

B.TECH. DEGREE EXAMINATION, MAY 2018

II B.Tech II Semester

STRENGTH OF MATERIALS  
(Civil Engineering)

Time : 3 hours

Max Marks: 60

*Answer FIVE Questions, Choosing ONE Question from each section  
All questions carry equal marks*

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**SECTION - I**

1. A simply supported beam AB of span 10 m carries a UDL of 25 N per metre over 3 metres from left hand support and also over 4 m from the right hand support. It has also two isolated loads of 25 N and 65 N at 3 m and 8 m respectively from the left hand support. Draw the BM and SF diagrams and calculate the BM at significant points.
2. (a) State the relation between BM and SF at any section of a beam.  
(b) A cantilever carries a uniformly distributed load of 5kN per metre for a length of 4 metres from its supported end and a point load of 10kN at the free end at a distance of 6 metres from the support. Draw the SFD and BMD

**SECTION - II**

3. (a) What is bending stress? What is the difference between bending stress and direct stress?  
(b) Determine the dimensions of the rectangular section of a cantilever 6m long and carrying UDL at the rate of 14kN/m run. Assume depth width ratio of the cantilever as 1.2:1 and maximum allowable bending stress as 80 N/mm<sup>2</sup>.
4. A 3m long rectangular beam of section 150mmx250mm is loaded with a point load of 35000N distant 1m from the right hand support. Find the maximum shear stress in the beam. Also find the shearing stress at a layer 20mm below the top of the beam at a section 1m to the right of the left hand support.

**SECTION - III**

5. (a) What are the assumptions made in the Euler's formula.  
(b) A slender column was built in at one end and an eccentric load is applied at the free end. Working from first principles find an expression for the maximum length of the column such that the deflection of the free end does not exceed eccentricity of loading.

6. A hollow short column has a rectangular section 200cmx150cm and 25cm thick. A compressive load of 250kN is applied to the column vertically at an eccentricity of 15cm from the CG of the section of the column on a line bisecting 200cm side. Draw also stress distribution diagram.

#### SECTION – IV

7. (a) What is the function of torsion bar and shaft coupling.
- (b) Determine a suitable diameter of a shaft transmitting 20kW at 150r.p.m. if the maximum allowable shear stress in the shaft material is not to exceed  $5200\text{N/cm}^2$  and angle of twist is not to exceed  $1^\circ$  in a length of twenty times the diameter of the shaft. Take  $G=8.5 \times 10^6 \text{ N/cm}^2$ .
8. (a) Draw sketches showing series connection and parallel connection of helical springs. what do you mean by equivalent stiffness of helical spring?
- (b) A close coiled helical spring is to have a stiffness of 15N/cm of compression under a maximum load of 50N and a maximum shearing stress of  $12500 \text{ N/cm}^2$ . The solid length of the spring is 4.5cm. Find the diameter of the wire, the mean diameter of the coils and the number of coils required. Take  $G=4.2 \times 10^6 \text{ N/cm}^2$

#### SECTION – V

9. (a) What are the assumptions made in Lamé's theory.
- (b) A thick spherical shell having internal radius of 100mm is subjected to an internal fluid pressure of  $25\text{N/mm}^2$ . If the maximum hoop stress is  $120\text{N/mm}^2$ , find the thickness of the shell.
10. A rectangular element in a strained body is subjected to tensile stresses of  $220\text{N/mm}^2$  and  $160\text{N/mm}^2$  on mutually perpendicular planes together with a shear stress of  $80\text{N/mm}^2$ .  
Determine
- (i) Principal stresses
  - (ii) Principal planes
  - (iii) Maximum shear stress and
  - (iv) Plane of maximum shear stress.

Code: 13SH2201

B.TECH. DEGREE EXAMINATION, MAY 2018

II B.Tech. II Semester  
ENGINEERING MATHEMATICS - IV  
(Common for EEE & ECE)

Time: 3 hours

Max. Marks: 60

Answer FIVE Questions, Choosing ONE Question from each section

All Questions carry equal marks

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**SECTION - I**

- 1 (a) Find a real root of the equation  $x^3 - x - 4 = 0$ , using False position method  
(b) Find by Newton-Rapson method, the real root of the equation  $x^4 - x - 9 = 0$
- 2 (a) Fit a straight line to the following data

X	1	2	3	4	5
Y	14	27	40	55	68

- (b) Fit a parabola of the form  $y = a + bx + cx^2$  to the following data

X	10	12	15	23	20
Y	14	17	23	25	21

**SECTION - II**

- 3 (a) Solve the following equations by Gauss-elimination method  
 $x + 2y + 3z = 1$ ,  $2x + 3y + 8z = 2$ ,  $x + y + z = 3$
- (b) Solve the following equations by Gauss- Jordan method  
 $10x + y + z = 12$ ,  $2x + 10y + z = 13$ ,  $x + y + 5z = 7$
- 4 (a) Solve the following system of equations by using Gauss- seidal iteration method  
 $28x + 4y - z = 32$ ,  $x + 3y + 10z = 24$ ,  $2x + 17y + 4z = 35$
- (b) Solve the system of equations  $x^2 + y = 11$ ,  $y^2 + x = 7$  with  $x_0 = 3.5$ , and  $y_0 = -1.8$  by Newton-Raphson method.

**SECTION - III**

- 5 (a) Given that  $\frac{dy}{dx} = x^2 + y$  and  $y(0) = 1$ . Find an approximate value of  $y$  at  $x=0.02$  by modified Euler's method.

(b) Using Runge-Kutta method of fourth order, compute  $y(0.1)$  and  $y(0.2)$  from

$$\frac{dy}{dx} = x^2 - y, \quad y(0) = 1, \quad \text{taking } h = 0.1$$

- 6 Determine the value of  $y(0.4)$  using Milne's Predictor and Corrector's method, given that  $\frac{dy}{dx} = x - y$ ,  $y(0) = 1$ . Use Runge-kutta method to get the values of  $y(0.1), y(0.2), y(0.3)$ .

#### SECTION - IV

- 7 (a) Using Newton forward interpolation formula, find  $f(1.75)$  from the following values

x	1.7	1.8	1.9	2.0
f(x)	5.474	6.050	6.686	7.389

- (b) Using Lagrange's interpolation formula evaluate  $f(4)$  from the following

x	0	2	3	6
f(x)	-4	2	14	158

- 8 Find  $\frac{dy}{dx}$  and  $\frac{d^2y}{dx^2}$  at  $x = 1.5$  from the following below table

x	1.5	2	2.5	3	3.5	4
y	3.375	7	13.625	24	38.875	59

#### SECTION -V

- 9 (a) A random variable  $X$  has the following probability distribution

X	1	2	3	4	5	6	7	8
P(X)	K	2K	3K	4K	5K	6K	7K	8k

Find the value of (i) K      (ii)  $P(X \leq 2)$       (iii)  $P(2 \leq X \leq 5)$

- (b) If the variance of a Poisson Variate is 3, then find the probability that

(i)  $x = 0$       (ii)  $0 < x \leq 3$       (iii)  $1 \leq x < 4$

- 10 If the masses of 300 students are normally distributed with mean 68kgs and standard deviation 3kgs, how many students have masses

(i) Greater than 72kgs

(ii) Less than or equal to 64kgs

(iii) Between 65 and 71kg inclusive

B.TECH. DEGREE EXAMINATION, MAY 2018

**II B.Tech. II Semester**

**ENVIRONMENTAL STUDIES**  
(Common for ME & CSE)

Time: 3 hours

Max. Marks: 60

*Answer FIVE Questions, Choosing ONE Question from each section  
All Questions carry equal marks*

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**SECTION - I**

1. (a) Explain about the importance of environmental studies  
(b) Give an accounting of abiotic components of the environment
2. (a) What are food chains and food webs? Give examples and discuss their significance.  
(b) Define biodiversity. Explain genetic diversity, specific diversity and ecosystem diversity

**SECTION - II**

3. (a) Discuss about over exploitation of forests.  
(b) Discuss regarding the following  
i) Desertification and ii) Land degradation
4. (a) What are the major causes for conflicts over water? Discuss one inter – state water conflict.  
(b) Explain the renewable and non-renewable energy needs use of alternate energy sources

**SECTION - III**

5. (a) What are the different sources and types of air pollutants  
(b) What is noise? Describe briefly the effects of noise on human health.
6. (a) What is composting? Explain the various methods of composting.  
(b) Discuss the causes and effects Global warming.

