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10AL51

**Fifth Semester B.E. Degree Examination, Dec.2015/Jan.2016**  
**Management and Entrepreneurship**

Time: 3 hrs.

Max. Marks:100

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

**PART – A**

- 1 a. Explain the various functions of management. (10 Marks)  
b. Explain the roles of a manager. (10 Marks)
- 2 a. Discuss the importance of planning. Differentiate between strategic planning and tactical planning. (10 Marks)  
b. With a flow chart, explain the steps involved in decision making. (10 Marks)
- 3 a. What are the principles of an organization? Explain. (10 Marks)  
b. Explain briefly the steps involved in selection process. (10 Marks)
- 4 a. Explain briefly Herzberg's theory of motivation. (10 Marks)  
b. What are the essentials of a sound control system? Explain. (10 Marks)

**PART – B**

- 5 a. Define the term 'Entrepreneur'. Differentiate between entrepreneur and Intrapreneur. (10 Marks)  
b. Explain the stages in entrepreneurial process. (10 Marks)
- 6 a. What are the steps involved in setting up of small scale industry (SSI)? Explain. (10 Marks)  
b. What are the objectives and functions of world trade organization (WTO)? Explain. (10 Marks)
- 7 a. Explain the objectives and functions of NSIC and KSFC. (10 Marks)  
b. Write short notes on KSSIDC and SISI. (10 Marks)
- 8 a. Explain in detail the guidelines for preparation of project report. (10 Marks)  
b. What are the various network analysis techniques? Differentiate between PERT and CPM. (10 Marks)

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**Fifth Semester B.E. Degree Examination, Dec.2015/Jan.2016**  
**Design of RCC Structural Elements**

Time: 3 hrs.

Max. Marks:100

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

**PART – A**

- 1 a. Explain working stress method, limit state method of RCC design. (04 Marks)  
 b. Distinguish between balanced, under reinforced and over reinforced section of RCC design. (06 Marks)  
 c. Derive the expression for depth of NA  $\bar{y} = 0.42x_u$ , in the case of rectangular RCC beam design. (06 Marks)  
 d. Obtain an expression for limiting percentage of steel for a rectangular RCC section with M20 concrete and Fe500 steel. (04 Marks)
- 2 a. A singly reinforced beam 250mm × 450mm deep up to centre of reinforcement E cover 50mm Effective span 6m using M20 concrete and Fe 500 steel. Determine the central point load that can be supported in addition to self wt. When i) 3 – 16mm dia bars ii) 3 – 20mm dia bars are used as reinforcement. (12 Marks)  
 b. A doubly reinforced concrete beam 250mm wide 500mm deep is required to support 40kN/m including self wt effective span is 5m. Effective cover 50mm, using M<sub>20</sub> concrete Fe 415 steel, find steel for flexure and shear. (08 Marks)
- 3 A rectangular section 200×450mm overall is reinforced with 3 – 16mm dia of an effective depth 420mm. Two hanger bars 12mm dia effective span 5m. The beam support a load of 10kN/m. Calculate short term deflection and long term deflection using M<sub>20</sub> concrete and Fe415 steel. (20 Marks)
- 4 A hall 16m × 6m supported by beams spaced 4m c/c thickness of slab 120mm UDL 4kN/m<sup>2</sup> Design a T beam using M20 concrete Fe415 steel for flexure and shear. Take bearing as 500mm. Also show the check for deflection and bond. (20 Marks)

**PART – B**

- 5 Design a two-way RCC slab for a room 6m × 4m supported on wall 230mm corners are held down. Live load 4kN/m<sup>2</sup> Floor finish 1.0kN/m<sup>2</sup>. Adopt M20 concrete Fe415 steel. (20 Marks)
- 6 a. Design RCC column having unsupported length 2.75m to support a load of 2000kN using M20 concrete Fe415 steel  
 i) As a square section      ii) As a rectangular section with  $\frac{b}{D} = \frac{3}{4}$ . (12 Marks)  
 b. A column 300mm × 400mm is to support a ultimate load of 1200kN, Mu200kNm. Find steel using M20 concrete Fe415 steel, assuming effective cover 50mm. Sketch the reinforcement details. (08 Marks)
- 7 A square column 400mm sides carries a load of 900kN. Design a footing SBC of soil 100kN/m<sup>2</sup>. Adopt M20 concrete Fe415 steel. Show the check for one way, two way shear and bond strength. (20 Marks)
- 8 The main stair of an office building has to be located in a stair measuring 3.5m×5.5m. Distance between the floor is 3.75m live load 3kN/m<sup>2</sup>. Design the Dog legged stair using M20 concrete, Fe415 steel. Also sketch the details of reinforcement. (20 Marks)

