

Bharatiya Vidya Bhavan's  
**SARDAR PATEL COLLEGE OF ENGINEERING**  
(An Autonomous Institution Affiliated to University of Mumbai)

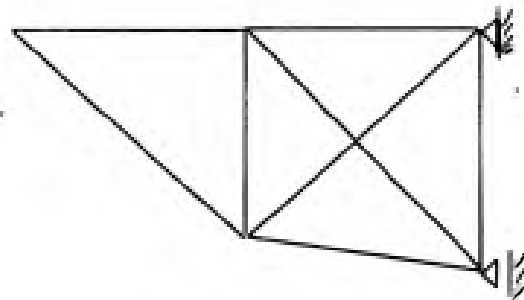
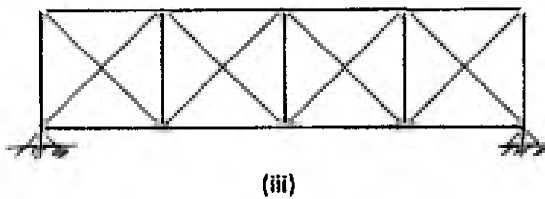
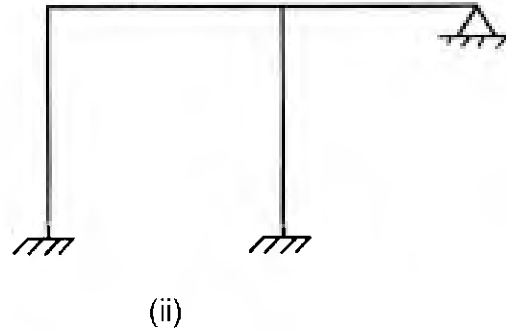
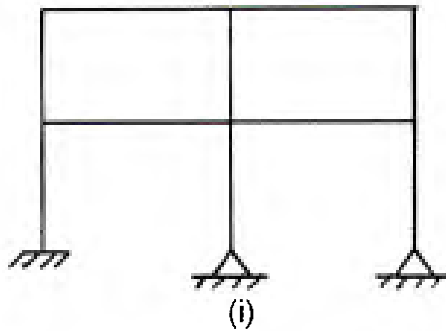
*PKT*  
Total Marks : 100  
CLASS/SEM : TE (CIVIL) SEM V  
SUBJECT : STRUCTURAL ANALYSIS - II

June 2015  
Duration : 3 Hours

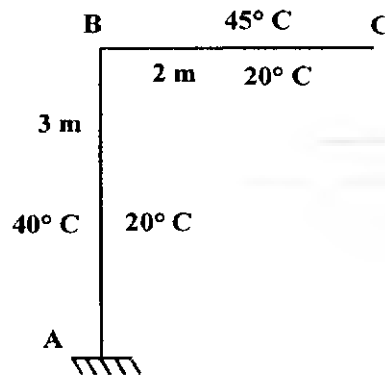
- Attempt any FIVE questions out of SEVEN questions.
- If there are sub questions, answers to all sub questions should be grouped together.
- Figures to the right indicate full marks.
- Assume suitable data if necessary and state the same clearly.

*Master.*

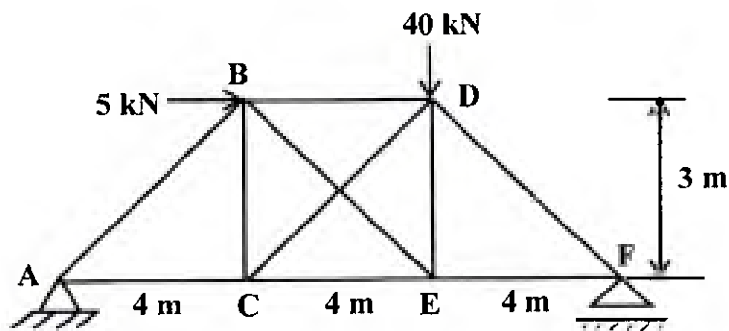
Q.1 (a) Determine the static and kinematic indeterminacy of the structures shown (10)  
in figures below.