**SECTION - IV**

7. (a) Explain the effects industrialization on the quality of environment.  
(b) What do you understand the term Green Revolution? What are the benefits of the green revolution?
8. (a) What is sustainable development? Discuss the concept of sustainable development.  
(b) Explain the role of Environmental impact Assessment in India

**SECTION - V**

9. (a) Discuss the salient features of the Air (Prevention and control of pollution) Act
- (b) Why do we refer to Environmental Protection Act, 1986 as an umbrella Act? Discuss the major Environmental Protection rules, 1986.
10. (a) Why does Mathura refinery pose problem to the Taj Mahal? Discuss it.
- (b) Describe the study of mountain hilly area

Code: 13CE2205

B.TECH. DEGREE EXAMINATION, MAY 2018

**II B.Tech II Semester**

**BUILDING PLANNING AND DRAWING**

(Civil Engineering)

Time : 3 hours

Max Marks: 60

*Note: Two full questions from Part A and Question 4 from Part B.*

*Assume suitable data wherever necessary*

*Drawing sheets should be folded to the size of answer book and fasten it severely to main answer book*

**PART - A**

- 1 (a) Explain how you will select a site for the construction of residential building.  
(b) List standard sizes of Doors and Windows used in residential buildings.
- 2 (a) List the requirements for Bed room and Dining room in a residential building.  
(b) Explain the Municipal bye-laws with reference to (i) Open space requirements, (ii) Height limitation, (iii) Plinth area regulation.
- 3 (a) Discuss briefly the planning of a residential building.  
(b) Explain with line diagram the functional requirements to be considered while planning a Hospital building.

**PART - B**

- 4 (a) Draw the conventional signs for the following items(in 40 mm x 40 mm blocks):  
(i) Brick (ii) Concrete (iii) Plaster (iv) Aluminum (v) Wood  
(b) The line plan of a residential building is shown in fig below. Providing superstructure wall thicknesses of 200 mm, as per the specifications given below draw the dimensioned Plan and Section 'AA' to a suitable scale.  
Specifications:  
Note: All dimensions given below are in mm
  - Foundations overall width and depth : 900X1000
  - Concrete (1:4:8) bed : 900X200

- First footing: 600X400, second Footing: 450X400 with C.R. Masonry in CM (1:8)
- Basement height 500 and width 300 with B.M in CM (1:6), D.P.C 50 mm thick.
- Super structure: Brick Masonry in C.M (1:6), 200 thick and height 3200 (plinth to ceiling)
- R.C.C. (1:1.5:3) roof slab 120 thick, 50 mm weather proof course.
- Parapet in Brick Masonry in C.M. (1:6) 110 thick and height 750 above roof with a coping over it of 150x50mm
- Sunshades 500 wide, to be provided over all openings in the outer Wall
- Flooring with polished Shahabad slabs over a 100 mm thick cement Concrete (1:3:6)
- Provide suitable dimensions to doors, windows etc.

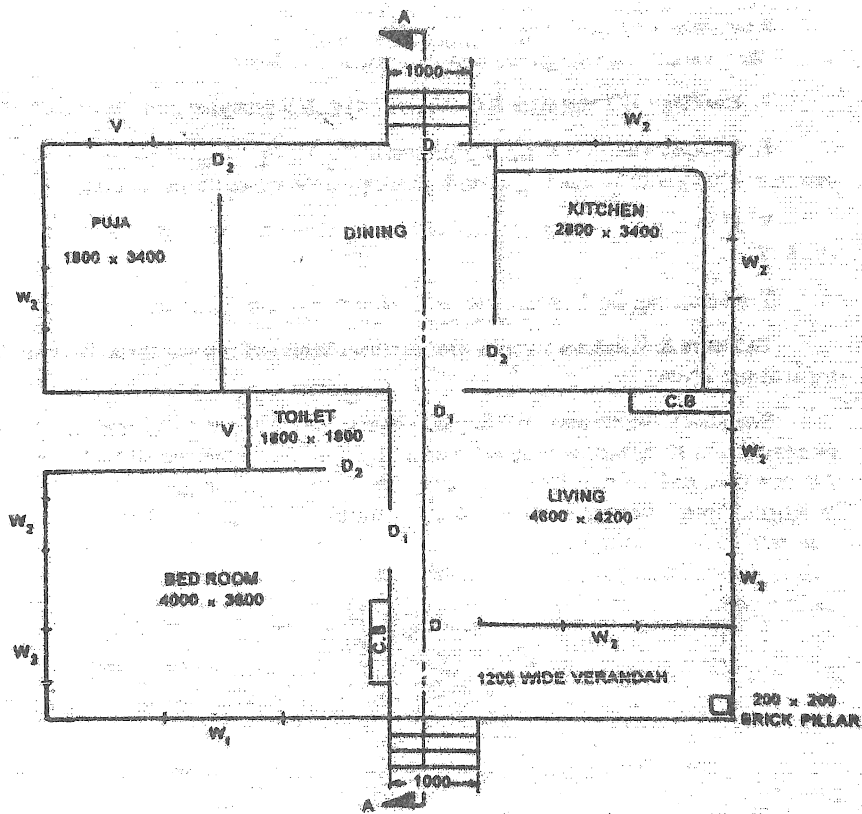


FIG. LINE DIAGRAM



**Code : 13CS2203**

**B.TECH. DEGREE EXAMINATION, MAY 2018**

**II B.Tech. II Semester**  
**OPERATING SYSTEMS**  
**(Computer Science & Engineering)**

Time : 3 hours

Max. Marks :60

*Answer FIVE Questions, Choosing ONE Question from each section*  
*All Questions carry equal marks*

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**SECTION - I**

- 1 a) What is operating system?  
b) List the functions of operating system and explain.
- 2 What is system call? List various types of system calls and explain them.

**SECTION - II**

- 3 Describe the following CPU Scheduling algorithms with the help of examples.  
i) Round robin      ii) Preemptive SJF      iii) FCFS
- 4 (a) Define a process and Explain about process control block.  
(b) What are different states a process? Explain process state diagram in detail.

**SECTION - III**

- 5 (a) What is a semaphore? Explain about different types of semaphores.  
(b) Explain in detail about monitors.
- 6 (a) Define deadlock. What are the characteristics of deadlock?  
(b) Detect deadlock with the help of resource allocation graph.

**SECTION - IV**

- 7 (a) Discuss about thrashing.  
(b) List the page table structures and Explain about hashed page table.

- 8 a) What is swapping? Explain about contiguous memory allocation.  
b) Discuss about demand paging

**SECTION - V**

- 9 How to transform I/O request to hardware operations? Explain.
- 10 (a) Write short notes on file sharing and protection  
(b) Illustrate directory structure.

B.TECH. DEGREE EXAMINATION, MAY 2018

**II B.Tech. II Semester****PULSE & ANALOG CIRCUITS**  
(Common for EEE & ECE)

Time : 3 hours

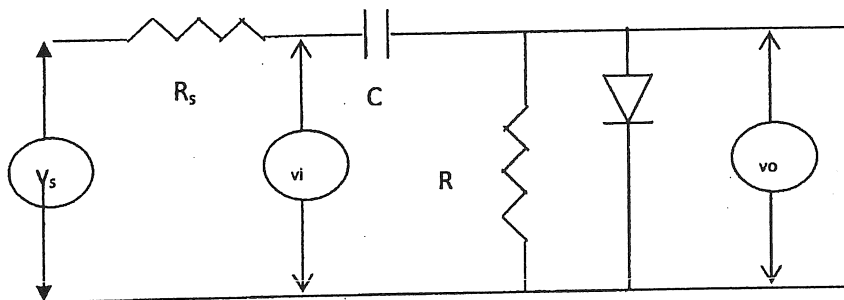
Max. Marks :60

*Answer FIVE Questions, Choosing ONE Question from each section*  
*All Questions carry equal marks*

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**SECTION - I**

- 1 a) Draw and explain the response of high pass RC network for a (i) step input and (ii) Pulse input.
- b) Draw the circuits for positive unbiased clamping and the biased clamping and explain the operation of the circuit with the help of waveforms for a square wave input.
- 2 a) Draw and explain the response of low pass RC circuit for a square wave input.
- b) A rectangular wave with  $T_1 = 1\text{msec}$ , and  $T_2 = 1\mu\text{sec}$ , with usual notation has an amplitude of 12V, this signal is applied to a restorer circuit shown in figure.  $R_f = 50\Omega$ ,  $R = 50\text{K}\Omega$ ,  $R_s = 0$ ,  $C$  is arbitrarily very large. Sketch the output waveform, giving voltage levels.

**SECTION - II**

- 3 a) Draw the circuit of a binary and explains its stable states.
- b) Write short note on the speed-up capacitors.
- 4 a) Draw the circuit of a Free Running Oscillator and explain its operation and also sketch relevant waveforms.

