USN | | | | | | | | | |          **10AL51**

## Fifth Semester B.E. Degree Examination, June/July 2017
## Management and Entrepreneurship

Time: 3 hrs.                                    Max. Marks:100

**Note:** *Answer any FIVE full questions, selecting atleast TWO questions from each part.*

### PART – A

1   a. Define Management with list and explain the functions of Management.    **(10 Marks)**
    b. "Manager plays a vital role in an organization". Justify this statement with reference to Interpersonal, Decision and Informational roles.    **(10 Marks)**

2   a. State and explain importance of planning process.    **(10 Marks)**
    b. Elucidate on steps in Decision making with probable difficulties faced by Manager.    **(10 Marks)**

3   a. What are Committees? Explain the principles of committees.    **(10 Marks)**
    b. Explain techniques of selection in detail.    **(10 Marks)**

4   a. Define Motivation. Mention characteristics and anticipated results of motivation.    **(10 Marks)**
    b. Describe essentials of Sound control system.    **(10 Marks)**

### PART – B

5   a. Briefly describe Entrepreneurship and list out types of Entrepreneurs.    **(10 Marks)**
    b. Enumerate on barriers faced by Women Entrepreneurs.    **(10 Marks)**

6   a. Describe Small Scale industry, Ancillary industry and Tiny industry.    **(10 Marks)**
    b. Explain the impact of Liberalization , Privatization and Globalization on small scale industry.    **(10 Marks)**

7   a. Describe Single Window concept.    **(05 Marks)**
    b. Enumerate on functions of SISI.    **(05 Marks)**
    c. Explain the role of KSFC in setting up industries.    **(05 Marks)**
    d. Write on objectives of NSIC.    **(05 Marks)**

8   a. Explain the process of product identification and project selection.    **(10 Marks)**
    b. Discuss on essentials of project appraisal.    **(10 Marks)**

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## Fifth Semester B.E. Degree Examination, June/July 2017
## Design of RC Structural Elements

Time: 3 hrs.                                   Max. Marks:100

Note: *1. Answer any FIVE full questions, selecting*
*atleast TWO questions from each part.*
*2. Use of IS – 456 – 2000 and SP – 16 is permitted.*

### PART – A

1   a.   Explain the philosophy and principles of limit state method of RCC design.    **(06 Marks)**
    b.   Explain the following :
       i)   Characteristic loads
       ii)   Characteristics strength
       iii)   Partial safety factor for loads
       iv)   Partial safety factor for materials.    **(08 Marks)**
    c.   Explain different types of steel used in RCC.    **(06 Marks)**

2   a.   What is a stress block? Derive from fundamentals the expression for area of stress block $0.36 \, t_{ck} \, x_u$ and depth of centre of compressive force from the extreme fibre in compression $0.42 \, x_u$.    **(08 Marks)**
    b.   A RC beam 200mm wide by 500mm deep effective is reinforced with 3 nos of 16mm dia bars. Find the moment of resistance of the beam. Effective span is 5.0m. If the effective cover is 40mm, find the safe working load as well as superimposed load. Use M25 grade concrete and Fe 415 steel.    **(12 Marks)**

3   a.   Explain the importance of side face reinforcement. Give the specification for the same.    **(06 Marks)**
    b.   Enlist various reasons that cause cracking in RCC.    **(04 Marks)**
    c.   A simply supported rectangular beam of 12m span has an effective depth of 800mm. The area of reinforcement required to support the loads is designed as 1.6 percent. Check the deflection control of the beam by empirical method if i) Fe 415 grade HYSD bars are used ii) Fe 500 grade bars are used.    **(10 Marks)**

4   Design a singly reinforced concrete beam of clear span 5m to support a design working live load of 10 kN/m. Adopt M20 grade concrete and Fe 415 HYSD bars. Also show the detailing of reinforcements.    **(20 Marks)**

### PART – B

5   Design RC slab rectangular panel discontinuous and restrained all-round, has an effective spans of 3.5m × 5.0m. Live load is 2 kN/m² and floor finish is 0.6 kN/m². Use M20 grade concrete and Fe-415 grade steel. All corners are held down.    **(20 Marks)**