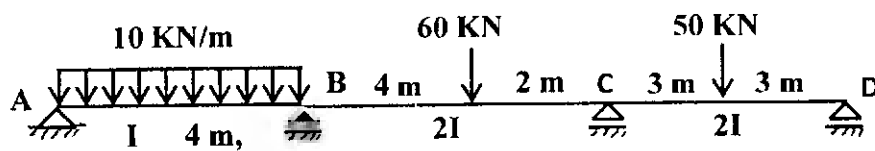
- Q.1 (b) For the frame shown in figure calculate the vertical deflection of D due to change in temperature as indicated in figure. Take  $\alpha = 12 \times 10^{-6} / ^\circ\text{C}$  and depth of all members as 400 mm. (10)



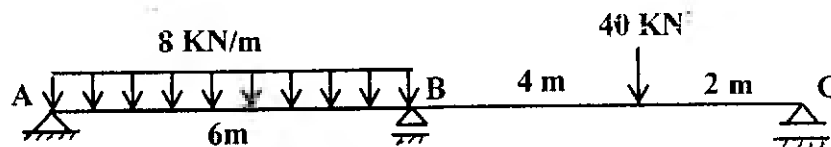
- Q.2 (a) Find the forces in all members of the truss shown in figure below. Take force in member CD as the redundant force. Assume AE to be same for all the members. (10)



- Q.2 (b) Analyse the continuous beam shown in figure using three moment theorem. (10)



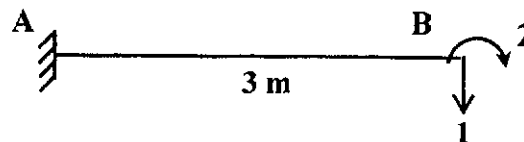
- Q.3 (a) Find the reactions at A in the continuous beam shown in figure using the theorem of least work. (10)



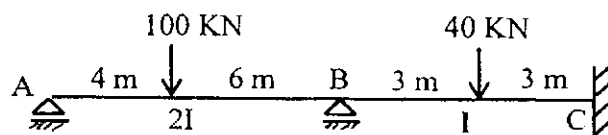
Structural Analysis - II

Q.3 (b) A two hinged parabolic arch of span 24 m and rise 4 m carries a concentrated load of 30 kN at a distance of 5 m from the right support. Determine the horizontal thrust in the arch. The moment of inertia (MI) of the section of the arch varies as  $I = I_0 \sec^2 \alpha$ , where  $I_0 = MI$  of the section at the crown. (10)

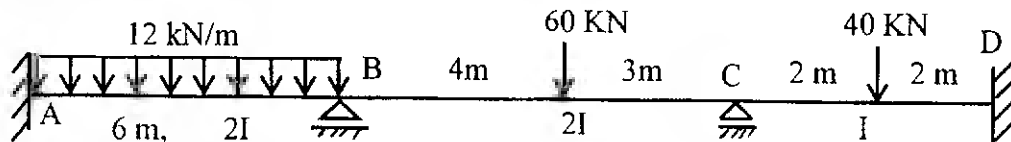
Q.4 (a) Calculate the flexibility coefficients for the beam shown in figure w.r. to the coordinates indicated in figure. (08)



Q.4 (b) Analyse the beam shown in figure by slope deflection method. (12)



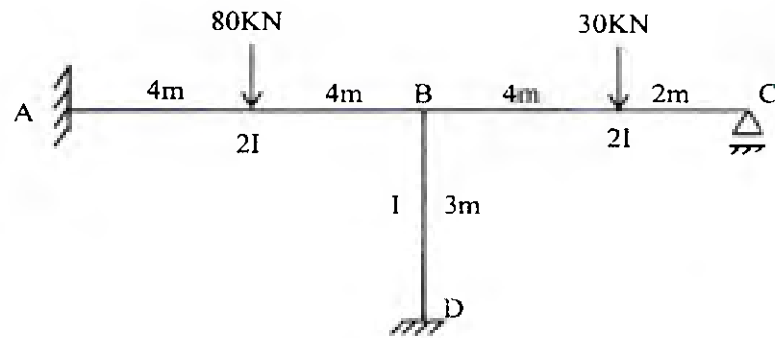
Q.5 (a) Analyse the beam shown in figure by moment distribution method. Draw BMD. (16)



Q.5 (b) Define flexibility coefficient  $f_{ij}$  and state the important properties of the flexibility matrix. (04)

