

- Instructions:**
- 1) All questions are compulsory
 - 2) Figures to the right indicate maximum marks
 - 3) Assume suitable data if not given
 - 4) Use of non-programmable calculator is allowed

- Q. 1 a) What do you mean by interest rate? Discuss about nominal interest rate and effective interest rate. 07 CO1
- b) What is effective interest rate for the nominal interest rate of 12% when compounding is done on daily basis? 08 CO3
- For this effective rate of interest, calculate present worth for a project of 10 years life with initial capital investment of Rs. 10,00,000 and annual benefits of Rs. 2,00,000 per year. Also Draw Cash flow diagram for the same.

OR

- c) Calculate future worth of project having following details. 08 CO3
- Initial Investment = Rs. 10,00,000
Annual Benefits = Rs. 50,000
Annual Operation & Maintenance cost = Rs. 5,000
Salvage Value = Rs. 10,000
Life of project = 12 years
Interest rate = 12.49 % per annum.
- Q. 2 a) Discuss how construction projects are analyzed by using annual worth analysis method. 07 CO1
- b) Interpret suitable choice for purchasing equipment, by using rate of return method for following data. 08 CO3

| | Equipment A | Equipment B |
|-------------------------------------|---------------|---------------|
| Initial Cost | Rs. 11,00,000 | Rs. 18,00,000 |
| Annual Operating & Maintenance Cost | Rs. 33,000 | Rs. 29,900 |
| Salvage Value | Rs. 10,000 | Rs. 20,000 |
| Life | 9 years | 9 years |

OR

- c) A finance company advertises two investment plans. In plan 1, the company pays Rs. 12,000 after 15 years for Rs. 1,000 invested now. In plan 2, for every Rs. 1,000 invested, the company pays Rs. 4,000 at the end of the 10th year and Rs. 4,000 at the end 15th year. Select the best investment plan from the investors point of view at $i=12\%$, compounded annually. (Use present worth method) 08 CO3



- Q.3 a) Discuss the importance of Benefit-Cost ratio analysis for evaluation of construction projects. 07 CO1
- b) A company purchased small equipment for Rs. 50,000. Annual maintenance costs are expected to be Rs. 1,500, but net income will be Rs. 10,000 per year. How long it take for the company to recover its investment at an interest rate of 10 % per year? 08 CO2
- OR**
- c) An industry is selling a product for Rs. 10 per unit. The fixed cost for assets is Rs. 40000 with variable cost of Rs. 6 per unit. How many units should be produced so that there will be no profit no loss? 08 CO2
- Q.4 a) As you aware that, business owner has one of the means of raising funds is Securities. Discuss in detail securities for fund raising. 08 CO4
- b) Discuss importance of working capital management for successful running of enterprise. 07 CO4
- OR**
- c) Discuss how one can raise capital for his/her enterprise by using following alternatives. 07 CO4
- Trade Credit, Accruals and Commercial Paper 10 CO5
- Q.5 a) Attempt any **TWO**
Describe process of computation of liquidity ratios, leverage ratios. 10 CO5
- b) Discuss in detail techniques comparative financial statement and common size statement analysis. 10 CO5
- c) Discuss balance sheet analysis with a suitable example from construction industry. 10 CO5
- Q.6 a) Attempt any **TWO**
Discuss the importance and process of book keeping with reference to construction project. 10 CO6
- b) Explain how budgets and budgetary control system in construction firms is executed at construction sites. 10 CO6
- c) Explain with a suitable example report preparation for fabrication work activity. 10 CO6



| |
|-----------|
| Enroll No |
| |

K.E.Society's
Rajarambapu Institute of Technology, Rajaramnagar
(An Autonomous Institute, affiliated to SUK)
End Semester Examination
F.Y.M.Tech. Civil Const.Mgt. Sem- II

| |
|------------|
| Q. P. Code |
| EB 2565 |

Course Code: CCM1284

Course Name: Construction Contracts

Day & Date: Mon., 22/08/2022

Time : 2.30 to 5.30 pm.