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10CV53

**Fifth Semester B.E. Degree Examination, Dec.2015/Jan.2016**

**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 For a simply supported beam of span 25m, compute by influence line principle,  
 i) Maximum bending moment at 8m from left support  
 ii) Absolute maximum bending moment and  
 iii) Maximum reaction

The series of concentrated loads to be taken as rolling load system as shown in Fig. Q1

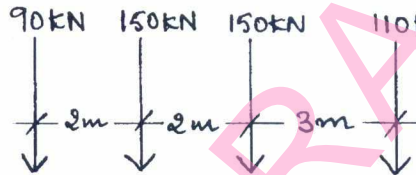


Fig. Q1

(20 Marks)

- 2 Analyse the portal frame shown in Fig. Q2 using slope deflection method. Sketch BMD.

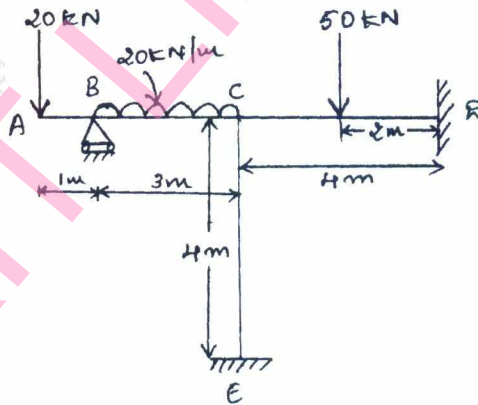


Fig. Q2

(20 Marks)

- 3 Analyse a continuous beam shown in Fig.Q3 using moment distribution method. Sketch, SFD and BMD support 'B' and 'C' settles by 8mm and 3mm respectively  $EI = 2 \times 10^4 \text{ kN/m}^2$ .

(20 Marks)

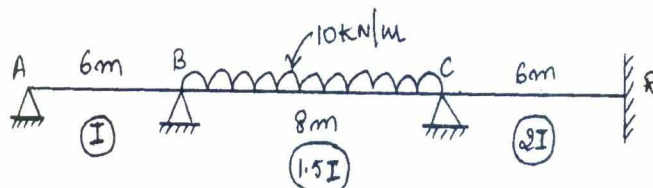


Fig. Q3

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

- 4 Analyse the portal frame using slope deflection method or using moment distribution method. Sketch BMD and elastic curve. (20 Marks)

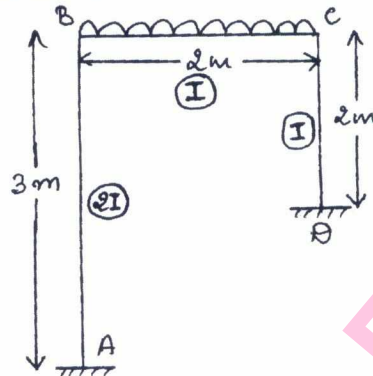


Fig.Q4

**PART - B**

- 5 Analyse the portal frame shown in Fig. Q5 by Kani's method and sketch BMD. (20 Marks)