Q.6 (a) Analyse the frame shown in figure by stiffness method. (14)

Structural Analysis - II



Q.6 (b) (i) Explain the difference between force method and displacement method of analysis of indeterminate structures. (04)

(ii) State if the following method is a force method or displacement method. (02)

(a) Method of least work

(b) Moment distribution method

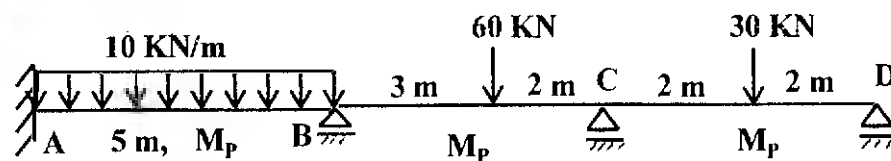
Q.7 (a) Find the shape factor for a T section with the following data. (10)

Top flange - width = 300 mm, thickness = 30 mm

Depth of web = 200 mm, thickness of web = 20 mm.

Q.7 (b) A continuous beam is subjected to working loads as shown in figure below. (10)

If  $M_p = 50$  kN-m, calculate the (true) load factor for the beam.



**Bharatiya Vidya Bhavan's**  
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**RE-EXAM** (011)  
OF  
**ODD SEMESTER**

Date: June 2015  
Duration: 3 Hours

Total Marks: 100

CLASS/SEM: T.Y BTech. Civil Sem. V SUBJECT: Geotechnical Engineering - I

- Attempt any FIVE questions out of SEVEN questions.
- Answers to all sub questions should be grouped together.
- Figure to right indicate full marks.
- Make suitable assumptions where necessary and state them clearly. *Master*

- Q1. a) Draw the three phase diagram of soil and explain void ratio, porosity, moisture content and degree of saturation (05)
- b) An undisturbed sample of clay, 20 mm thick, consolidated 50% in 15 min when tested under double drainage conditions. If the clay layer in the field was 6 m and is also under double drainage conditions, determine the time it will take for 50% consolidation. (05)
- c) Differentiate between standard and modified Proctor tests (05)
- d) State the limitations and advantages of direct shear test. (05)
- Q2. a) Explain the standard penetration test for soil investigations in detail. (10)
- b) Draw a typical grain size distribution curve for a well graded soil and a gap graded soil. Explain how you will determine  $D_{10}$ ,  $D_{30}$ ,  $D_{60}$ ,  $C_u$  and  $C_c$ . State the how you can determine if a soil is well graded or not, based on this data. (10)
- Q3. a) A long natural slope in  $c-\phi$  soil is inclined at  $10^\circ$  to horizontal. The water table is at the surface and seepage is parallel to the slope. If a slip plane develops at 3.5 m below GS, calculate factor of safety assuming  $\phi = 23^\circ$ ,  $c=10\text{kPa}$  and  $\gamma_{\text{sat}} = 18.5 \text{ kN/m}^3$ . (05)
- b) In a falling head permeability test, the following observations were noted: (05)
- i. Cross-section of specimen =  $15 \text{ cm}^2$
  - ii. Cross-section of stand pipe =  $0.075^2$
  - iii. Length of specimen = 10 cm
  - iv. Initial head above datum = 27.5 cm
  - v. Head after 5 min = 20 cm
- Determine the coefficient of permeability
- c) Derive Laplace's equation for flow in two dimensions (10)

- Q4. a) Explain the spring analogy for primary consolidation of saturated soil with neat sketches. (10)
- b) A soil sample failed under major principal stress of 300 kPa when minor principal stress was 100 kPa. If for the same soil, another sample was subjected to a minor principal stress of 200 kPa, calculate the major principal stress for  $\phi = 30^\circ$ . (10)
- Q5. a) Explain the following terms coefficient of consolidation, degree of consolidation, time factor, pre-consolidation pressure and compression index. (05)
- b) What are the various causes of slope failures? Illustrate the different types of failures of a slope. (05)
- c) Explain in detail any five factors affecting permeability (10)
- Q6. a) Geotechnical investigations at a site have revealed that 3 m clay layer lies above a 4 m gravel layer. If  $\gamma_{sat}$  of clay and gravel are  $18 \text{ kN/m}^3$  and  $19.5 \text{ kN/m}^3$  respectively, and water table is at ground surface, draw the pressure distribution diagrams of total, effective and neutral stress. (05)
- b) Differentiate between compaction and consolidation (05)
- c) In a direct shear test (box size 6cm x 6cm) on a sandy silt sample, the following observations were made. Determine the shear parameters. Also calculate the magnitude and orientation of principle stresses for the second sample. (10)