- b) Design the Schmitt trigger circuit using silicon transistors with  $(h_{FE})_{\min} = 80$ . Arbitrarily select  $V_{CC} = 30V$ ,  $R_1 = 24K\Omega$ ,  $R_2 = 6K\Omega$ . It is required that  $V_1 = 4.5V$ ,  $V_2 = 1.5V$ , that the output swing be 10V, and that the output stage  $Q_2$  operate in its active region. Find  $R_{C1}$ ,  $R_{C2}$  and  $R_e$ .

### **SECTION - III**

- 5 a) With a neat circuit diagram explain the operation of an UJT Relaxation oscillator.  
b) Design a relaxation oscillator to have 2Khz output frequency, using a 20V supply. Given values are  $\eta = 0.75$ ,  $I_p = 2\mu A$ ,  $I_V = 1mA$ , and  $V_{EB(Sat)} = 3V$ .
- 6 a) Explain the transistor miller time-base generator with neat block diagram.  
b) With a neat circuit diagram explain the Bi-directional diode sampling gate.

### **SECTION - IV**

- 7 a) Compare BJT and MOSFET.  
b) With the help of structure, explain working principle of depletion mode MOSFET.
- 8 a) Explain the working principle of Enhancement mode MOSFET with the help of structure and draw its VI characteristics.

### **SECTION - V**

- 9 a) What is a power amplifier? List out different types of power amplifiers.  
b) Explain transformer coupled Class A amplifier.
- 10 a) Explain the operation of class-B push-pull amplifier.  
b) Explain small signal tuned amplifier.

B.TECH. DEGREE EXAMINATION, MAY 2018

**II B.Tech. II Semester**

**MACHINE TOOLS**  
(Mechanical Engineering)

Time: 3 hours

Max. Marks: 60

*Answer FIVE Questions, Choosing ONE Question from each section*  
*All Questions carry equal marks*

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**SECTION - I**

- 1 Illustrate how following operations are performed on lathe :
- |                     |                    |
|---------------------|--------------------|
| (i) Center drilling | (ii) Scrolling     |
| (iii) Trepanning    | (iv) Taper turning |
- 2 With the help of diagram explain working of a progressive action multi spindle automatic lathe.

**SECTION - II**

- 3 (a) Explain the features of a planing machine.  
(b) Sketch the relative motions between the tool and work piece in shaper, slotter and planner.
- 4 (a) Draw the sketch of a horizontal spindle boring machine and explain its features.  
(b) Discuss the features of a radial drilling machine.

**SECTION - III**

- 5 (a) Explain following operations on a milling machine  
(i) T-slot milling (ii) Shell end milling (iii) End milling  
(b) Describe the features of horizontal milling machine.
- 6 (a) Discuss any two indexing methods  
(b) With a neat sketch explain the process of gear shaping.

**SECTION - IV**

- 7 (a) A Single point cutting tool with designated geometry has to be ground. Suggest a suitable grinding machine and explain its features.  
(b) With reference to grinding process explain the following terms :  
(i) Grinding ratio (ii) Truing (iii) Dressing

- 8 (a) A square hole of 20 x 20 is to be created on a disc of 60 mm diameter and 6mm thick. Suggest a suitable process to accomplish the task and sketch the tool and machine to carry out this task.
- (b) Briefly explain the lapping process.

### **SECTION - V**

- 9 (a) Justify the need of modern machining methods
- (b) Illustrate mechanism of material removal in Electro Chemical Machining (ECM).
- 10 (a) Propose a suitable modern machining method to create a round hole on a sheet of glass of 20 mm thickness and explain its mechanism of material removal.
- (b) Illustrate laser beam machining with a neat sketch.

LB

Code : 13CE2202

B.TECH. DEGREE EXAMINATION, MAY 2018

**II B.Tech II Semester**

**FLUID MECHANICS - II**

(Civil Engineering)

Time : 3 hours

Max Marks: 60

*Answer FIVE Questions, Choosing ONE Question from each section  
All Questions carry equal marks*

**SECTION - I**

1. (a) Derive Hagen-Poiseuille equation for laminar flow in the circular pipes.  
(b) A laminar flow is taking place in a pipe of diameter of 200 mm. The maximum velocity is 1.5 m/s. Find the mean velocity and the radius at which this occurs. Also calculate the velocity at 4 cm from the wall of pipe.
  
2. (a) Derive Darcy-Weisbach formula for calculating loss of head due to friction in a pipe.  
(b) A main pipe divides into two parallel pipes, which again forms one pipe. The length and diameter for the first parallel pipe are 2500 m and 1 m respectively, while the length and diameter of second parallel pipe are 2500 m and 0.8 m respectively. Find the rate of flow in each parallel pipe, if total flow in the main is  $3 \text{ m}^3/\text{s}$ . The coefficient of friction for each parallel pipe is same and equal to 0.005.

**SECTION - II**

3. (a) Define hydraulic gradient line and energy grade line and show all the losses that are occurring when three pipes are connected in series, by drawing the hydraulic grade line and energy grade line and give the equations for various losses that are occurring.  
(b) For the distribution main of a city water supply a 0.3 m main is required. As pipes above 0.25 m diameter are not available, it is decided to lay two parallel mains of same diameter. Find the diameter of the parallel main.

4. (a) Describe Prandtl mixing length theory for finding the shear stress in turbulent flow.
- (b) The velocity in a pipe is measured by a pilot tube at the centre of the pipe is 3 m/s and 10 cm away from the centre is 1.5 m/s. The pipe diameter is 30 cm. Assuming the flow is turbulent, find out the discharge through the pipe.

### SECTION - III

5. (a) Describe the separation of boundary layer and control of boundary layer.
- (b) The velocity distribution in the boundary layer is given by  $u/U = 2(y/\delta) - (y/\delta)^2$ , where  $u$  is the velocity at a distance  $y$  from the plate and  $u = U$  at  $y = \delta$ ,  $\delta$  being boundary layer thickness. Find the displacement thickness, momentum thickness and energy thickness.
6. (a) What do you understand by drag and lift? Explain in detail the formation of drag on a flat plate.
- (b) Write a brief note on Magnus effect.

### SECTION - IV

7. (a) Show that in the case of a pelton wheel maximum hydraulic efficiency occurs when the bucket speed is half that of the velocity of the jet.
- (b) A Kaplan turbine working under a head of 25 m develops 16500 kW shaft power. The outer diameter of the runner is 4 m and hub diameter is 2 m. The guide blade angle is  $35^\circ$ . The hydraulic and overall efficiency are 90% and 85% respectively. If the velocity of whirl is zero at outlet, determine: (i) runner vane angles at inlet and outlet, and (ii) speed of turbine.
8. (a) Define the terms 'unit power', 'unit speed' and 'unit discharge' with reference to a hydraulic turbine. Also derive expressions for these terms.
- (b) A pelton wheel has to be designed for the following data: power to be developed = 6000kW, Net head available = 300 m, speed = 500 rpm, Ratio of jet diameter to the wheel diameter = 1/10 and overall efficiency = 85%. Find the number of jets, diameter of jet, diameter of the wheel.



## SECTION - V

9. (a) What do you understand by characteristic curves of a pump? What is the significance of the characteristic curves? Explain them in detail.
- (b) The diameter of a centrifugal pump, which is discharging  $0.035 \text{ m}^3/\text{s}$  of water against a total head of 25 m is 0.05m. The pump is running at 1250 r.p.m. Find the head, discharge and ratio of powers of a geometrically similar pump of diameter 0.3 m when it is running at 2400 r.p.m.
10. (a) With the help of a neat sketch explain the component parts and working of a double acting reciprocating pump.
- (b) Write a brief note on the classification of reciprocating pumps.

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Code : 13SH2203

B.TECH. DEGREE EXAMINATION, MAY 2018

**II B.Tech. II Semester**

**ECONOMICS & ACCOUNTANCY**  
(Computer Science & Engineering)

Time : 3 hours

Max. Marks :60

*Answer FIVE Questions, Choosing ONE Question from each section*  
*All Questions carry equal marks*

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**SECTION - I**

- 1 (a) Define Demand Determination.  
(b) Distinguish between micro and macro economics.
- 2 (a) Discuss the different types of price elasticity of demand.  
(b) Diagrammatically explain unitary elasticity of demand.

**SECTION - II**

- 3 (a) Managerial use of production cycle.  
(b) Illustrate law of variable proportion theory
- 4 (a) Explain the law of return to scale.  
(b) Describe Cobb-Douglas Production function with its properties.

**SECTION - III**

- 5 (a) What are the kinds of Market structure?  
(b) Distinguish between monopoly and monopsony.
- 6 (a) Explain how is price determined?  
(b) What is market saturation?

**SECTION - IV**

- 7 Define Shares? Explain the different kinds of preference shares.
- 8 What is Joint stock company? Explain features of company.

