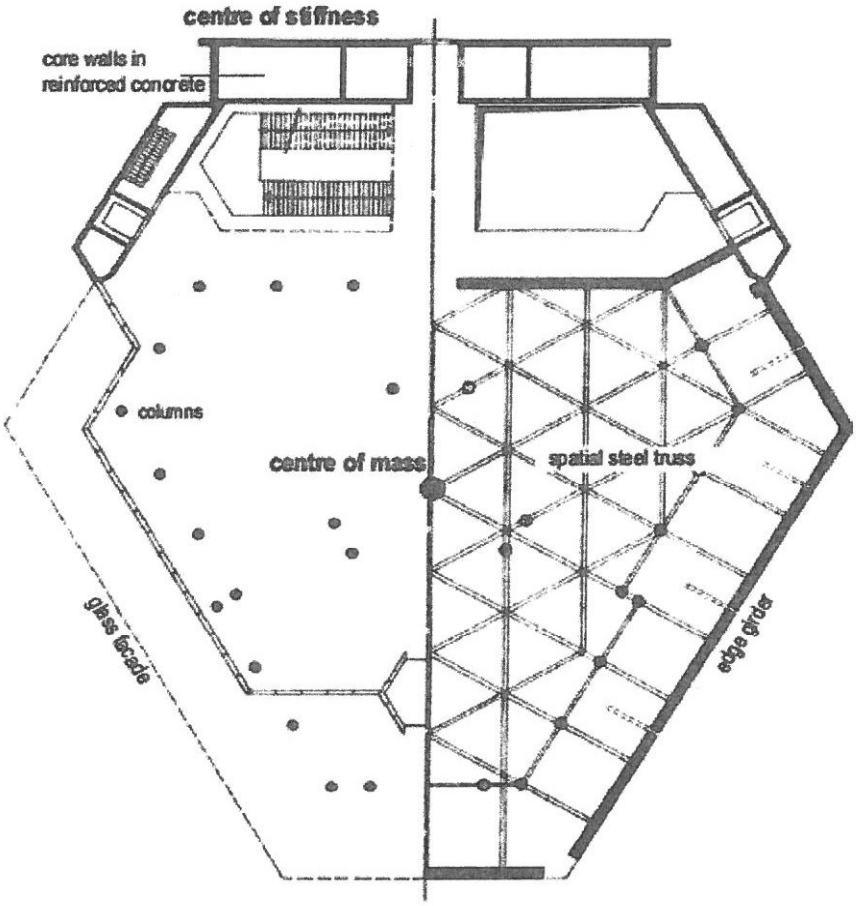


Figure 5 (a) Floor plan of an auditorium through the ground floor level (left) and through the hollow space of the support floor (right) with the locations of the centres of mass and stiffness

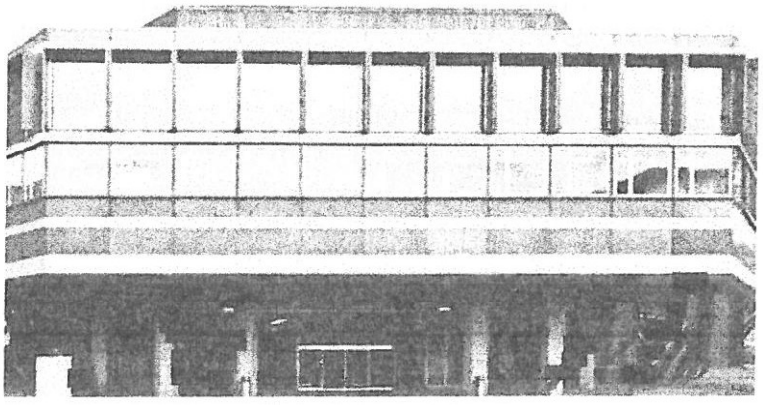


Figure 5 (b) Front façade of the auditorium

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EB 1142

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Rajarambapu Institute of Technology Rajaramnagar

(An Autonomous Institute)