Sample No.	Normal Load (kN)	Shear Load (kN)
1	0.36	0.18
2	0.54	0.24
3	0.72	0.31

- Q7. a) Explain the use of Taylor's stability number and stability curves in slope stability (05)
- b) Explain any two tests used in the field to differentiate between silt and clay (05)
- c) Explain in detail the classification of soils as per IS codes. (10)

TE (CIVIL), Sem-V, A.T.K.T, R3/06/2015.  
Geotechnical Engineering - I

156  
23/06/15

**Bharatiya Vidya Bhavan's  
SARDAR PATEL COLLEGE OF ENGINEERING**

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KT Paper (OLD)

Total Marks: 100

Date: June 2015  
Duration: 3 Hours

CLASS/SEM: T.E./Sem. V. (CIVIL)

SUBJECT: Geotechnical Engineering - I

- Attempt any FIVE questions out of SEVEN questions.
- Answers to all sub questions should be grouped together.
- Figure to right indicate full marks.
- Make suitable assumptions where necessary and state them clearly.

Master

- Q1. a) Differentiate between compaction and consolidation (05)  
b) From the first principles, with usual notations, prove that (05)  
$$e = w G / S_r$$
  
c) Explain the spring analogy for primary consolidation of saturated soil (10)  
with neat sketches.
- Q2. a) Define relative density and explain the method to obtain the same in a (10)  
laboratory, given the density of a sample in the field.  
b) Explain the various parameters that affect the permeability of soil. (10)
- Q3. a) A core cutter was used to determine the field density of the soil at a site. (05)  
Determine the void ratio and field density of the soil based on the  
following observations:  
Core cutter internal diameter = 100 mm  
Core cutter height = 130 mm  
Weight of empty core cutter = 1980 g  
Weight of soil from field + core cutter = 3870 g  
Moisture content of sample = 22.1%  
b) What is a flow net? Explain its characteristics with a neat sketch. (05)  
c) Explain in detail the log of time fitting method to determine the (10)  
coefficient of consolidation from laboratory data.
- Q4. a) Explain what is meant by quick sand condition. What is the difference (05)  
between permeability and seepage?  
b) Explain the importance of geotechnical investigations for any (05)  
construction project.  
c) The following data was noted during a modified proctor test conducted in (10)  
the laboratory. Determine the OMC and MDD of the soil.

Geotechnical Engineering-I

Trial Number	1	2	3	4	5
Weight of mould + soil (g)	3771	3860	3949	3959	3934
Weight of empty mould (g)	2007				
Volume of mould (cc)	1000				
Moisture content	10%	12%	15%	16%	20%

- Q5. a) A clay layer is expected to show a total settlement of 30mm. If it settles by 3mm at the end of 4 months after application of load, how much settlement will occur in 12 months? (05)
- b) Differentiate between void ratio and porosity (05)
- c) What is the Standard Penetration Test? Explain in detail. (10)
- Q6. a) Calculate the coefficient of permeability of a soil sample if 400 ml of water takes 9 min to travel through the sample under a head of 40 cm. The sample diameter is 8 cm and height is 5 cm. (05)
- b) Explain the terms- liquid limit, plastic limit, shrinkage limit, plasticity index and density index (05)
- d) In a direct shear test (box size 6cm x 6cm) on a sandy silt sample, the following observations were made. Determine the shear parameters. Also calculate the magnitude and orientation of principle stresses for the second sample. (10)

Sample No.	Normal Load (kN)	Shear Load (kN)
1	0.36	0.18
2	0.54	0.24
3	0.72	0.31

- Q7. a) State Darcy's Law and assumptions he made. (05)
- b) A sample of dry sand is tested under triaxial conditions. The sample failed at deviator stress of 482kPa when cell pressure was 100 kPa. Find  $\phi$ . (05)
- c) Draw the total pressure, effective pressure and hydrostatic pressure diagram for a soil 7 m thick, having ground water level at 4 m below ground surface and dry unit weight  $16.3 \text{ kN/m}^3$  and saturated unit weight as  $18.1 \text{ kN/m}^3$ . Assume capillary rise of 1.2 m. (10)



TE (CIVIL), Sem-V, A.T.K.T, 25/06/15.