Max Marks: 100

- Instructions:** 1) All questions are compulsory
2) Figures to the right indicate maximum marks
3) Assume suitable data if not given
4) Use of non-programmable calculator is allowed

- Q.1 a Distinguish among public and private works in relation with construction contracts. 08 1
- OR**
- a Describe the essentials of valid contract. 08 2
- b "All contracts are agreements but all agreements are not contracts" discuss and justify. 08 1
- Q.2 a 'A' submitted his tender in competition with others for a public construction project. On opening of the tenders, it was realized by him that he had committed an error. He wants to revoke his tender. Can he do so without any liability under each of the following circumstances. 08 2
- a. Before tenders are scrutinized and a decision is taken by the department,
- b. Tenders are scrutinized and the department has decided to accept his tender but the letter of acceptance is not being posted, and
- c. On receipt of the letter of acceptance of his tender.
- Reason your answers.
- b Explain two-envelope system of submission of tender. 06 2
- OR**
- b Explain the requirement of free consent. 06 2
- Q.3 a 'A 40-year man, married a 16-year-old girl' identify the type of contract formed (valid, void or voidable) and justify your answer. 06 1
- b Discuss Hybrid annuity model (HAM) of concession contract. 06 2
- OR**
- b Describe Turnkey Contract in depth. 06 2
- c Discuss the purpose of EMD and SD. Explain the provisions made in the clause with respect to SD. 06 3
- Q.4 a Discuss in short standard set of conditions frequently used in civil engineering contracts. 06 3
- b Distinguish among Percentage contract and item rate contract. 06 3



OR

- b Discuss any three types of concession contracts used in construction industry. 06 3
- c Discuss the conditions under which contractors claim for an extension of time can be justified. 06 3

- Q.5 a Propose the actions you will take in respect of: 08 4
- a. The contractor, without permission, sublets the work to another firm.
 - b. Certain defects are observed in the work after completion, but before the maintenance work is over.
 - c. The material brought on the site by the contractor is not as per the specifications.
 - d. The contractor fails to start the work as per schedule.

- b Draft suitable clauses to be incorporated in the conditions of contract with respect to: 08 4
(ANY TWO)
- a. Subletting,
 - b. Arbitration,
 - c. Extension of time,
 - d. Extra work,
 - e. Final payment
 - f. Suspension of contract, and
- Breach of contract.

OR

- b Draft detailed specifications for: **(ANY TWO)** 08 4
- a. Excavation of trench for laying drainage pipe,
 - b. RCC slab,
 - c. Wood work in doors and windows,
 - d. Brickwork II in cement mortar

- Q.6 a Explain the difference between sole arbitration and joint arbitration. What are the factors to be considered for sole or joint arbitration in case of tunnel project work in a hydro-power plant located in Sikkim state? (Assume suitable data to support your answer) 06 4

OR

- a In a fast-track construction project for a bandhara (weir), while drafting the contract document, the client missed to draft the arbitration condition. After 65% of completion of the work a dispute arises between the contractor and client. How will this dispute be resolved in absence of arbitration clause? Explain the most suitable alternative to resolve this dispute. 06 4
- b Discuss different methods of Alternative Dispute Resolution (ADR) 06 4
- c Distinguish among Arbitration and Adjudication 06 4



| |
|-----------|
| Enroll No |
| |

K. E. Society's
Rajarambapu Institute of Technology, Rajaramnagar
(An Autonomous Institute, affiliated to SUK)
End Semester Examination (August 2022)
M.Tech. Civil Const.Mgt. Sem- II

| |
|----------|
| Q.P.Code |
| EB 2577 |

Course Code: CCM1304

Course Name: PE III- Health and Safety Management

Day & Date: Wed., 24/08/2022
Time : 2.30 to 5.30 pm.

Max Marks: 100

- Instructions:** 1) All questions are compulsory
2) Figures to the right indicate maximum marks
3) Assume suitable data if not given
4) Use of non-programmable calculator is allowed

- | | Marks | |
|---|--------------|-----|
| Q.1 Attempt Any Two | | |
| (a) Should the wearing of safety footwear and safety helmets be a rule for everyone on site? Give Justification? | 07 | CO2 |
| (b) Discover the hazard identification and prevention process for construction site? | 07 | CO2 |
| (c) Discuss the existing condition of safety Legislation on construction site in India? | 07 | CO2 |
| Q.2 Attempt Any Two | | |
| (a) Outline the precautions that should be taken before anyone is allowed in a trench or excavation? | 07 | CO4 |
| (b) Compare your understanding from elimination and substitution of safety hazard? | 07 | CO4 |
| (c) The Child Labour (Prohibition & Regulation) Act, 1986 | 07 | CO4 |
| Q.3 Attempt Any Two | | |
| (a) Why are a considerable number of the accidents in excavation work fatal? | 08 | CO3 |
| (b) Enlist the types of Scaffoldings used in construction? Give recommendation for each type as a safety officer? | 08 | CO3 |
| (c) Prepare a checklist for movable type of scaffolding? | 08 | CO3 |
| Q.4 Attempt Any Two | | |
| (a) Give importance of giving the safety education and training to persons on construction site? | 08 | CO1 |
| (b) Predict the types of accident which are most associated with roof work? | 08 | CO1 |
| (d) Prepare a checklist to check the site before and during the excavation? | 08 | CO1 |