Enroll No	

F.Y. M Tech Civil (Structure) SEM – I

Program Elective –I Advanced Foundation Engineering

Subject code –CES1091

Day and Date Thu., 28/12/2017

Time - 2.30 – 4.30 pm Max Marks - 50

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 456 is allowed

Q No 1	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.	CO 2	16
Q No 2	Design a pile under a column transmitting an axial load of 600 KN. It is driven toa hard strata available at depth of 10 m. design suitable pile cap for above pile .Use M 20 concrete and Fe 415.	CO 2	18
	OR		
Q No 2	Design group of piles under a column transmitting an axial load of 2600 KN. It is driven to a soft strata for 12 m depth . The piles are spaced 1 m apart. Also design pile cap for above pile group .Use M 20 and Fe 415.	CO 2	18
Q No 3 a	Explain briefly design criteria for well foundation	CO 3	06
b	Explain briefly different types of foundation structures used in sea foundation	CO 1	10

Enroll No	

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Rajarambapu Institute of Technology, Rajaramnagar

(An Autonomous Institute, affiliated to SUK)

End Semester Examination Nov/Dec 2017

F.Y.M.Tech. Civil Structure SEMESTER- I

Q.P.Code
EB 1154

Course: PE-II Introduction to Project Management **Course Code**: CES1131

Day & Date: Saturday 30.12.2017

Time : 2.30pm to 4.30pm Max Marks: 50

Instructions: 1) All questions are compulsory

2) Figures to the right indicate full marks

Q.1 (a) Explain the Steps in Project Management planning process. 06

(b) Discuss in detail Direct and Manage Project Work activities. 06

(c) "Crashing may result in increased cost but do not add resources"- Justify the statement 05

OR

d) Elaborate the concept of project time management in construction industry 05

Q.2 (a) Classify and explain in detail the various long and short term sources of finance. 04

(b) The details of shreenath company are as under 08

Sales (40% cash sales)		15,00,000
Less: Cost of sales		7,50,000
	Gross Profit:	7,50,000
Less: Office Exp. (including int. on debentures)	1,25,000	
Selling Exp.	1,25,000	2,50,000
	Profit before Taxes:	5,00,000
Less: Taxes		2,50,000
	Net Profit:	2,50,000

Balance Sheet

Particulars	Rs.	Particulars	Rs.
Equity Share capital	20,00,000	Fixed Assets	55,00,000
10%Preference share capital	20,00,000	Stock	1,75,000
Reserves	11,00,000	Debtors	3,50,000
10% Debentures	10,00,000	Bills receivable	50,000
Creditors	1,00,000	Cash	2,25,000
Bank-overdraft	1,50,000	Fictitious Assets	1,00,000
Bills payable	45,000		
Outstanding expenses	5,0000		
	64,00,000		64,00,000

Beside the details mentioned above, the opening stock was of Rs. 3, 25,000. Taking 360 days of the year, calculate the following ratios.

1) Gross Profit Ratio 2) Current ratio 3) Liquid ratio 4) Debtors ratio

c) Write Short note on : Du Point Analysis 05

OR

d) "Projects should be formulated primarily to meet the needs of customers". Highlight the importance of financial analysis in project management. 05

Q.3 (a) Here are two alternatives for purchasing a concrete mixer. Both the alternatives have same useful life. The cash flow details of alternatives are as follows: 06

Alternative-1: Initial purchase cost = Rs.3,00,000, Annual operating and maintenance cost = Rs.20,000, Expected salvage value = Rs.1,25,000, Useful life = 5 years.

Alternative-2: Initial purchase cost = Rs.2,00,000, Annual operating and maintenance cost = Rs.35,000, Expected salvage value = Rs.70,000, Useful life = 5 years.

Using present worth method, find out which alternative should be selected, if the rate of interest is 10% per year.

(b) What do you mean by breakeven point? Explain any one method of computation of breakeven point. 05

(c) Explain the need & importance of financial analysis of engineering project with suitable example. 05

OR

d) Write Short note on : Sensitivity analysis 05