Hydraulic Engineering - I

25/06/15

Bharatiya Vidya Bhavan's  
**Sardar Patel College of Engineering**  
(An Autonomous Institution Affiliated to University of Mumbai)  
Department of Civil Engineering  
**KT-Examination-June 2015**  
**2014-2015**

Class/Sem: T.Y. B.Tech. Civil, Sem. V

Subject: Hydraulic Engineering-I

Max. Marks: 100

Duration: 3 hours

- Solve any five questions out of seven.
- Answer to all sub questions should be grouped together.
- **Figure** to right indicates full marks.
- Assume suitable data wherever necessary and state it clearly.

Mustafa

- Q. No.1 Write short notes on (*any four*) (20)
- (a) Classification of turbines.
  - (b) Head Discharge curve for a centrifugal pump.
  - (c) Pipes in parallel and series.
  - (d) Kinetic energy correction factor.
  - (e) Draft tube theory.

- Q. No.2 (a) Two pipes connected in series carries water from 60 meter level to 30 meter level. (10)  
Details of piping system are as given in **Table 1** below. Considering minor losses; determine discharge and plot HGL and TEL.

Table 1.

Pipe	Length (m)	Diameter (cm)	Friction Factor (f)
1	950	25	0.018
2	800	15	0.022

- (b) A siphon pipe 10 cm diameter is used to transfer water from reservoir to tank. The inlet leg of siphon is 35 meter and outlet leg is 350 meter. The highest point of the pipe axis is 2.42 meter above the water surface of the upstream reservoir. If the level difference between reservoir water level and tank water level is 16 meter and friction factor for pipe is 0.03, find discharge through siphon and pressure at the summit. (10)
- Q. No.3 (a) Water is admitted at the axis of rotation of a two arm lawn sprinkler. The nozzle has a diameter of 1 cm and sprinkler arms have a radius of 30 cm. For the flow rate of 1.25 liters/sec. Find; (i) Speed of rotation of the sprinkler (10)  
(ii) Torque to keep the sprinkler stationary.
- (b) Find the force on a  $45^\circ$  horizontal reducing pipe bend of size 30 cm x 15 cm carrying 250 liters/sec of water at an inlet pressure of 25 meters. (10)
- Q. No.4 (a) Show that the efficiency of a free jet striking normally on a series of flat plates mounted on the periphery of a wheel can never exceed 50%. (10)
- (b) A jet of water moving at 15 m/sec impinges on a moving symmetrical curved vane such that it deflects jet through  $140^\circ$ . If the vane is moving at 5 m/sec, find the angle of the jet so that there is no shock at inlet. Also determine the absolute velocity of jet at exit in magnitude and direction and work done (10)

Hydraulic Engineering - I

- Q.No.5 (a) Explain briefly the principles on which a Kaplan turbine works. (10)  
(b) Derive an expression for maximum efficiency of the Pelton wheel giving the relationship between the jet speed and bucket speed. (10)
- Q.No.6 (a) Differentiate clearly between available and required NPSH. Discuss the factors influencing available and required NPSH. (10)  
(b) A centrifugal pump impeller has an outer diameter of 30 cm and inner diameter of 15 cm. The pump runs at 1200 rpm. The impeller vanes are set at a blade angle of  $30^\circ$  at the outlet. If the velocity of flow is constant at 2 m/sec, calculate: (10)  
(i) The velocity and direction of water at outlet.  
(ii) Head developing assuming manometric efficiency = 85%.  
(iii) Blade angle at inlet.
- Q.No.7 (a) Explain with neat sketch working of:  
(i) Hydraulic press (ii) Hydraulic crane (10)  
(b) Obtain an expression for head loss when laminar flow takes place between two stationary parallel plates and sketch velocity and shear stress distribution. (10)
- \*\*\*\*\*

TE (CIVIL), Sem-V, A.T. K.T, 27/06/15.  
Building, Design & Drawing

Lib  
27/06/15

Bharatiya Vidya Bhavan's  
**SARDAR PATEL COLLEGE OF ENGINEERING**  
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KT Exam

Date: 27th June 2015

Total Marks: 100

Duration: 4 Hours

Class/Sem: T.E. (Civil), Sem V.