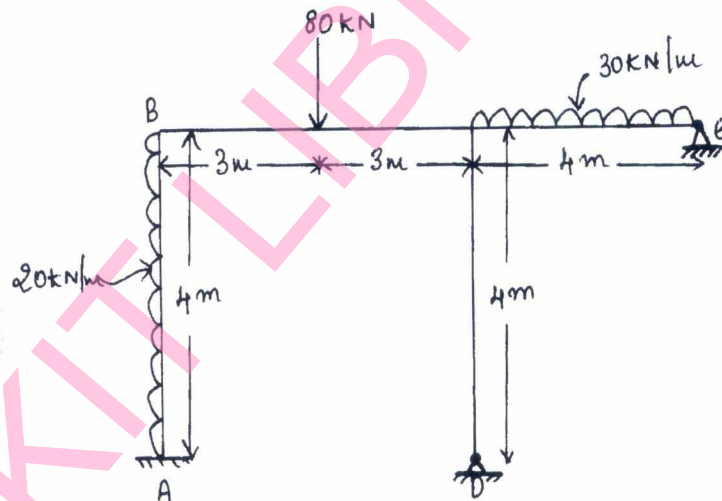
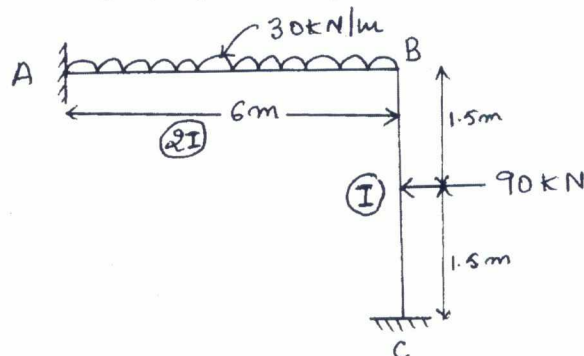
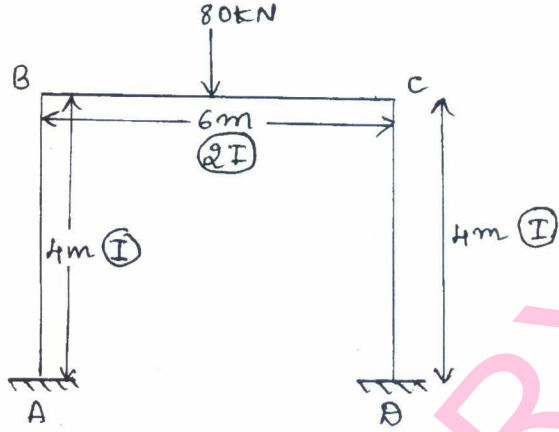


Fig.Q5

- 6 Analyse the frame shown in Fig. Q6 by flexibility method. Draw BMD. (20 Marks)



7 Analyse the portal frame loaded as shown in Fig. Q7 by stiffness method. Sketch BMD



(20 Marks)

8 a. Explain the following

- i) Period frequency
- ii) Damping
- iii) Forced vibration
- v) Single degree of freedom systems

(04 Marks)

b. Develop the solution for a differential equation of a body, when it is under;

- i) Free undamped vibration
- ii) Free damped vibration.

(16 Marks)

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10CV54

**Fifth Semester B.E. Degree Examination, Dec.2015/Jan.2016**  
**Geotechnical Engineering - I**

Time: 3 hrs.

Max. Marks:100

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

**PART - A**

- 1 a. With the help of three phase diagram for fully saturated soil, partially saturated soil and perfectly dry soil, define the following terms : i) Water content ii) Degree of saturation iii) Voids ratio iv) Porosity. (06 Marks)
- b. Derive from first principle, the following phase relation :  

$$r_d = \frac{(1 - n_a)G_r}{1 + wG}$$
 (06 Marks)
- c. For a given soil, having specific gravity = 2.67, unit weight of 17.6 kN/m<sup>3</sup> and moisture content of 10.8%, determine dry unit weight, voids ratio, porosity and degree of saturation. For the same soil, determine the weight of water, in kN to be added per cum of soil for 80% degree of saturation. (08 Marks)

- 2 a. State Stoke's law. List the assumptions and limitations of Stoke's law as applied to soil sedimentation. (06 Marks)
- b. With the help of particle size distribution curves, define the following terms : (06 Marks)  
 i) Well graded soils ii) Poorly graded soils iii) Gap – graded soils iv) C<sub>u</sub> and C<sub>c</sub>.
- c. The following data was obtained from liquid limit test on a cohesive soil.

|                     |      |      |      |      |
|---------------------|------|------|------|------|
| Number of blows (N) | 40   | 35   | 22   | 14   |
| Moisture content    | 25.5 | 28.0 | 32.5 | 36.0 |

Plot the flow curve and determine the flow index and liquid limit. If the plastic limit of the soil is 18.5%, what are the plasticity and toughness indices? (08 Marks)