**SECTION - V**

- 9 Write short notes on  
(a) Balance Sheet (b) Trail Balance  
(c) Ledger (d) Journal
- 10 (a) What are the factors determination of working capital?  
(b) Evaluate the Modern techniques of capital budgeting



Code: 13CE2208

B.TECH. DEGREE EXAMINATION, MAY 2018

II B.Tech. II Semester

**HYDRAULIC MACHINES**  
(Mechanical Engineering)

Time: 3 hours

Max. Marks: 60

*Answer FIVE Questions, Choosing ONE Question from each section  
All Questions carry equal marks*

**SECTION - I**

- 1 (a) Prove that the force exerted by a jet of a water on a fixed semi circular plate in the director of the jet when the jet strikes at the centre of the semi circular plate is two times the force exerted by the jet on fixed vertical plate.
- (b) A jet of water of diameter 50mm moving with a velocity of 20 m/s strikes a fixed plate in such a way that the angle between the jet and the plate is  $60^\circ$ . Find the force exerted by the jet on the plate (i) in the direction normal to the plate (ii) in the direction of the jet.
- 2 A jet of water having a velocity of 30 m/s strikes a curved vane, which is moving with a velocity of 15 m/s. The jet makes an angle of  $30^\circ$  with the direction of motion of vane at inlet and leaves at an angle of  $120^\circ$  to the direction of motion of vane at outlet. Calculate (i) Vane angles, if the water enters and leaves the vanes without shock (ii) work done per second per unit weight of water striking the vanes per second.

**SECTION - II**

- 3 (a) Differentiate between  
(i) Impulse and reaction turbines (ii) Radial and Axial flow turbines (iii) Inward and outward radial flow turbines (iv) Kaplan and Propeller turbine

- (b) A Kaplan turbine develops 60,000 kW of power under a head of 25 m with overall efficiency of 90%. Taking the value of flow ratio = 0.5, speed ratio = 1.6, the hub diameter as 0.35 times the diameter of the runner, find the diameter of the runner.
- 4 A Pelton wheel turbine nozzle for which  $C_v = 0.97$  is 400 m below the water surface of a lake. The jet diameter is 80mm, the pipe diameter is 0.6m, its length is 4km and  $f = 0.032$  in the formula  $h_f = fLV^2 / 2gD$ . The bucket deflects the jet through  $165^\circ$  and they run at 0.48 times the jet speed. Bucket friction reducing the relative velocity at outlet by 15% of the relative velocity at inlet. Mechanical efficiency = 90%. Find the flow rate and shaft power developed by the turbine.

### SECTION – III

- 5 (a) What is the principle behind a centrifugal pump? Explain the working of a single stage centrifugal pump with the help of neat sketch.
- (b) Derive an expression for the minimum starting speed of a centrifugal pump.
- 6 A centrifugal pump has the following characteristics:  
 Outer diameter of impeller = 400 mm  
 Width of impeller vanes at outlet = 50 mm  
 Angle of impeller vanes at outlet =  $40^\circ$ , speed of impeller is = 800 rpm  
 Head = 15 m. Determine velocity of flow at outlet, velocity of water leaving the vane, and Discharge of the pump.

### SECTION – IV

- 7 (a) How will you classify the reciprocating pumps? Define slip, percentage of slip and negative slip of a reciprocating pump
- (b) A double acting reciprocating pump running at 40 rpm is discharging  $1.0 \text{ m}^3$  of water per minute. The pump has a stroke of 400mm. the diameter of the piston is 200mm. The delivery and suction heads are 20m and 5m respectively. Find the slip of the pump and power required to deliver the pump.
- 8 The diameter and stroke length of a single acting reciprocating pump are 100mm and 300mm respectively. The water is lifted to a height of 20m above the centre of the pump. Find the maximum speed at which the pump may be run so that no separation occurs during the delivery stroke, if the diameter and length of

delivery pipe are 50mm and 25mm respectively. Separation occurs if the absolute pressure head in the cylinder during delivery stroke falls below 2.5m of water. Take atmospheric pressure as 10.3m of water.

### SECTION – V

- 9 (a) Describe with the help of a neat sketch the working of a hydraulic accumulator
- (b) The diameter of the two parts of the ram of a differential accumulator are 150mm and 130mm, and stroke length is 1.2m. If the pressure of water is  $9810 \text{ kN/m}^2$  when the load is either at rest at the upper end of the stroke or the load is moving with uniform velocity, what will be the weight of the loaded cylinder? How much energy can be stored in this accumulator? What will be the diameter of the ram of an ordinary accumulator to move the same load with the help of the same water pressure?
- 10 (a) Explain with neat sketch the principle of working of hydraulic intensifier.
- (b) Find the power of the motor to drive the plunger of a hydraulic press lifting 10kN to a height of 1.0m in 10 minutes. The diameter of ram and plunger are 150mm and 25 mm respectively. Take stroke of plunger as twice of diameter of the ram. Find also the number of strokes required by the plunger.





Code : 13EC2201

B.TECH. DEGREE EXAMINATION, MAY 2018

II B.Tech. II Semester

SWITCHING THEORY & LOGIC DESIGN

(Common for EEE & ECE)

Time : 3 hours

Max. Marks :60

*Answer FIVE Questions, Choosing ONE Question from each section*

*All Questions carry equal marks*

\* \* \*

**SECTION - I**

- 1 (a) Convert the following into indicated number system.  
(i)  $(326)_4 = (x)_{10}$       (ii)  $(2958.675)_{10} = (X)_{16}$
- (b) Perform the arithmetic operation using 8-bit 2's Complement  
(i) Add -65 to +26      (ii) Add 47.25 to 45.75
- 2 (a) A 7-bit Hamming code received as 0111011. Find the correct code.
- (b) Convert the following into Gray number  
(i)  $(4A7)_{16}$       (ii)  $(537)_8$

**SECTION - II**

- 3 (a) Realize the XOR Function using NAND logic and NOR logic.
- (b) Obtain the minimal expression for  $f = \sum m(1,2,4,6,7)$  and implement it using universal gates.
- 4 (a) Reduce the following expression  $f = \sum m(0,1,2,3,5,7,8,9,10,12,13)$  and implement the real minimal expression in using NAND logic
- (b) Expand  $A + BC + AB\bar{D} + ABCD$  into Minterms.

**SECTION - III**

- 5 (a) Construct a 2 line to 4 line Decoder and explain its operation
- (b) Write a note on 4 X 1 Multiplexer.

- 6 (a) What is multiplexer? Use a 4X1 multiplexer to implement the logic function  $F(A,B,C) = \sum m(1,2,4,7)$  multiplexer.  
(b) Write short note on priority encoder

#### **SECTION - IV**

- 7 (a) Discuss clocked S-.R Flip-Flop & D Flip-Flop  
(b) Draw the circuit diagram of shift Register and explain the operation of SISO & PIPO shift register
- 8 (a) Distinguish between Asynchronous & synchronous counter  
(b) Construct the synchronous counter for a given sequence 0,3,5,6

#### **SECTION - V**

- 9 (a) Compare SRAM & DRAM  
(b) With the help of architecture explain the operation of Semiconductor RAM
- 10 Explain the operation of ROM, EPROM, EEPROM

Code : 13CS2201

B.TECH. DEGREE EXAMINATION, MAY 2018

**II B.Tech. II Semester**

**DATABASE MANAGEMENT SYSTEMS**  
(Computer Science & Engineering)

Time : 3 hours

Max. Marks :60

*Answer FIVE Questions, Choosing ONE Question from each section*  
*All Questions carry equal marks*

\* \* \*

**SECTION - I**

- 1 (a) What are the differences between weak entity and strong entity and explain with an example?  
(b) Define : (i) Attribute (ii) Primary attribute  
(iii) Entity set (iv) Composite attribute
- 2 (a) Explain about network model with example.  
(b) What are the sub-languages of SQL? Explain with suitable examples.

**SECTION - II**

- 3 (a) Explain the Relational Algebra Operation.  
(b) Explain Domain Relational Calculus.
- 4 (a) What is meant by Integrity constraint? Explain Domain integrity constraint with example.  
(b) Compare and contrast Relational Calculus Versus Relational Algebra.

**SECTION - III**

- 5 (a) Explain the decomposition process with example.  
(b) What are the differences between functional dependency and multi-valued dependency?
- 6 (a) What is meant by Normalization? Explain 5NF.  
(b) Explain : (i) Candidate key (ii) Super key (iii) Primary key

**SECTION - IV**

- 7 (a) Explain the Time-stamp based concurrency control.  
(b) Explain the Two-phase locking with example.

- 8 (a) What is meant by Serialization? Explain with an example.  
(b) Explain the optimistic concurrency control.