Subject: Building Design & Drawing

1. Attempt any Five out of Seven.
2. Answers to all sub questions should be grouped together.
3. Illustrate answer with neat sketches wherever required.
4. Make suitable assumptions where necessary and state them clearly.
5. Figure to right indicate full marks.

Master.

Q1) Draw a developed ground floor & first floor plan of residential building G+1 load bearing structure with following requirements. Calculate the total built-up area and give schedule of openings. Draw to a scale of 1:50 or suitable. (20M)

Sr. No.	Type of Unit	No. of Units	Internal area of No. Unit (in m <sup>2</sup> )
1	Living room	01	20
2	Bedroom	02	16
3	Additional bedroom with attached toilet	01	18
4	Kitchen	01	10
5	W.C.	02	1.2
6	Bath	02	2.2
7	Staircase	01	Use suitable dimensions

Q2 Draw a developed ground floor & first floor plan of Girls Hostel building G+1 frame structure. The following units are to be provided: (20M)

- (i) Per room 4 girls.
- (ii) Entrance lobby and general stationary shop - 45 m<sup>2</sup>
- (iii) Dining hall = 300 m<sup>2</sup>
- (iv) Rector Room = 35 m<sup>2</sup>
- (v) Kitchen = 45 m<sup>2</sup>
- (vi) Storeroom = 18 m<sup>2</sup>
- (vii) Gymnasium, Reading Room, T.V.Room.
- (viii) Assume any additional suitable data if necessary and mention it clearly with justification:

Draw to a scale of 1:50 or suitable and give schedule of openings. The ext. wall tk. is 230 mm and int. wall tk. is 150 mm.

Page (1)

TE (CIVIL), sem-V, A.T.K.T, 27/6/15.  
Building, Design & Drawing.

Q3a) Enlist the architectural composition and explain with example unity and mass composition. (10)

Q3b) Explain the principles of town planning (10)

Q4a) Explain the objectives of building bye-law & write a note on provision for lighting & ventilation with respect to building bye-law. (10)

Q4b) Enlist the general building bye laws that one need to follow while planning any residential building. (10)

Q5a) Show line sketches of furniture arrangement in a living room of area  $18\text{m}^2$  and give furniture details. (5)

Q5b) Draw two point Perspective view of (Q1) or (Q2) (15)

- o Eye level at 1.5 m above ground level.
- o Station point 8 m away from picture plane vertically below the corner of the steps touching the picture plane the corner makes an angle of  $30^\circ$ - $60^\circ$  with picture plane.
- o Draw to suitable.

Q6a) Define green building and state the procedure of certification of green building. (10)

Q6b) Draw elevation and plumbing layout for the structure you have planned in Q1 or Q2 with schedule. (10)

Q7) Draw a cross sectional elevation passing through the stairs, a door & window and a sanitary unit for the structure you has planned in Q.1. Or Q.2 With Construction notes. (20)

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Page - (2)

Bharatiya Vidya Bhavan's  
SARDAR PATEL COLLEGE OF ENGINEERING  
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KT Exam (old syllabus)

Date: 27<sup>th</sup> June 2015

Duration: 4 Hours

Total Marks: 100

Class/Sem: T.E. (Civil), Sem V.

Subject: Building Design & Drawing- II

1. Attempt any Five out of Seven.
2. Answers to all sub questions should be grouped together.
3. Illustrate answer with neat sketches wherever required.
4. Make suitable assumptions where necessary and state them clearly.
5. Figure to right indicate full marks.

Master.

Q1) Draw a developed ground floor & first floor plan of Girls Hostel building G+1 load bearing structure. The following units are to be provided: (20)

- (i) Per room 3 girls.
- (ii) Entrance lobby = 25 m<sup>2</sup>
- (iii) Dining hall = 300 m<sup>2</sup>
- (iv) Rector Room = 35 m<sup>2</sup>
- (v) Kitchen = 45 m<sup>2</sup>
- (vi) Storeroom = 18 m<sup>2</sup>
- (vii) Gymnasium, Reading Room, T.V.Room.
- (viii) Assume any additional suitable data if necessary and mention it clearly with justification

Draw to a scale of 1:50 or suitable and give schedule of openings.