Q.5 Attempt All

- | | | |
|---|----|-----|
| (a) Point out which safety precautions will you take during mass concreting work as Safety Officer? | 08 | CO2 |
| (b) Suggest the safety signs which you will recommend to workers before entering in to any Industrial Shed? | 08 | CO2 |
| (c) Enlist the methods of demolition used in construction industry? Justify any one in detail? | 06 | CO2 |

OR

- | | | |
|---|----|-----|
| (d) Identify the correct method to demolition for RCC framed structure in densely populated area? | 06 | CO2 |
|---|----|-----|

Q.6 Attempt Any Two

- | | | |
|--|----|-----|
| (a) Identify the roles and responsibilities of safety officer on construction site? | 09 | CO4 |
| (b) Discuss and justify any five personal protective equipments used on construction site? | 09 | CO4 |
| (d) Summarize how you will the accident on construction site? | 09 | CO4 |



Enroll No

Q.P.Code

EB2588

Course Code: CCM1354

Course Name: PE-IV Building Materials

Day & Date: Friday, 26/08/2022

Time : 2:30 to 5:30 pm

Max Marks: 100

- Instructions:** 1) All questions are compulsory
 2) Figures to the right indicate maximum marks
 3) Assume suitable data if not given
 4) Use of non-programmable calculator is allowed

| Q.No. | Question Statement | Max Marks | CO no. |
|-------|--|-----------|--------|
| 1 | a | 8 | CO1 |
| | What are the characteristics of sustainable materials? Rammed earth to produce sustainable house, justify the statement. | | |
| | b | 7 | CO1 |
| | Enumerate benefits of going Green. Hempcrete is for innovative product development, justify the statement. | | |
| | OR | | |
| | c | 7 | CO1 |
| | Ferrock is viable alternative to Cement, discuss with benefits. | | |
| 2 | a | 8 | CO2 |
| | How to produce Light weight concrete? Discuss its benefits in tall structures. | | |
| | b | 7 | CO2 |
| | A plastic fiber in cement concrete is viable solution to recycle, Discuss with the help of practical applications. | | |
| | OR | | |
| | c | 7 | CO2 |
| | Durability of concrete is influenced by the addition of Micro silica, justify the statement. | | |
| 3 | a | 8 | CO1 |
| | Compare wet process and dry process method of production of crumb rubber modified bitumen with suitable sketch. | | |
| | b | 7 | CO1 |
| | Discuss properties and benefits of Glenium product in concrete technology. | | |
| | OR | | |
| | c | 7 | CO1 |
| | Explain the construction of Nuclear containment shells of different | | |



shapes considering materials and methods to be used.

| | | | | |
|---|---|--|---|-----|
| 4 | a | Can we replace Kolhapur type (K.T.) weir by using Ferro cement technology? If yes write down construction techniques to be used. | 8 | CO2 |
| | b | How to produce high performance concrete? explain its practical applications | 7 | CO1 |
| 5 | a | What are refractories and their types? Give example of each of them | 6 | CO2 |
| | b | Describe the mechanical properties of ceramic materials | 6 | CO2 |
| | c | How is the Obscured glass obtained? | 4 | CO2 |
| | d | Describe briefly the applications of glass in building industry. | 4 | CO2 |
| 6 | a | What is thermal insulation and acoustic insulation material? Explain any two materials. | 6 | CO1 |
| | b | What is intelligent building materials? Explain any two with its benefits | 6 | CO2 |
| | c | What do you know about Rich lite (recycled paper)? discuss its applications | 4 | CO2 |
| | d | Comment on the use of old jeans for roofing material. | 4 | CO1 |



| |
|------------|
| Enroll No. |
| |

K. E. Society's
Rajarambapu Institute of Technology, Rajaramnagar
(An Autonomous Institute, Affiliated to Shivaji University, Kolhapur)
End Semester Examination August 2022

| |
|-----------|
| Q.P. Code |
| EB2541 |

First Year M. Tech. (Civil Construction Management Engineering) Semester – II

Course Name: Statistical Analysis **Course Code:** SHP 526

Day and Date: Fri., 18/08/2022 **Time:** 2:30 to 5:30 pm. **Max. Marks – 100**

- Instructions:**
- i) All questions are compulsory.
 - ii) Figures to the right indicate full marks.
 - iii) Assume the data if not given.
 - iv) Use of non-programmable calculator is allowed.