6   a.   A column of size 300 mm × 400 mm is subjected to an axial factored load of 1200 kN and a factored moment of 250 kN-m. Design the column using M25 concrete and Fe 415 steel. Provide 40mm cover. Use of SP–16 is allowed.    **(10 Marks)**
    b.   Design short column (rectangular) subjected to an axial load of 3000 kN. Take effective length = 3.0m. Use M20 grade concrete Fe 415 grate steel. Check for minimum eccentricity in the direction.    **(10 Marks)**

7    A rectangular column of size 350mm × 550mm carries a live load of 1800 kN. The safe bearing capacity of soil is 200kN/m². Using M25 concrete and Fe 415 steel. Design a rectangular footing to support the column. Sketch the details of reinforcement.    **(20 Marks)**

8    The main stair of an office building has to be located in a stair case room measuring 2.5m × 5.6m. The vertical distance between the floors is 3.75m. Live load on stairs 5 kN/m². Design the flight slab using M20 and Fe 415 if flight slab and landing slab span in the same direction.    **(20 Marks)**

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USN ☐☐☐☐☐☐☐☐☐☐ **10CV53**

## Fifth Semester B.E. Degree Examination, June/July 2017
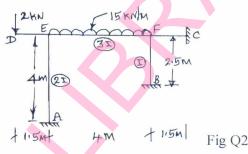## Structural Analysis – II

Time: 3 hrs. Max. Marks:100

**Note: 1.** *Answer FIVE full questions, selecting at least TWO questions from each part.*
**2.** *Assume any missing data suitably.*
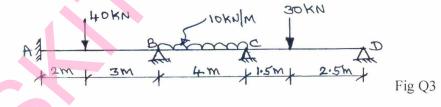
### PART – A

1  a. What is an influence line? Explain its advantages in structural analysis. **(06 Marks)**
   b. A moving u.d.l of 20kN/m and 8m long cross over a simply supported girder of span 20m. Determine :
      i)   Maximum +ve shear force –ve shear force and B.M at 6m from left support
      ii)  Absolute maximum SF and BM anywhere on the girder
      iii) Intensity of u.d.l throughout the span. **(14 Marks)**
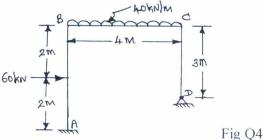
2  Analyse the frame shown in Fig Q2 by slope deflection method. Draw BMD and elastic curve. **(20 Marks)**



Fig Q2

3  Analyse the continuous beam shown in Fig Q3 by moment distribution method. Sketch the BMD, SFD and Elastic curve, EI constant. **(20 Marks)**



Fig Q3

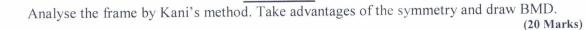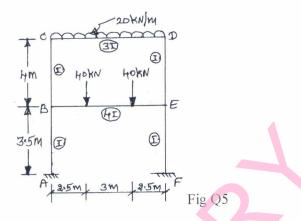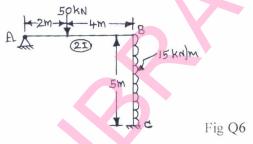4  Analyse the frame shown in Fig Q4 by moment distribution method. Draw BMD, EI is constant. **(20 Marks)**
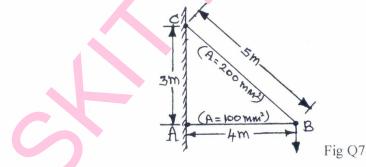


Fig Q4

## PART – B

**5** Analyse the frame by Kani's method. Take advantages of the symmetry and draw BMD.

**(20 Marks)**



Fig Q5

**6** Analyse the frame shown in Fig Q 6 by flexibility matrix method. Draw BMD and Elastic curve. **(20 Marks)**



Fig Q6

**7** Determine the displacement at 'B' of a pin jointed plane frame shown in Fig Q7. Also calculate the forces in the members AB and BC due to the given loading, by stiffness matrix method. Take $E = 2 \times 10^5$ N/mm$^2$. **(20 Marks)**