- 3 a. Explain the salient features of I.S plasticity chart for classification of fine grained soils. (06 Marks)
- b. List and explain the structure of three different clay minerals commonly found in soils. (06 Marks)
- c. The properties of soil as determined from laboratory test on three samples are as given below :

| Soil | LL (%) | PL (%) | W <sub>n</sub> (%) | Percent finer than 75μ |
|------|--------|--------|--------------------|------------------------|
| A    | 114    | 42     | 120                | 55                     |
| B    | 80     | 30     | 72                 | 43                     |
| C    | 64     | 36     | 20                 | 47                     |

Determine : i) The plasticity indices and classify the soils.  
 ii) The liquidity indices and classify the consistency. (08 Marks)

- 4 a. Explain the following terms : i) Coefficient of Permeability ii) Quick sand condition iii) Seepage velocity. (06 Marks)
- b. Derive an expression for the determination of coefficient of permeability by falling head permeameter. (06 Marks)
- c. A sand sample is tested in a permeameter 11.7cm high and 10.15 cm in diameter The quantity of water passing through the sample under an effective head of 10cm for a period of 90 seconds was measured 600 ml. Determine i) Coefficient of permeability ii) Coefficient of percolation and iii) Seepage velocity. Assume the dry density of soil = 16.47 kN/m<sup>3</sup> with sp. Gravity of soil solids = 2.64. (08 Marks)

**PART - B**

- 5 a. Explain briefly Mohr – Coulomb strength theory. Draw the failure envelopes for  $\phi = 0$ ,  $C = 0$  and  $C - \phi$  soils. (06 Marks)
- b. Define Sensitivity and Thixotrop as applied to cohesive soils. (04 Marks)
- c. Calculate and draw the total, effective and pore water pressure distribution for a soil profile with properties as shown in fig. Q5(c). Assume specific gravity of soil = 2.70. (10 Marks)

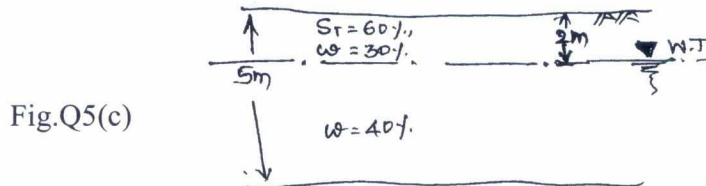


Fig.Q5(c)

- 6 a. Distinguish between standard and modified proctor tests. (04 Marks)
- b. List and explain briefly the factors affecting compaction. How does compaction differs from consolidation. (06 Marks)
- c. Data from a laboratory Proctor compaction test on clayey sand is as given below. Plot the compaction curve and find OMC and maximum dry density. If the specific gravity of soil solids is 2.75, find the voids ratio and degree of saturation at OMC. (10 Marks)

|                                   |      |       |      |       |       |       |
|-----------------------------------|------|-------|------|-------|-------|-------|
| Water content (%)                 | 6.5  | 10.5  | 14.5 | 18.5  | 22.5  | 26.5  |
| Bulk density (kN/m <sup>3</sup> ) | 14.0 | 18.04 | 20.0 | 21.05 | 21.00 | 18.99 |

- 7 a. Briefly explain consolidation using spring analogy. (06 Marks)
- b. Explain Casagrande’s method of determination of preconsolidation pressure. (06 Marks)
- c. In a consolidation test, voids ratio decreased from 0.80 to 0.65, when the pressure was changed from 100kN/m<sup>2</sup> to 200kN/m<sup>2</sup>. Determine i) Compression Index ii) Coefficient of compressibility and iii) Coefficient of volume change. (08 Marks)
- 8 a. Explain the merits and demerits of direct shear test. (04 Marks)
- b. A laboratory consolidation test was performed on a specimen of clay 25mm thick, drained both at top and bottom. The time required for 50% consolidation was 12 minutes. Determine the coefficient of consolidation of clay. Also calculate the time required for same degree of consolidation (50%) for this clay deposit 5m thick and drained at top end only. (06 Marks)
- c. The following results were obtained from a consolidated undrained test on a normally consolidated clay. Plot the strength envelope in terms of total stresses and effective stresses and determine cohesion intercept and angle of shearing resistance. (10 Marks)

| Sl. No | Cell Pressure (kN/m <sup>2</sup> ) | Deviator stress (kN/m <sup>2</sup> ) | Pore water Pressure (kN/m <sup>2</sup> ) |
|--------|------------------------------------|--------------------------------------|--|
| 1      | 250                                | 152                                  | 120                                      |
| 2      | 500                                | 300                                  | 250                                      |
| 3      | 750                                | 455                                  | 350                                      |