1. Attempt the following.

a) Interest centers around the life of an electronic component. Suppose it is known that the probability that the component survives for more than 6000 hours is 0.42. Suppose also that the probability that the component survives no longer than 4000 hours is 0.04. Let A be the event that the component fails a particular test and B be the event that the component displays strain but does not actually fail. Event A occurs with probability 0.20, and event B occurs with probability 0.35. COI 8

- (i) What is the probability that the component does not fail the test?
- (ii) What is the probability that the component works perfectly well (i.e., neither displays strain nor fails the test)?
- (iii) What is the probability that the component either fails or shows strain in the test?

b) An manufacturer is concerned about a possible recall of its best-selling four-door sedan. If there were a recall, there is a probability of 0.25 of a defect in the brake system, 0.18 of a defect in the transmission, 0.17 of a defect in the fuel system, and 0.40 of a defect in some other area. COI 7

- (i) What is the probability that the defect is the brakes or the fueling system if the probability of defects in both systems simultaneously is 0.15?
- (ii) What is the probability that there are no defects in either the brakes or the fueling system?

OR

b) A manufacturer of a flu vaccine is concerned about the quality of its flu serum. Batches of serum are processed by three different departments having rejection rates of 0.10, 0.08, and 0.12, respectively. The inspections by the three departments are sequential and independent. COI 7

- (i) What is the probability that a batch of serum survives the first departmental inspection but is rejected by the second department?
- (ii) What is the probability that a batch of serum is rejected by the third department?

2. Attempt the following.

- a) If the mean and variance of normal distribution $n(x; \mu, \sigma)$ are μ and σ^2 , respectively, then prove that the standard deviation is σ . CO2 5
- b) Suppose that a system contains a certain types of components whose time, in years is CO2 5



given by T. The random variable T is modeled by the exponential distribution with mean time to failure $\beta = 5$. If 5 of these components are installed in different systems, what is the probability that at least 2 are still functioning at the end of 8 years?

- c) The probability that a certain kind of component will survive a shock test is $\frac{3}{4}$. Find the probability that exactly 2 of the next 4 components tested survive. CO2 5

OR

c) On average, 3 traffic accidents per month occur at a certain intersection. What is the probability that in any given month at this intersection

- (i) exactly 5 accidents will occur?
 (ii) fewer than 3 accidents will occur?

Given: Poisson Probability Sums $\sum_{x=0}^r p(x; r)$

| | |
|---------|-----------|
| | $\mu = 3$ |
| $r = 4$ | 0.8153 |
| $r = 5$ | 0.9161 |

3. Attempt the following.

a) What is sampling distribution of S^2 (the variance of random sample of size n). CO3 5

b) A manufacturer of car batteries guarantees that the batteries will last, on average, 3 years with a standard deviation of 1 year. If five of these batteries have lifetimes of 1.9, 2.4, 3.0, 3.5, and 4.2 years, should the manufacturer still be convinced that the batteries have a standard deviation of 1 year? Assume that the battery lifetime follows a normal distribution. CO3 5

c) A certain change in a process for manufacturing component parts is being considered. Samples are taken under both the existing and the new process so as to determine if the new process results in an improvement. If 75 of 1500 items from the existing process are found to be defective and 80 of 2000 items from the new process are found to be defective, find a 90% confidence interval for the true difference in the proportion of defectives between the existing and the new process. CO3 5

OR

c) Discuss two important statistics the sample mean and its central tendency. CO3 5

4. Attempt the following.

a) Illustrate type-I error and type-II error in testing hypothesis. CO3 5

b) A large manufacturing firm is being charged with discrimination in its hiring practices. CO3 5

(i) What hypothesis is being tested if a jury commits a type I error by finding the firm guilty?