Fig Q7

**8** a. Explain : i) Degree of freedom ii) Free vibration
iii) Natural frequency iv) Forced vibration. **(08 Marks)**

b. Determine the natural angular frequency cyclic frequency and periodic of oscillation for a spring mass system with mass 10kg and stiffness 1000 N/m. If the system is given an initial displacement of 0.1m and an initial velocity of 0.2m/sec obtain the equation of motion. Also find displacement, velocity and acceleration after 0.2 sec. **(12 Marks)**

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# Fifth Semester B.E. Degree Examination, June/July 2017
## Geotechnical Engineering – I

Time: 3 hrs.                                                                 Max. Marks:100

Note: *1. Answer any FIVE full questions, selecting*
*atleast TWO questions from each part.*
*2. Missing data, if any, may be suitably assumed.*

### PART – A

1  a. Define following : i) void ratio   ii) water content   iii) degree of saturation. **(06 Marks)**

   b. Starting from 3-phase diagram, with usual notations prove that : $\gamma_b = \dfrac{(G + s_r e)}{(1 + e)} \gamma_w$. **(06 Marks)**

   c. For a given sandy soil, $e_{max} = 0.82$ and $e_{min} = 0.42$. Let $G = 2.66$, in the field, the soil is compacted to a moist unit weight of $16.87$ kN/m$^3$ at a moisture content of 9%. Determine void ratio, porosity, degree of saturation and relative density. **(08 Marks)**

2  a. What are index properties? List various index properties. **(06 Marks)**

   b. With the help of particle size distribution curves, explain well graded, poorly graded, fine gained and coarse grained soils. **(08 Marks)**

   c. A pycnometer test for the determination of water content of a soil sample, having $G = 2.70$, yielded the following data : weight of moist soil mass = 230.75g
   Weight of pycnometer + soil + water = 3092.85g
   Weight of pycnometer full of water = 2965.2g
   Calculate the water content of the soil. **(06 Marks)**

3  a. Draw a neat sketch of plasticity chart proposed by Casagrande. Using the above chart and the following data classify the soils as per IS 1498 – 1970.

**(10 Marks)**

| Soil | $W_L$ | $W_p$ | % passing 75 μ IS sieve | % gravel | %sand | $C_u$ | $C_c$ |
|------|-------|-------|-------------------------|----------|-------|-------|-------|
| A | 400 | 45 | 100 | 0 | 0 | – | – |
| B | 40 | 20 | 70 | 10 | 20 | – | – |
| C | 40 | 20 | 20 | 20 | 60 | 7 | 2 |
| D | Non plastic | Non plastic | 10 | 10 | 80 | 5.0 | 1.0 |

   b. With the help of neat sketches explain the principle clay minerals Kaolinite, Montmorillonite and Illite. **(10 Marks)**

4  a. What is permeability of soil? Briefly explain the factors affecting permeability. **(06 Marks)**

   b. Explain the suitability of variable head permeameter test and also derive the expression used to find the coefficient of permeability. **(06 Marks)**

   c. For a field pumping test a well was sunk through a horizontal stratum of sand 14.5m thick underlayed by a clayey stratum. Two observation wells were sunk at horizontal distances of 16m and 34m respectively from the pumping well. The initial position of water table was 2.2m below ground level. At a steady state of pumping rate is 925 lit/min, the draw downs in the observation wells were found to be 2.45m and 1.20m respectively. Show the arrangement in a diagram and determine the co-efficient of permeability. **(08 Marks)**

## PART – B

5  a.  List the factors affecting shear strength of soils.  **(04 Marks)**
   b.  Explain Mohr-coulomb theory of shear strength.  **(06 Marks)**
   c.  Compute the shear strength of soil along a horizontal plane at a depth of 5m in a deposit of sand having the following particulars.
   Angle of internal friction, $\phi = 36°$
   Dry unit weight, $\gamma_d$        = 17 kN/m$^3$
   Specific gravity, G        = 2.7
   Assume the ground water table is at a depth of 2.4m from the ground level. Also determine change in shear strength if water table rises upto ground level.  **(10 Marks)**