**SECTION - V**

- 9 (a) Explain different types of errors with examples.  
(b) Explain the ARIES.
- 10 (a) What is meant by check point? Explain operation of check point.  
(b) Write short notes on (i) Shadow paging  
(ii) Long-recovery technique.

B.TECH. DEGREE EXAMINATION, MAY 2018

**II B.Tech. II Semester****RANDOM SIGNALS & STOCHASTIC PROCESSES**  
(Electronics & Communication Engineering)

Time : 3 hours

Max. Marks :60

*Answer FIVE Questions, Choosing ONE Question from each section*  
*All Questions carry equal marks*

\* \* \*

**SECTION - I**

- 1 (a) State and prove the properties of probability density function.  
 (b) Determine the all applicable joint and conditional probabilities of the below experiment, if a box there are 100 resistors having resistance and tolerance as shown in table. Let define three events: A as “draw a 47Ω resistor”, B as “draw a resistor with 5% tolerance” and C as “draw a 100Ω resistor”.

Resistor	Tolerance		Total
	5 %	10 %	
22 Ω	10	14	24
47 Ω	28	16	44
100 Ω	24	08	32
<b>Total</b>	<b>62</b>	<b>38</b>	<b>100</b>

- 2 (a) With help of neat characteristic curves, interpret the concepts of following distribution and density functions with applications.  
 (i) Uniform Function (ii) Exponential Function  
 (b) A random variable has a probability density  $f_X(x) = \begin{cases} \frac{5}{4}(1-x^4), & 0 < x \leq 1 \\ 0, & \text{elsewhere} \end{cases}$   
 Determine first and second order moments along with variance.

**SECTION - II**

- 3 (a) State and prove the Properties of Joint Probability Distribution Function.  
 (b) Two random variables X and Y are characterized by the density function

$$f_{XY}(xy) = \frac{xy}{9}, \quad 0 < x < 2, 0 < y < 3$$

$$0, \quad \text{elsewhere}$$

Examine whether that X and Y are uncorrelated and statistically independent.

- 4 (a) Summarize the concept of Jointly Gaussian random variables and its properties.  
 (b) If statistically independent random variables X and Y having respective densities  $f_X(x) = 5u(x)e^{-5x}$ ,  $f_Y(y) = 2u(y)e^{-2y}$  then compute the density function of  $W = X+Y$ .

### SECTION - III

- 5 (a) Elaborate the first order stationary random process and second order, and WSS random process with necessary conditions.  
 (b) A wide-sense stationary random process having autocorrelation function

$$R_{XX}(\tau) = A_0 \left[ 1 - \frac{|\tau|}{T} \right], \quad -T < \tau < T$$

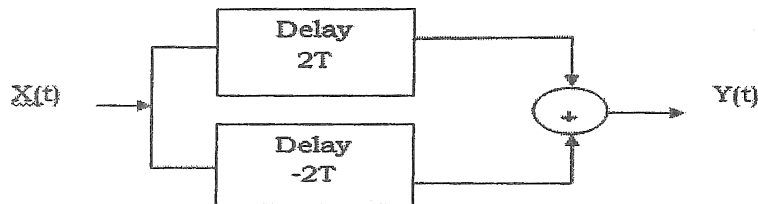
Determine the power spectrum.

$$0, \quad \text{elsewhere}$$

- 6 (a) Examine the following properties of auto PSD for a given random process  $X(t)$ .  
 (i)  $S_{\dot{X}\dot{X}}(\omega) = \omega^2 S_{XX}(\omega)$  (ii)  $S_{XX}(-\omega) = S_{XX}(\omega)$  where  $\dot{X}(t) = \frac{d}{dt}(X(t))$   
 (b) A random process is described by  $X(t) = A$ , where  $A$  is a continuous random variable and is uniformly distributed on  $(0,1)$ . Show that  $X(t)$  is wide sense stationary.

### SECTION - IV

- 7 (a) Solve for the autocorrelation function  $R_{YY}(\tau)$  of the system response.  
 (b) A stationary random process  $X(t)$  is applied to the input of a system for which  $h(t) = 3u(t)t^2 e^{-3t}$ . If  $E[X(t)] = 2$ , what is the mean value of system's response  $Y(t)$
- 8 (a) Derive the expression for auto power density of system response.  
 (b) The power density spectrum of a random process is given by  $S_{XX}(\omega) = \frac{16}{16 + \omega^2}$ . Analyze it is valid density or not. If it is transmitted through a system as shown in figure, find output Auto PSD



### SECTION - V

- 9 (a) Discuss the thermal noise source with necessary equations.  
 (b) Three amplifiers with spot effective input noise temperature of 125K and available power gain  $G$  are cascaded. The overall spot effective input noise temperature is 155K, then what is  $G$ ?
- 10 A signal  $x(t) = u(t) 5t^2 e^{-2t}$  is added to a white noise for which  $\frac{N_0}{2} = 10^{-2} \text{ W / Hz}$ .  
 If the sum is applied to a low pass RC Network (i). What is filter's transfer function?  
 (ii). What is  $\frac{S_0}{N_0}$ ? (iii). Sketch the impulse response of filter.

code : 13EE2204

B.TECH. DEGREE EXAMINATION, MAY 2018

**II B.Tech. II Semester**

**ELECTRO MECHANICAL ENERGY CONVERSION - II**  
(Electrical & Electronics Engineering)

Time : 3 hours

Max. Marks :60

*Answer FIVE Questions, Choosing ONE Question from each section*  
*All Questions carry equal marks*

\* \* \*

**SECTION - I**

- 1 (a) What are the conditions to be satisfied for satisfactory parallel operation of 1-phase transformers? Explain.  
(b) A 100 KVA, 50 Hz, 440/11000 V, 1-phase transformer has an efficiency of 98.5% when supplying full-load current at 0.8pf and an efficiency of 99% when supplying half-full load current at unity pf. Find the iron losses and ohmic losses corresponding to full load current. At what value of load current will the maximum efficiency be attained?
- 2 (a) With the help of a neat circuit diagram, explain how sumpner's test is conducted.  
(b) A 200V, 60 Hz single phase transformer has hysteresis and eddy current losses of 250 watts and 90 watts respectively. If the transformer is now energised from 230 V, 50 Hz supply, calculate its core losses. Assume Steinmentz's constant equal to 1.6.

**SECTION - II**

- 3 (a) Explain the principle of three-phase to two-phase conversion using scott-connected transformers.  
(b) A 3-phase step-down transformer is connected to 6.6 kV mains and takes 10A. Calculate the secondary line voltage, line current and output for the following connections: (i) Delta/Star and (ii) Star/Delta. The ratio of turns per phase is 12. Neglect losses.
- 4 (a) What are the advantages and disadvantages of STAR-STAR choice of 3-phase transformer connection?  
(b) Two transformers are connected in open delta and supply a balanced 3-phase load of 240 KW at 400 volts and a power factor of 0.866 lagging. Determine. i) The Secondary line current ii) The KVA load on each transformer iii) The power delivered by the Individual transformers. If a third transformer having the same rating as each of the other two is added to form a Delta Bank, what total load can be supplied?

### SECTION - III

- 5 (a) Describe the principle of operation of a 3-phase induction motor. Explain why the rotor is forced to rotate in the direction of rotating magnetic field?  
(b) A 3-phase slip-ring, induction motor with star-connected rotor has an induced e.m.f. of 120V between slip-rings at standstill with normal voltage applied to the stator. The rotor winding has a resistance per phase of  $0.3\Omega$  and standstill leakage reactance per phase of  $1.2\Omega$ . Calculate i) Rotor current/phase when running short-circuited with 4% slip and ii) the slip and rotor current per phase when the rotor is developing maximum torque.
- 6 (a) With the help of necessary derivation, show that a rotating magnetic field is produced in a 3-phase induction motor  
(b) A 3-phase, 6-pole, 50Hz induction motor has a slip of 1% at no load, and 3% at full load. Determine i) synchronous speed ii) No-load speed iii) full-load speed iv) frequency of rotor current at stand still v) frequency of rotor current at full load.

### SECTION - IV

- 7 (a) Explain the procedure of drawing the circle diagram of an induction motor. What information can be obtained from the circle diagram?  
(b) An 8-pole, 50Hz, 3-phase slip ring induction motor has effective resistance of  $0.08\Omega$ /phase. The speed corresponding to maximum torque is 650 r.p.m. What is the value of resistance to be inserted in rotor circuit to obtain maximum torque at starting?
- 8 (a) Explain the procedure to conduct blocked rotor test and no-load test on induction motor.  
(b) 4-pole, 3-phase, 50Hz induction motor has a starting current which is 5 times its full load value when switched on directly. What will be the % reduction in starting torque if the motor is started with,  
i) Star-delta starter  
ii) Auto transformer starter with 65% tapping?