(ii) What hypothesis is being tested if a jury commits a type II error by finding the firm guilty?

c) The Edison Electric Institute has published figures on the number of kilowatt hours used annually by various home appliances. It is claimed that a vacuum cleaner uses an average of 46 kilowatt hours per year. If a random sample of 12 homes included in a planned study indicates that vacuum cleaners use an average of 42 kilowatt hours per year with a standard deviation of 11.9 kilowatt hours, does this suggest at the 0.05 level of significance that vacuum cleaners use, on average, less than 46 kilowatt hours annually? Assume the population of kilowatt hours to be normal. Given: $T < -1.16 \approx 0.135$. CO3 5

OR



c) An electrical firm manufactures light bulbs that have a lifetime that is approximately normally distributed with a mean of 800 hours and a standard deviation of 40 hours. Test the hypothesis that $\mu = 800$ hours against the alternative, $\mu \neq 800$ hours, if a random sample of 30 bulbs has an average life of 788 hours. Use a P-value in your answer. Given: $Z < -1.64 = 0.0505$. CO3 5

5. Attempt the following.

a) The following data give the hardness (X) and tensile strength (Y) for some specimens of a material in certain units in a factory. CO4 10

| | | | | | | | | | |
|---|----|----|----|----|----|----|----|----|----|
| x | 14 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| y | 84 | 78 | 70 | 75 | 66 | 67 | 62 | 58 | 60 |

- (i) Compute the coefficient of correlation r between x and y
(ii) Comment on the result.

OR

a) A sample of 25 pairs of values of x and y lead to the following results. CO4 10

$$\sum x = 127, \sum y = 100, \sum x^2 = 760, \sum y^2 = 449, \sum xy = 500$$

Later on it was found that two pairs of values were taken as (8, 14) and (8, 6) instead of correct values (8, 12) and (6, 8) .

Compute the correct coefficient of correlation r between x and y

b) The following table gives according to age the frequency of marks obtained by 47 students in an intelligence test. CO4 10

| Age in years \ Marks | 0-4 | 4-8 | 8-12 | 12-16 | Total |
|----------------------|-----|-----|------|-------|-------|
| 0-5 | 7 | - | - | - | 7 |
| 5-10 | 6 | 8 | - | - | 14 |
| 10-15 | - | 5 | 3 | - | 8 |
| 15-20 | - | 7 | 2 | - | 9 |
| 20-25 | - | - | - | 9 | 9 |
| Total | 13 | 20 | 5 | 9 | 47 |

- (i) Compute the Karl Pearson product moment correlation coefficient
(ii) Interpret the result.

6. Attempt the following.

a) Given the following results of weights X and heights Y of 1000 men. CO4 6
 $\bar{X} = 150\text{lbs}, \sigma_x = 20\text{lbs}, \bar{Y} = 68\text{inches}, \sigma_y = 2.5\text{inches}$ and $r = 0.6$. where \bar{X} and \bar{Y} are means of X and Y , σ_x and σ_y are standard deviations of X and Y and r is the correlation coefficient between X -series and Y -series.

John weighs 200 lbs, Smith is five feet tall. Estimate the height of John and weight of Smith.

b) In a certain type of metal test specimen, the normal stress on a specimen is known to be functionally related to the shear resistance. The following is a set of coded experimental data on the two variables. CO4 7

Normal



stress (X): 26.8 25.4 28.9 23.6 27.7 23.9 24.7 28.1 26.9 27.4 22.6 25.6
Shear

resistance (Y): 26.5 27.3 24.2 27.1 23.6 25.9 26.3 22.5 21.7 21.4 25.8 24.9

(i) estimate the regression line of Y on X.

(ii) estimate the shear resistance if the normal stress is 24.5 kg/cm^2 .

c) Why we need some assumptions in linear regression model? List the assumptions in multiple linear regression models.

CO4 7

OR

c) The following data represents the strength and elasticity values based on ten tests.

| | | | | | | | | | | |
|---------------|------|------|------|------|------|------|------|------|------|------|
| Strength (X) | 5.40 | 6.18 | 8.71 | 6.28 | 7.60 | 8.49 | 5.74 | 9.93 | 8.38 | 6.94 |
| Elasticity(Y) | 17 | 18 | 21 | 17 | 17 | 16.5 | 17 | 17.5 | 19 | 13.5 |

(i) compute the correlation between elasticity and strength

(ii) the regression equation of elasticity on strength

(iii) the elasticity when strength is 7.5