Q2) Draw a developed ground floor & first floor plan of sports club building G+1 framed structure with following requirements. Calculate the total built-up area and give schedule of openings. Draw to a scale of 1:50 or suitable. (20)

Sr. No.	Type of Unit	No. of Units
1	Indoor Game room	02
2	Tennis practice room	01
3	Gymnasium	01
4	Aerobics Room	01
5	Yoga Room	01
6	Cloakroom for keeping baggage	01
7	Storeroom	01
8	Water closet for gents & ladies	02
9	Staircase	01

TE (CIVIL), Sem-V, A.T.K.T, 27/06/15. (Old)  
Building, Design & Drawing of

Q3a) Explain with example unity, mass composition and scale. (10)

Q3b) Explain the principles of town planning (10)

Q4a) Explain briefly growth of town according to origin (10)

Q4b) What are advantages and disadvantage of green building and State the organization related with certification of green building. (10)

Q5a) Define following terms: Building line, Carpet Area, Plinth Area, Floor area ratio & Plinth. (5)

Q5b) Draw two point Perspective view of (Q1) or (Q2) (15)

- Eye level at 1.5 m above ground level.
- Station point 8 m away from picture plane vertically below the corner of the steps touching the picture plane the corner makes an angle of  $30^{\circ}$ - $60^{\circ}$  with picture plane.
- Draw to suitable.

Q6a) Explain in detail Zoning and Green belt. (10)

Q6b) Draw front view of the building you have planned in Q.1 or Q.2 with Area statement (10)

Q7) Draw a cross sectional elevation passing through the stairs, a door, window, one room and a sanitary unit for the structure you has planned in Q.1. Or Q.2 With Construction notes. (20)

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TE (CIVIL), Sem - V, A.T.K.T., 27/06/15.

Lib  
27/06/15

Entrepreneurship & Management.



**SARDAR PATEL COLLEGE OF ENGINEERING**  
**[An Autonomous Institution Affiliated to University of Mumbai]**



**Class. T.E (CIVIL) [Sem: V]**  
**Subject: Entrepreneurship & Management**

**Exam: KT- EXAM**

**Marks: 100. (3 hours.)**

**Instruction:**

**Date:**

1. Attempt any five.

*Master*

- Q.1. a) Explain the concept of Entrepreneur and Entrepreneurship? Also explain the difference between them? (10 marks)
- b) What are the different factors affecting to entrepreneurship process? (10 marks)
- Q.2. a) Discuss the various classification/types of entrepreneurs along with one examples. (10 marks)
- b) Explain the McClelland Need for Achievement Theory with Kakinada experiments? (10 marks)
- Q.3. a) Describe contribution made by "Fredrick Taylor" towards scientific management? (10 marks)
- b) Describe contribution made by "Henry Fayol" towards Administrative approach management? (10 marks)
- Q.4. a) what do you mean by the Project? Explain the stages, identification, selection of project? (10 marks)
- b) What are different sources & types of finance available for entrepreneurship in India? (10 Marks)
- Q.5. a) Define the small scale industry and also Highlight the chief characteristics of it? (10 marks)
- b) Explain in detail various steps to be followed in start up the small scale industry? (10 marks)

TEC (CIVIL), Sem-II, A.T.K.I.T, 27/06/2015,  
Entrepreneurship & Management.

Q.6. a) Write short note on: Pay-back period.

(4 Marks)

b) An initial investment in plant & machinery of ₹ 22000 is expected to generate cash flows of ₹ 2342, ₹ 2200, ₹ 3850, ₹ 5230 at the end of first, second, third & fourth year respectively. At the end of fourth year machines will be sold for ₹ 650 as salvage value. Calculate the net present value of the investment if the discount rate is 10.5%.

(6 Marks)

c) Journalize the following transactions in the books of Mr. Rahul for Dec 2014 & also post them in ledger for cash account only.