6  a.  What do you understand by field control of compaction? Explain proctor needle method.  **(08 Marks)**
   b.  Following are the observations of a compaction test :

| Water content (%) | 7.7 | 11.5 | 14.6 | 17.5 | 19.5 | 21.2 |
|---|---|---|---|---|---|---|
| Weight of wet soil (N) | 16.67 | 18.54 | 19.92 | 19.52 | 19.23 | 18.83 |

   If the volume of compaction mould is 950CC, assume G = 2.65
   i)  Draw the compaction curve
   ii)  Report the maximum dry unit weight and optimum moisture content
   iii)  Draw 100% saturation line.  **(12 Marks)**

7  a.  Explain spring analogy of consolidation of soils.  **(06 Marks)**
   b.  Explain normally consolidated, under consolidated and over consolidated soils.  **(06 Marks)**
   c.  In a consolidation test void ratio decreased from 0.70 to 0.60, when the pressure changed from 50 kN/m$^2$ to 100 kN/m2. Determine :
   i)  Compression index
   ii)  Coefficient of compressibility
   iii)  Coefficient of volume change.  **(08 Marks)**

8  a.  Write the advantages and disadvantages of direct shear test.  **(04 Marks)**
   b.  Briefly explain different drainage conditions in triaxial test in laboratory and how these simulates field problems.  **(06 Marks)**
   c.  In a drained triaxial compression test, a saturated sand sample failed at a deviator stress of 360 kN/m$^2$ under a cell pressure of 100 kN/m$^2$. Find the effective shear parameters of sand if another identical sample is tested under a cell pressure of 200 kN/m$^2$. Determine the deviator stress at which the specimen fails.  **(10 Marks)**

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## Fifth Semester B.E. Degree Examination, June/July 2017
## Hydrology and Irrigation Engineering

Time: 3 hrs.            Max. Marks:100

Note: 1. *Answer any FIVE full questions, selecting*
*atleast TWO questions from each part.*
*2. Missing data may suitably be assumed.*

### PART – A

1  a. Define Precipitation. Explain various forms of precipitation.    **(06 Marks)**
   b. Explain with neat sketch Syphon's rain gauge station.    **(07 Marks)**
   c. The average annual rainfall in cm at four existing raingauge stations in a basin are 105, 79, 70 and 66. If the average depth of rainfall over the basin is to be estimated within 10% error, determine the additional number of gauges required.    **(07 Marks)**

2  a. Define Evaporation. With neat sketch, explain measurement of evaporation using IS class A pan.    **(06 Marks)**
   b. What are the various methods of measurement of rate of infiltration? Also explain determination of constants in Horton's equation.    **(06 Marks)**
   c. The rate of rainfall for successive 30 minutes period of a 4 hour storm are as follows : 3.5, 6.5, 8.5, 7.8, 6.4, 4.0, 4.0, 6.0 cm/hr. Taking the value of $\phi$ index as 4.5 cm/hr. Compute the following : i) Rainfall total   ii) Total rainfall excess and iii) W – index.    **(08 Marks)**

3  a. Define a Hydrograph. Explain various components of flood hydrograph.    **(06 Marks)**
   b. Explain step by step derivation of unit hydrograph.    **(06 Marks)**
   c. Given the ordinates of 4 hr. unit hydrograph, derive the ordinates of 12 hr unit hydrograph for same catchment.    **(08 Marks)**

| Time (hrs) | 0 | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 | 44 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ordinate of 4 hr unit hydrograph | 0 | 20 | 80 | 130 | 150 | 130 | 90 | 52 | 27 | 15 | 5 | 0 |

4  a. Define Flood routing. What are the uses of flood routing?    **(06 Marks)**
   b. Differentiate between : i) Hydraulic routing and hydrologic routing   ii) Channel routing and reservoir routing   iii) Prism storage and Wedge storage.    **(06 Marks)**
   c. Derive Muskingum routing equation and expressions for routing co-efficients $C_0$, $C_1$ and $C_2$.    **(08 Marks)**