### SECTION - V

- 9 (a) Explain the principle of operation of induction generator and mention its advantages and disadvantages.  
(b) Draw the equivalent circuit of double cage induction motor and derive its torque equation.
- 10 (a) Explain the Cascade method of speed control with neat sketches  
(b) Two motors A and B with 10 poles and 12 poles respectively are cascaded. The motor A is connected to a 50Hz supply. Find i) Speed of set ii) the electrical power transferred to the motor B when the input to the motor A is 60kW. Neglect losses.



Code : 13CE2203

B.TECH. DEGREE EXAMINATION, MAY 2018

**II B.Tech II Semester**

**SOIL MECHANICS**

(Civil Engineering)

Time: 3 hours

Max. Marks: 60

*Answer FIVE Questions, Choosing ONE Question from each section  
All Questions carry equal marks*

\* \* \*

**SECTION - I**

- 1 (a) Differentiate between:
  - (i) Saturated Unit Weight and Submerged Unit Weight
  - (ii) Well graded soil and Poorly graded soil
- (b) Obtain an expression for soil moisture content, degree of saturation, specific gravity of solids and void ratio.
2. (a) Explain plasticity chart with a neat sketch and its use in classification of fine grained soil.
- (b) A partially saturated soil sample has a natural water content of 15% and Bulk Unit Weight of  $20\text{kN/m}^3$ . Compute the Degree of Saturation, Void Ratio and Porosity.

**SECTION - II**

- 3 (a) What is Darcy's law? What are its limitations?
- (b) Determine the average horizontal and vertical permeabilities of a soil mass made up of three horizontal strata, each 1m thick, if the coefficients of permeability are  $1 \times 10^{-1}\text{mm/s}$ ,  $3 \times 10^{-1}\text{mm/s}$  and  $8 \times 10^{-2}\text{mm/s}$  for the three layers.
- 4 (a). What is effective stress principle?
- (b) A deposit of fine sand has a void ratio of 0.54 and specific gravity of solid particles is 2.67. Compute the safe exit gradient with a factor of safety of 4.

**SECTION - III**

- 5 (a) What is a compaction Curve? Give its salient features. What is zero air void line?
- (b) The maximum dry density and optimum moisture content of a soil from standard proctor test are  $18 \text{ kN/m}^3$  and 16% respectively. Compute the degree of saturation of the sample, assuming specific gravity of soil grains as 2.7.

- 6 (a) Derive an expression for vertical stress at a point due to a point load using Boussinesq theory.  
(b) A load of 50kN is applied at a concentrated unit on a surface. Find the vertical pressure at a point 1.5m below the load and 3m away horizontally.

#### SECTION - IV

- 7 (a) Discuss the spring analogy for primary consolidation. What are its uses?  
(b) In a consolidation test the following results have been obtained, when the load was changed for 52 kN/m<sup>2</sup> to 100kN/m<sup>2</sup>, the void ratio changed from 0.7 to 0.65, Determine the coefficient of volume decrease,  $m_v$  and compression index,  $C_c$ .
- 8 (a) Differentiate between primary consolidation and secondary consolidation.  
(b) A clay layer, 8m thick, is subjected to a pressure of 70kN/m<sup>2</sup>. If the layer has a double drainage and undergoes 50% consolidation ( $T=0.196$ ) in one year, determine the coefficient of consolidation.

#### SECTION - V

- 9 (a) How are shear tests classified, based on drainage conditions? Under what conditions each of these tests is preferred?  
(b) Given the results of two sets of triaxial shear tests:  
 $\sigma_{11} = 1800 \text{ kN/m}^2$ ;  $\sigma_{31} = 1000 \text{ kN/m}^2$   
 $\sigma_{12} = 2800 \text{ kN/m}^2$ ;  $\sigma_{32} = 2000 \text{ kN/m}^2$   
Compute  $\Phi$  and  $c$ .
- 10 (a) Differentiate between unconsolidated undrained test and drained test. Under what conditions are these test results used for design purposes?  
(b) A soil specimen was tested in a triaxial machine. If the angle of shearing resistance was  $36^\circ$  and the confining pressure  $100\text{kN/m}^2$ , determine the deviator stress at which the sample failed.

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**II B.Tech. II Semester****STRENGTH OF MATERIALS**  
(Mechanical Engineering)

Time: 3 hours

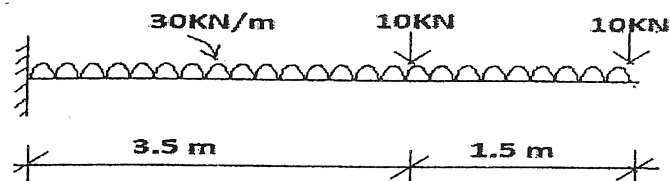
Max. Marks: 60

*Answer FIVE Questions, Choosing ONE Question from each section*  
*All Questions carry equal marks*

\* \* \*

**SECTION - I**

- 1 A cantilever of span 5 m, carries loads as shown in fig. Draw shear force and bending moment diagrams for the beam.



- 2 A beam of span 10m is simply supported at left and overhang at other end. It carries a uniformly distributed load of 4kN/m acting over the span of 5m from left support. A horizontal force of 5kN acting on the top of 2m lever at 4m from the left end. In the total span of 10m, 3m is overhanging and a point load of 12kN is acting at the free end. Draw the Shear Force and Bending Moment diagram and locate the Point of Contra flexure. Draw shear force and bending moment diagrams for the beam.

**SECTION - II**

- 3 Explain the theory of pure bending starting with assumptions and ending up with the bending equation. How is the theory applicable for practical purposes?
- 4 An I-section has flanges 80x15mm and web 100x15mm. This section is subjected to a shearing force of 10kN. Find the values of maximum and average shear stresses induced in section?

**SECTION - III**

- 5 Determine (i) slope at the supports (ii) deflection under the load (iii) maximum deflection of a simply supported beam of length 10m, which is carrying a point load of 10kN at a distance of 6m from the left end. Take  $E=2 \times 10^5 \text{ N/mm}^2$  and  $I= 1 \times 10^8 \text{ mm}^4$ . Use Macaulay's method.
- 6 Derive the torsion equation for a shaft of circular cross section.

#### SECTION - IV

- 7 a The principal stresses at a point in an elastic material are  $200 \text{ N/mm}^2$  (tensile),  $100 \text{ N/mm}^2$  (tensile) and  $50 \text{ N/mm}^2$  (compressive). If the stress at the elastic limit in simple tension is  $200 \text{ N/mm}^2$ . Determine whether the failure of the material will occur according to maximum principal strain theory. Take Poisson's ratio = 0.3.
- b A rectangular bar of cross section area  $12000 \text{ mm}^2$  is subjected to an axial load of  $360 \text{ kN}$ . Determine the normal and shear stresses on a section which is inclined at an angle of  $30^\circ$  with the normal cross section of the bar.
- 8 a What are the different theories of failure? Discuss about their Scope.
- b Determine the diameter of a bolt subjected to an axial pull of  $9 \text{ kN}$  and transverse shear of  $4.5 \text{ kN}$ . Take elastic limit of bolt material as  $225 \text{ N/mm}^2$ , factor of safety 3 and Poisson's ratio 0.3. Apply maximum shear stress theory.

#### SECTION - V

- 9 Derive expression for the Euler's Buckling load in a column fixed at one end and pinned at other end.
- 10 A thin cylindrical shell of 0.6 meters diameter and 0.9 meters long is subjected to an internal pressure  $1.2 \text{ N/mm}^2$ . Thickness of cylinder wall is 15 mm. Determine
- Longitudinal stress, circumferential stress and maximum shear stress induced and
  - Change in diameter, length and volume. Take  $E = 200 \text{ GPa}$  and  $\nu = 0.3$ .

Code : 13EE2205

B.TECH. DEGREE EXAMINATION, MAY 2018

**II B.Tech. II Semester**

**GENERATION OF ELECTRIC POWER**

(Electrical and Electronics Engineering)

Time : 3 hours

Max. Marks :60

*Answer FIVE Questions, Choosing ONE Question from each section*

*All Questions carry equal marks*

\* \* \*

**SECTION - I**

- 1 a) Explain the important components of a steam power station.
- b) Discuss the merits and demerits of a thermal power plant.
- 2 a) With neat diagrams explain about the types of boilers used in thermal power plant.
- b) Explain about the functions of electrostatic precipitator and condensers in thermal plants.