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10CV55

**Fifth Semester B.E. Degree Examination, Dec.2015/Jan.2016**  
**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. What do you understand by the term hydrology? Explain with neat sketch, Horton's engineering representation of "Hydrologic cycle". (08 Marks)
  - b. What is Precipitation? List the different forms and types of precipitation. (07 Marks)
  - c. Determine the optimum number of rain gauges in a catchment area from the following data :
    - i) No. of existing rain gauges = 08.
    - ii) Mean Annual rainfall at the gauges are = 1000 , 950 , 900 , 850 , 800 , 700 , 600 and 400mm.
    - iii) Permissible error = 6%. (05 Marks)
2.
  - a. What is Evaporation? What are the factors that affect evaporation? How would you measure evaporation? (06 Marks)
  - b. What are the factors that affect infiltration? Explain with sketch, the measurement of infiltration by double ring infiltrometer. (09 Marks)
  - c. The rate of rainfall for half an hour period of 3 – hour storm are 1.6, 3.6, 5.0, 2.8, 2.2 and 1.0cm/hr. The corresponding surface runoff is estimated to 3.6cm. Determine  $\phi$  and W – index. (05 Marks)
3.
  - a. Define hydrograph. Describe the various components of a simple hydrograph resulted from a storm rainfall. (08 Marks)
  - b. Explain briefly the various factors affecting flood hydrograph. (08 Marks)
  - c. Define unit hydrograph. List the assumptions made in deriving the unit hydrograph. (04 Marks)
4.
  - a. Define Flood. Explain the various empirical formulae for estimating peak flood for catchments (any four). (10 Marks)
  - b. Define flood routing. What are the uses of flood routing? Write down the Muskingum routing equation and the expressions for the routing coefficients  $C_0$ ,  $C_1$ ,  $C_2$ . (10 Marks)

**PART – B**

5.
  - a. What is Irrigation? Discuss in brief the benefits and ill effects of irrigation. (12 Marks)
  - b. Explain any four advantages and disadvantages of well irrigation over canal irrigation system. (08 Marks)
6.
  - a. Give the list of common Indian soils. (06 Marks)
  - b. Explain the soil moisture and soil moisture contents in different zones, with neat sketch. (08 Marks)



- c. Determine the frequency of irrigation from the following data :
- Field capacity of soil = 35%.
  - Permanent wilting point = 18%.
  - Density of soil =  $1.5\text{g/cm}^3$
  - Root zone depth = 700mm.
  - Daily consumptive use of water = 17mm. **(06 Marks)**
- 7
- Define Duty, Delta and Base period. Derive the relationship between them. **(06 Marks)**
  - Explain consumptive use of water. List the factors affecting consumptive use of water. **(09 Marks)**
  - A channel is to be designed for irrigating 5000 hectares in Kharif crop and 4000 hectares in Rabi crops. The water required for Kharif and Rabi are 600mm and 250mm respectively. The Kor period for Kharif is 3 weeks and for Rabi is 4 weeks. Determine the discharge of the channel for which it is to be designed. **(05 Marks)**
- 8
- What is Canal? Explain various considerations for alignment of a canal, with a sketch. **(12 Marks)**
  - Design an irrigation channel in alluvial soil according to Lacey's silt theory for the given data :
    - Full supply discharge = 15 cumec.
    - Mean diameter of the silt particles = 0.33mm.
    - Channel side slope =  $\frac{1}{2} H : 1 V$ .Find also the bed slope of the channel. **(08 Marks)**

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10CV56

**Fifth Semester B.E. Degree Examination, Dec.2015/Jan.2016**  
**Transportation Engineering - I**

Time: 3 hrs.