(10 marks)

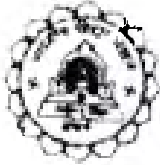
Date	Transactions	Amount
1	He started the business with cash	300000
3	Sold goods to Mr.Amar for cash	1800
8	Purchased goods on credit from rakesh.	34000
10	Paid office rent by cheque of Bank of india	4800
12	Paid commission to RAKESH	600
16	Purchased furniture from SHAH furniture Mart	11000
19	Deposited money in bank of MAHARASHTRA	32000
24	Returned goods to Mr.Nagesh	2000
26	Received interest	15000

Q.7. Write short notes on: - (any four)

(20 marks)

- i. SWOT analysis.
- ii. Environment for Entrepreneurship.
- iii. Break-Even analysis
- iv. Barriers affecting to Entrepreneurship.
- v. Importance of Small Scale Industries in India.
- vi. Line & line-staff Organisation.





Bharatiya Vidya Bhavan's  
Sardar Patel College of Engineering  
MUNSHI NAGAR, ANDHERI (WEST), MUMBAI-400 058.



**EXAMINATION, T. E. Civil (Sem - V)**  
**SUBJECT - TRANSPORTATION ENGINEERING - I**

**MARKS: 100**

- Note: (i) Solve any five Questions out of seven  
(ii) Assume suitable data if required.

*Master*

Q.1. (each sub question carries 5 marks)

- (i) Discuss suitability of Different mode of transportation. (20)  
(ii) Write short notes on weight component of aircraft.  
(iii) Discuss different types of engine used in aircraft.  
(iv) Explain with sketch how the movement of aircraft can control in space.

Q.2.

- (i) Discuss the systematic approach for expansion of existing airport or construction of new airport. (10)  
(ii) Design an exit taxiway joining runway and parallel main taxiway. The total angle of turn is  $30^\circ$  and turning speed 95 km/hr. draw a neat sketch showing all design elements. (10)

Q.3.

- (i) What are the assumptions made while calculating the basic length of runway? How will you calculate the basic length of runway? (10)  
(ii) the length of runway under standard condition is 1600 m. the airport reference temperature is  $25^\circ\text{C}$  the airport is to be provided at elevation of 125 m above mean sea level. Calculate the corrected length of runway for following data. (10)

End to end Runway length (m)	0 to 300	300 to 900	900 to 1500	1500 to 1800	1800 to 2100
Gradient (%)	+ 1.0	- 0.20	+ 0.50	+ 1.0	-0.30

Q.4. (each sub-question carries 5 marks)

- (i) Discuss why uniformity of gauge is required. (20)  
(ii) Discuss with sketch different types of joints  
(iii) Advantages and disadvantages of different types of sleepers  
(iv) Explain with sketch left and right hand turnout

Q.5.

- (i) Explain with sketch classification of signals according to functional characteristics. (06)  
 (ii) Discuss the points you will consider while selecting the site for station. (06)  
 (iii) A  $9^\circ$  branch curve diverge out from  $8^\circ$  main curve in opposite direction in a layout of meter gauge yard. If the speed on main line is restricted to 25 km/hr. determine the restricted speed on branch line. (08)

Q.6.

- (i) Explain with sketch coning of wheel and tilting of rail. (06)  
 (ii) Derive the relationship between superelevation, speed, Gauge and radius of circular curve. What are its limiting values for different gauges. (07)  
 (iii) The monthly mean temperatures of the atmosphere at a particular site where airport has to be constructed are given bellow. Determine airport reference temperature. (07)

Month	Mean value of average daily temperature	Mean value of Maximum daily temperature	Month	Mean value of average daily temperature	Mean value of Maximum daily temperature
Jan	3	5.5	July	32.6	37.7
Feb	15.5	17	Aug	30.5	35.5
Mar	20	23.4	Sept	27.4	31.5
Apr	25.6	32.3	Oct	22.8	28.3
May	37.7	47.4	Nov	12.9	18
June	40.4	50.60	Dec	6.7	12.3

7. Write short notes on (any five)

(20)

- (i) Wet and dry docks  
 (ii) Breakwater  
 (iii) Factors affecting selection of site for Harbour  
 (iv) Sleeper density  
 (v) Negative cant.  
 (vi) Airport Marking  
 (vii) Airport parking system with neat sketch