### PART – B

5  a. Differentiate between : i) Agriculture and Irrigation    ii) Sewage irrigation and supplemental irrigation   iii) Explain Well irrigation method.    **(08 Marks)**
   b. Explain Environmental impacts of irrigation.    **(06 Marks)**
   c. Explain advantages and disadvantages of irrigation.    **(06 Marks)**

6  a. Explain classification of soils.    **(06 Marks)**
   b. What is Frequency of irrigation? How depth of water stored in root zone is derived?    **(06 Marks)**

c. After how many days will you supply water to (clay loam) in order to ensure efficient irrigation of given crop, if
i) Field capacity of soil = 27%   ii) Permanent wilting point = 14%   iii) Density of soil = 1.5 gm/cc   iv) Effective depth of root zone = 75cm   v) Daily consumptive use of water for given crop = 11mm.   **(08 Marks)**

7  a. Define Duty, Delta and Base period. Establish a relationship between them.   **(06 Marks)**
   b. What is Consumptive use of water? What are the factors affecting consumptive use of water?   **(08 Marks)**

   c. The base period, intensity of irrigation and duty of various crops under canal system are given in table below. Find the reservoir capacity, if the canal losses are 20% and reservoir losses are 12%.   **(06 Marks)**

| Crop | Base period in days | Duty at field (ha/cumecs) D | Area under crop (ha) |
|------|--------------------|-----------------------------|----------------------|
| Wheat | 120 | 1800 | 4800 |
| Sugarcane | 360 | 800 | 5600 |
| Cotton | 200 | 1400 | 2400 |
| Rice | 120 | 900 | 3200 |
| Vegetables | 120 | 700 | 1400 |

8  a. What are the Canals? Explain classification of canals.   **(06 Marks)**
   b. Explain Lacey's regime theory.   **(08 Marks)**
   c. Design an irrigation channel to carry a discharge of 14 cumecs. Assume

   $N = 0.0225$,   $m = 1$   $\dfrac{B}{D} = 5.7$   **(06 Marks)**

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## Fifth Semester B.E. Degree Examination, June/July 2017
### Transportation Engineering – I

Time: 3 hrs.                                                                    Max. Marks:100

**Note: 1.** *Answer FIVE full questions, selecting at least TWO questions from each part.*
     **2.** *Assume Missing data suitably*
     **3.** *Use of tables and charts extracted from IRC 37-2001 and IRC 58-2002 is permitted.*

### PART – A

1   a.   Explain the role of transportation for the development of rural areas in India.   **(06 Marks)**
    b.   What are the significant recommendations of Jayakar committee? How they are implemented?   **(08 Marks)**
    c.   What are the various characteristics of road transport?   **(06 Marks)**

2   a.   What are the methods of classification of roads? Mention their respective classification of road.   **(06 Marks)**
    b.   What are the different studies made in planning surveys? What are the typical drawing are prepared in the form of plans by analyzing the planning survey datas?   **(06 Marks)**
    c.   The area of a certain district in India is 13400Sq Km and there are 12 towns as per 1981 census. Determine the lengths of different categories of roads to be provided in this district by the year 2001.   **(08 Marks)**

3   a.   What is the necessity of re-alignment? What are the different types of improvement made by re-alignment of highway?   **(06 Marks)**
    b.   Draw the typical cross section of following roads with full details :
       i)   Cross section of two lane city road in built up area
       ii)   Cross section of divided highway in urban area.   **(06 Marks)**
    c.   The speeds of overtaking and over taken vehicles are 70 and 40kmph respectively on a two way traffic road the average acceleration during overtaking may be assumed as 0.99 m/sec$^2$.
       i)   Calculate safe overtaking sight distance
       ii)   What is the minimum length of overtaking zone?
       iii)   Draw a neat sketch of the overtaking zone and show the positions of the sign post.   **(08 Marks)**