Max. Marks:100

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

**PART – A**

1. a. Explain the role of Transportation in Rural Development in India. (04 Marks)  
 b. Outline the scope of Highway Engineering Studies. (08 Marks)  
 c. Enumerate the characteristics of Road Transportation. (08 Marks)
2. a. The following Data were collected for planning the Road Development Programme of a backward district : i) Total Area = 9800 km<sup>2</sup> ii) Agricultural and developed area = 4200 km<sup>2</sup> iii) Existing Railway track length = 165 kms iv) Existing length of Metalled roads = 360 kms v) Existing length of un – metalled roads = 456 kms vi) Number of towns or villages in different ranges are as below :

| Population                | > 5000 | 2001-5000 | 1001-2000 | 501-1000 | < 500 |
|---------------------------|--------|-----------|-----------|----------|-------|
| No. of villages and towns | 18     | 80        | 150       | 300      | 600   |

Calculate the additional length of metalled and unmetalled roads for the roads system based on Nagpur road plan formulae for this district. (10 Marks)

- b. What are the methods of classifying roads? Briefly outline classification of Urban roads. (10 Marks)
3. a. Draw the typical cross section of following roads indicating the width of pavement roadway and land : i) National highway in embankment in rural areas ii) A divided highway in urban areas. (06 Marks)  
 b. Explain the various Elements of Road margins in embankment and in cuttings, with neat sketch. (08 Marks)  
 c. Explain Camber. What are the objects of camber and shapes of camber? (06 Marks)
4. a. Explain with neat sketch, width of carriage way for single lane and two lane pavement and specify the IRC recommendations. (10 Marks)  
 b. The speed of the overtaking and overtaken vehicles are 80 and 50 kmph respectively on a two way traffic road. If the acceleration of overtaking vehicle is 0.98 m/sec<sup>2</sup> :  
 i) Calculate safe overtaking sight distance.  
 ii) Mention the minimum length of overtaking zone.  
 iii) Draw a neat sketch of overtaking zone and show the positions of sign posts. (10 Marks)

**PART – B**

5. a. A load penetration values of CBR tests conducted on a specimen of a soil sample are given below. Determine the CBR value of soil, if 100 divisions of load represents 190 kg and in the calibration chart of proving ring. (06 Marks)

|   |     |     |     |     |     |     |     |     |     |     |      |      |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| Penetration of Plunger, mm                      | 0.0 | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 4.0 | 5.0 | 7.5 | 10.0 | 12.5 |
| Load dial readings divisions for soil specimens | 0   | 8   | 16  | 24  | 30  | 36  | 42  | 48  | 58  | 58  | 65   | 70   |

- b. Explain the desirable properties of aggregates to be used in different types of pavement construction. (06 Marks)
- c. Distinguish between : i) Tar & bitumen ii) Cut back and Emulsion and list the tests on Bitumen. (08 Marks)
- 6 a. Draw a sketch of Flexible Pavement Cross section and show the component parts. Enumerate the functions and importance of each component of pavement. (08 Marks)
- b. Write the commonly used equations for theoretical computation of wheel load stresses by Westergaards for analysis of Interior, edge and corner loadings. (04 Marks)
- c. Calculate the stresses at Interior, Edge and Corner regions of a cement concrete pavement using Westergaards stress equation. Use the following data Wheel load,  $P = 5100$  kgs, Modulus of Elasticity  $E = 3.0 \times 10^5$  kg/cm<sup>2</sup>, Pavement thickness  $h = 18$  cms, Poisson's Ratio of concrete  $\mu = 0.15$ , Modulus of subgrade reaction  $K = 6.0$  kg/cm<sup>3</sup>, Radius of contact area  $a = 15$ cm. (08 Marks)
- 7 a. Enumerate the steps for preparation of WBM course with checking of surface evenness and rectification of defects. (12 Marks)
- b. Enumerate specifications (IRC) of materials for
- Coarse aggregates used in WBM pavements.
  - Size and grading required of coarse aggregates in WBM pavements.
  - Grading required for screening in WBM pavements.
- (08 Marks)
- 8 Write short notes with neat sketches wherever required on :
- Sub – Surface Drainage System with longitudinal and Transverse drains.
  - Surface Drainage System in Urban roads.
  - KRDCL and KSHIP, present scenario in Karnataka.
  - Jayakar Committee recommendations.
- (20 Marks)

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