**SECTION - II**

- 3 a) What are the factors to be considered for the selection of site for nuclear power plant?
- b) Explain schematic arrangement of nuclear power plant with neat sketch.
- 4 a) Draw a neat schematic diagram of a hydro-electric plant and explain the functions of various components.
- b) Explain the essential factors which influence the choice of site for a hydro-electric plant.

**SECTION - III**

- 5 a) Describe in brief, the different energy storage methods used in the solar system.
- b) Write short notes on :
  - i. Agricultural and process heat
  - ii. Solar distillation
  - iii. Solar Pumping
- 6 a) Describe with a neat sketch the working of wind energy conversion system with main components
- b) Discuss the advantages and disadvantages of wind energy conversion system

**SECTION - IV**

- 7 a) Describe an MHD closed cycle system. What are the advantages of MHD power generation?
- b) What are important factors to be considered while selecting materials for an MHD generator.

- 8 a) Describe an MHD closed cycle system, with its advantages and disadvantages.  
b) Derive the expression for maximum power per unit volume for a faraday generator

**SECTION - V**

- 9 a) What do you understand by the load curve ? What informations are conveyed by a load curve ?  
b) A generating station has a maximum demand of 25MW, a load factor of 60%, a plant capacity factor of 50% and a plant use factor of 72%. Find:  
(i) the reserve capacity of the plant  
(ii) the daily energy produced and  
(iii) maximum energy that could be produced daily if the plant while running as per schedule, were fully loaded.
- 10 a) Calculate the annual bill of a consumer whose maximum demand is 100kw, p.f. = 0.8 lagging and load factor is 60%. The tariff used is Rs. 75 per kVA of maximum demand plus 15 paise per kwh consumed.  
b) A factory has a maximum load of 240kw at 0.8 p.f. lagging with an annual consumption of 50,000 units. The tariff is Rs. 50 per kVA of maximum demand plus 10 paise per unit. Calculate the flat rate energy consumption. What will be the annual saving if p.f. is raised to unity?

B.TECH. DEGREE EXAMINATION, MAY 2018

**II B.Tech. II Semester**

**COMPUTER ORGANIZATION**  
(Computer Science & Engineering)

Time : 3 hours

Max. Marks :60

*Answer FIVE Questions, Choosing ONE Question from each section*  
*All Questions carry equal marks*

\* \* \*

**SECTION - I**

- 1 (a) Compare Multi Processors with Multi Computers.  
(b) What are different ways of representing the alpha numeric information.
- 2 (a) What is meant by addressing mode? Describe various types of addressing modes in detail.  
(b) Describe various instruction formats in a computer.

**SECTION - II**

- 3 (a) Write short on  
i)RAM ii)Virtual memory  
(b) What is replacement algorithm? Explain.
- 4 (a) Explain about different levels of RAID.  
(b) Write short notes on cache memory mapping functions

**SECTION - III**

- 5 (a) Explain Booths algorithm.  
(b) Multiply 10001 with 10101 using Booths algorithm
- 6 (a) Explain Floating point Arithmetic operations in detail.  
(b) Give the block diagram for a floating point adder and subtractor unit and discuss its operation

**SECTION - IV**

- 7 (a) Write short notes on Hardwired control.  
(b) Explain direct memory access with neat diagram.
- 8 (a) Write short on  
i) Universal Serial Bus ii) SCSI Bus  
(b) Explain about single and multiple bus organization and give the definition of bus.

**SECTION - V**

- 9 (a) Explain about data hazards.  
(b) Explain supper-scalar operation in pipelining.
- 10 (a) Discuss about data path, control and performance consideration.  
(b) Explain about Instruction hazards.





**II B.Tech. II Semester****ANALOG COMMUNICATIONS**  
(Electronics & Communication Engineering)

Time : 3 hours

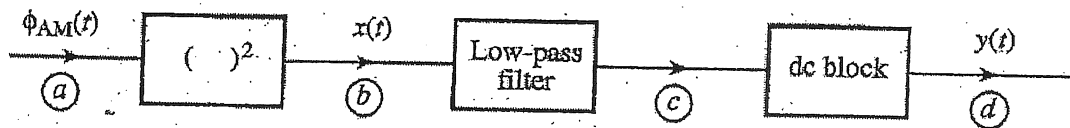
Max. Marks :60

Answer FIVE Questions, Choosing ONE Question from each section  
All Questions carry equal marks

\* \* \*

**SECTION - I**

- 1 (a) Draw the time and frequency domain versions of amplitude modulated wave for different modulation indices of 0.25, 0.5, 0.75 and 1 for single tone message signal.  
(b) Define modulation and illustrate the importance of it real time analog communication systems.
- 2 (a) AM signals are demodulated by a crystal detector (squaring device) followed by a block diagram as shown in figure. Determine the time and frequency domain equations of signals at points a, b, c and d with their corresponding spectrum. The message signal is band limited to 5 kHz, the carrier is 738 kHz and the low pass filter is ideal one with a cut-off frequency of 5 kHz.



- (b) List out the Electromagnetic spectrum with its applications.

**SECTION - II**

- 3 (a) With necessary mathematical equations show that wideband FM has infinity bandwidth.  
(b) Discuss the operation of slope detector and give its disadvantages.
- 4 (a) Describe the demodulation of FM using ratio detector with necessary circuit diagram and phasor diagrams.  
(b) Explain the 2 stage indirect method of generation of FM with considering an example. Draw the waveforms at the output of each and every block.

**SECTION - III**

- 5 (a) State and prove the sampling theorem for low pass signals.  
(b) With a suitable diagrams and waveforms explain the operation of TDM and FDM.
- 6 (a) Discuss the demodulation of PAM, PWM and PPM.  
(b) Compare the pulse modulation methods PWM and PPM with reference to its generation.

#### SECTION - IV

- 7 (a) Describe the effect of noise on linear communication systems such as DSB-SC and SSB-SC.  
(b) Explain how the pre-emphasis and de-emphasis improves the signal to noise ratio in FM systems.
- 8 (a) Show that FM receiver will produce improved figure of merit compared to AM receiver.  
(b) Discuss the threshold effect in AM and FM systems.

#### SECTION - V

- 9 (a) Explain how the characteristics of a radio receiver can be measured for a typical practical radio receiver.  
(b) Describe the use of automatic gain control in analog communication receiver.
- 10 (a) Give the disadvantages of a tuned radio frequency (TRF) receiver, with a neat block diagram explain how they overcome by a super heterodyne receiver.  
(b) Draw and explain the block diagram of high level modulation AM transmitter.

**Code : 13ME2201**

**B.TECH. DEGREE EXAMINATION, MAY 2018**

**II B.Tech. II Semester**

**APPLIED THERMODYNAMICS - I  
(Mechanical Engineering)**

Time: 3 hours

Max. Marks: 60

*Answer FIVE Questions, Choosing ONE Question from each section  
All Questions carry equal marks*

*\* \* \**

**SECTION - I**

- 1 (a) Explain various properties of steam  
(b) A steam power plant works between 40 bar and 0.05 bar. If the steam supplied is dry saturated and the cycle of operation is Rankine, Find (i) cycle efficiency, (ii) Specific steam consumption.
- 2 (a) State the methods of increasing the thermal efficiency of Rankine cycle  
(b) In a Rankine cycle, the steam at inlet to turbine is saturated at a pressure of 30 bar and the exhaust pressure is 0.2 bar. Determine: (i) The pump work (ii) Turbine work (iii) Rankine efficiency (iv) Condenser heat flow (v) Dryness fraction at end of expansion. If Assume flow rate of 12kg/.

**SECTION - II**

- 3 (a) Enumerate the factors which should be considered while selecting a boiler.  
(b) Explain with a neat sketch the working of Bob cock and Wilcox boiler
- 4 (a) Explain the following terms  
(i) Fusible Plug (ii) Feed check Valve (iii) Water Level Indicator  
(b) How the fire tube boilers are different from water tube boiler

**SECTION - III**

- 5 (a) State the factors which influence the nozzle efficiency  
(b) Dry saturated steam is expanded in a nozzle from 15 bar at 300<sup>0</sup> C to 1 bar. If the frictional loss in the nozzle is 14 % of the total heat drops calculate the mass of steam discharged when exit diameter of the nozzle is 14 mm.
- 6 (a) How will you classify the condensers? In what respect a jet condenser differs from a surface condenser?  
(b) The air leakage into the condenser operating in injection with a steam turbine is estimated at 0.7 kg/minute. The vacuum near the outlet to the air pump is 710 mm when the barometer reads 760 mm and temperature at this point is 20<sup>0</sup>C. Find (i) the minimum capacity of air-pump in m<sup>3</sup>/min, (ii) the mass of Vapour extracted with the air/min.