4   a.   What are the objects of providing transition curves on the horizontal alignment highways? How its length is calculated by the method of rate of change of centrifugal acceleration?   **(08 Marks)**
    b.   Find the total width of a pavement on horizontal curve for a new national highway to be aligned along a holling terrain with a minimum ruling radius. Assume necessary data.   **(06 Marks)**
    c.   A vertical summit curve is formed at the intersection of two gradients +3.0 and -5.0 percent. Design the length of summits curve to provide a stopping sight distance for a design of 80kmph. Assume other data.   **(06 Marks)**

### PART – B

5   a.   Explain how the C.BR value of the given soil is found in the laboratory.   **(08 Marks)**
    b.   A plate load test was conducted on a soaked subgrade during monsoon season using a plate diameter of 30cm. The test values are given below. Determine the modulus of subgrade reaction for the standard plate.   **(06 Marks)**

| Mean settlement values in mm | 0.0 | 0.24 | 0.52 | 0.76 | 1.02 | 1.23 | 1.53 | 1.76 |
|---|---|---|---|---|---|---|---|---|
| Load values in kg | 0.0 | 460 | 900 | 1180 | 1360 | 1480 | 1590 | 1640 |

    c.   What are the tests conducted to judge the desirable properties and suitability of the following highway materials i) Road aggregates    ii) Bitumen binder.   **(06 Marks)**

6  a. Explain E.S.WL. How it is determined for a dual wheel load assembly by graphical method?

(06 Marks)

   b. Calculate the stresses at interior, edge and corner region of a cement concrete pavement using Westergaard's stress equations and also determine the probable location where the crack is likely to develop due to corner loading.

Wheel load P = 5100kg

Modulus of elasticity of cement concrete E = $3.0 \times 10^5$ kg/cm$^2$.

Pavement thickness h = 18cm

Poisson's ratio of concrete $\mu$ = 0.15

Modulus of subgrade reaction K = 6.0kg/cm$^3$

Radius of contact area a = 15cm

(08 Marks)

   c. Design the flexible pavement for construction of new highway with the following data :

Number of commercial vehicles as per

Period of construction = 3 years

Initial traffic = 3500CV per day

Annual traffic growth rate = 6.5%

Category of road N.H 2 lane single carriage way.

Design life 15 years

VDF = 40, LDF = 75%

Use the following pavement design catalogue for 10% CBR : sketch the pavement structure

| Cumulative traffic (msa) | Total pavement thickness (mm) | Pavement | | Composition |
| | | Bituminous surfacing | | Granular base and sub base (mm) |
| | | BC (mm) | DBM (mm) | |
| 10 | 540 | 40 | 50 | |
| 20 | 565 | 40 | 75 | |
| 30 | 580 | 40 | 90 | Base 250 sub base 200 |
| 50 | 600 | 40 | 110 | |
| 100 | 630 | 50 | 130 | |
| 150 | 650 | 50 | 150 | |

(06 Marks)

7  a. What are the steps followed for the construction of new highway on cutting.   (06 Marks)

   b. What are the importances of highways drainage?   (06 Marks)

   c. The maximum quantity of water expected in one of the open longitudinal drainage on clayey soil is 0.9m$^3$/sec design the cross section and longitudinal slope of trapezoidal drain assuming the bottom width of the section to be 1.0m and cross slope to the 1.0 vertical to 1.5 horizontal. The allowable velocity of flow in the drain is 1.2m/sec and mannings roughness coefficient is 0.02.   (08 Marks)

8  a. What are the benefits to the road users and to other in the region due to improvement of the highway?

(08 Marks)

   b. Calculate the annual cost of a stretch of highway from to following particulars :

| Item | Total cost in Lakhs Rs | Estimated life years | Rat of interest % |
| --- | --- | --- | --- |
| Land | 35.0 | 100 | 6 |
| Earthwork | 40.0 | 40 | 8 |
| Bridges culverts Drainage | 50.0 | 60 | 8 |
| Pavement | 100.0 | 15 | 10 |
| Traffic signs and road appetencies | 15.0 | 5 | 10 |

The average cost of maintenance of the road is Rs 1.5 lakhs per year.   (06 Marks)

   c. What are the factors to the considered for evaluation of vehicle operation cost?   (06 Marks)