#### SECTION - IV

- 7 In a De Laval turbine steam issues from the nozzle with a velocity of 1200 m/s. the nozzle angle is  $20^{\circ}$ , the mean blade velocity is 400 m/s, and the inlet and outlet angles of blades are equal. The mass of steam flowing through the turbine per hour is 1020 kg. Calculate: (i) Blade angle, (ii) Relative velocity of steam entering the blade, (iii) Tangential force on the blades, (iv) Power developed, (v) Blade efficiency Take blade velocity coefficient as 0.8.
- 8 (a) (i) Define speed ratio and stage efficiency  
(ii) Bleeding of steam turbine  
(b) In a reaction turbine the fixed blades and moving blades are of the same shape but reversed in direction. The angles of the receiving tips are  $35^{\circ}$  and of the discharging tips  $20^{\circ}$ . (i) Find the power developed per pair of blades for a steam consumption of 2.5 kg/s, when the blade speed is 50m/s. if the heat drop pair is 11KJ/Kg  
(ii) Find the efficiency of the pair.

#### SECTION - V

- 9 (a) Derive an expression for the maximum efficiency of impulse turbine  
(b) Why do you require compounding of turbine and explain any one method
- 10 (a) Illustrate the throttle governing of steam turbines  
(b) What are the advantages of multi stage turbine over a single stage turbine

Code : 13CE2204

B.TECH. DEGREE EXAMINATION, MAY 2018

**II B.Tech II Semester**

**TRANSPORTATION ENGINEERING - I**

**(Civil Engineering)**

Time: 3 hours

Max. Marks: 60

*Answer FIVE Questions, Choosing ONE Question from each section*

*All Questions carry equal marks*

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**SECTION - I**

- 1 a) Briefly explain the historic development of road construction.  
b) What are the various surveys to be carried out before planning a highway system for a given area? Explain briefly.
2. a) What are the objectives of reconnaissance in engineering surveys? Discuss the scope of aerial survey for the purpose.  
b) Briefly explain the engineering surveys needed for locating a new highway

**SECTION - II**

- 3 a) Explain the role of pavement surface characteristics in highway geometric design. State the factors affecting friction between pavements and tyres of vehicles?  
b) Find the stopping sight distance required for a design speed of 70kmph. Assume suitable data. What are sight distance requirements at rising and falling gradient of 1 in 40 and 1 in 60
- 4 a) An ascending gradient of 1 in 40 meets a descending gradient of 1 in 70. Determine the length of summit curve to provide (a) ISD, (b) OSD for design speed of 75 kmph. Assume all other data  
b) A horizontal curve of radius 310m is to be designed with a design speed of 70kmph on a level terrain. The width of the road is 7.0 m and super elevation is to be provided by rotating the pavement with respect to the inner edge. The rate of introduction of super elevation is 1 in 130. If the maximum wheel base of a vehicle is 6.5m calculate the length of transition curve required.

**SECTION - III**

- 5 a) Explain how plate load test is carried for evaluation sub-grade support.  
b) Explain the desirable properties of aggregate used in pavement constructions

- 6 a) Explain the importance and how of California Bearing Ratio Test performed on soil sub-grade.
- b) Explain the objectives and requirements of bituminous mix design using Marshall Method.

#### SECTION - IV

- 7 a) The CBR value of soil sub-grade is 8%. Calculate the total thickness of flexible pavement using (i) design curve developed by California State Highway Department (ii) design chart recommended by IRC. (iii) Design formula developed by the U.S. Corps Engineers?  
Assume 4100kg wheel load or medium light traffic of 1500 commercial vehicles per day for design.
- b) Explain group index method of pavement design. What are the limitations of this method?
- 8 a) Calculate the stresses at interior, edge and corner regions of a concrete pavement using Westergaards stress equation for the following data:  
Wheel load=4100 kg, Modulus of elasticity of concrete= $3.3 \times 10^5$  kg/cm<sup>2</sup>, Pavement thickness=30cm, Modulus of subgrade reaction=8kg/cm<sup>3</sup>, Diameter of loaded area =25cm, Poisson's ratio of concrete= 0.15. Assume data if any data required.
- b) A concrete slab 7.5 m long, 3.5 m wide and 25 cm thick, is subjected to a temperature differential of 10.5 °C. Assuming that  $k = 50.0$  MN/m<sup>3</sup> and  $\alpha = 9 \times 10^{-6}$  /° C. Determine the maximum curling stress in the interior, edge and corner of the slab. Take the radius of contact as  $a = 150$  mm

#### SECTION - V

- 9 a) Write down the constructions procedure for water bound macadam road.
- b) Explain the objectives of compaction and the effect of inadequate compaction. Discuss the advantageous and applications various compacting equipment for construction of pavement layers
- 10 a) Explain the importance of highway drainage. What are the requirements of a good drainage system?
- b) Explain how the surface water is collected and disposed off in rural and urban roads.

B.TECH. DEGREE EXAMINATION, MAY 2018

**II B.Tech II Semester****SURVEYING - II**  
(Civil Engineering)

Time : 3 hours

Max Marks: 60

*Answer FIVE Questions, Choosing ONE Question from each section**All questions carry equal marks*

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**SECTION - I**

- 1 (a) Define the following terms: (i) Face right (ii) Changing face and (iii) Telescope inverted.
- (b) Explain the method of balancing a theodolite traverse.
2. A closed traverse was conducted round an obstacle and the following observations were made. Work out the missing quantities.

Side	Length (m)	Azimuth
AB	?	33°45'
BC	300	86°23'
CD	?	169°23'
DE	450	243°54'
EA	268	317°30'

**SECTION - II**

- 3 (a) What is the advantage of internal-focusing telescope in a tacheometer?
- (b) Write the advantages and disadvantages of keeping the staff vertical and also about tacheometer survey over other methods.
- 4 Following observations were taken from two traverse stations by means of a tacheometer fitted with an anallactic lens. The constant of the instruments is 100.

Inst. Station	Staff station	Height of Inst.	Bearing	Vertical angle	Staff readings
A	C	1.36	226°30'	+10°12'	0.755, 1.595, 2.455
B	D	1.40	84°45'	-12°30'	0.850, 1.840, 2.850

Co-ordinates of station A 212.3 N 186.8 W

Co-ordinates of station B 102.8 N 96.4 W

Compute the length and gradient of the line CD, if B is 6.50m higher than A.

### **SECTION - III**

- 5 (a) What are the elements of a simple circular curve? Give their relationships.  
(b) Two roads meet an angle of  $127^{\circ}30'$ . Calculate the necessary data for setting out a curve of 15 chains radius to connect two straight portions of the road if it is intended to set out the curve by chain and offsets only. Take length of chain as 30m.
- 6 (a) Explain in detail how length of vertical curve is obtained.  
(b) List out different types of vertical curves and explain in detail with the help of neat sketches.

### **SECTION - IV**

- 7 (a) Describe the steps for the initial setting of a total station for a fieldwork.  
(b) What are the advantages and disadvantages of total station?
- 8 Explain about the segments of Global Positioning System?

### **SECTION - V**

- 9 Write a short notes for the following:  
(a) Head parallax (b) Accommodation (c) Convergence (d) Retinal disparity
- 10 Explain in detail the rectification and enlargement of photographs with the help of neat sketches.



Code : 13SH2202

B.TECH. DEGREE EXAMINATION, MAY 2018

**II B.Tech. II Semester**

**ECONOMICS & ACCOUNTANCY**  
(Common for EEE & ECE)

Time : 3 hours

Max. Marks :60

*Answer FIVE Questions, Choosing ONE Question from each section*  
*All Questions carry equal marks*

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**SECTION - I**

- 1 (a) Explain in detail the various elasticity of Demand and its Determinants.
- 2 (a) .Discuss the law of Diminishing Marginal Utility Analysis
- (b) Explain the concept of consumer equilibrium.

**SECTION - II**

- 3 What are the internal and external economies of scale? Explain in detail.
- 4 (a) Define Break Even Analysis. Explain the managerial uses of Break Even Analysis
- (b) Explain in detail functions of commercial banks

**SECTION - III**

- 5 (a) What are the Features of monopoly?
- (b) Define price discrimination. Explain the conditions under which price discrimination is possible and profitable.
- 6 (a) What are the features of Perfect Competition ?
- (b) Explain the market power of monopoly

**SECTION - IV**

- 7 (a) Evaluate sole trade form of organization.
- (b) What is partnership? Mention the advantages and disadvantages of partnership?
- 8 What do you mean by company? Explain the features of joint stock companies.

**SECTION - V**

- 9 (a) What is Accounting? What are the concepts of Accounting?
- (b) Difference between Journal and Ledger.
- 10 (a) Define Capital Budgeting? Evaluate methods of Capital Budgeting.
- (b) Explain in detail the types of working capital.

