



**Subject Code: R16CC31OE11**

**III B.Tech I Semester Supple Examinations, October-2020**  
**PRINCIPLES OF WATER QUALITY MANAGEMENT (OPEN ELECTIVE-I)**  
**(CE)**

**Time: 3 hours**

**Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

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**PART-A**

1. (a) Define the variability of water in time and space
- (b) Explain the concept of blue water.
- (c) Write the methods to control of water logging
- (d) What is meant by recreational water demand?
- (e) Write the water requirements for environmental management
- (f) What is Genetic programming of water resources

[2+2+2+2+2+2]

**PART-B**

**4 X 12 = 48**

2. (a) What are water laws? Explain briefly about constitutional provisions in National Water Policy.
  - (b) Explain the present institutional framework for water management
3. (a) Explain the sustainability principles for water management.
  - (b) Explain the principles of and financing of water resources project.
4. (a) Explain the process of estimation of surface water and estimation of ground water.
  - (b) What are the structural and non-structural measures for flood management?
5. (a) What are the water requirements for environmental management ?
  - (b) Explain about the management of rehabilitation & resettlement.
6. (a) Explain the model Tree in water resources planning, development & management.
  - (b) Explain WHO- BIS- ICMR standards for water quality.
7. (a) Explain the use of Artificial Neural Networks in water resources
  - (b) Explain the Physical and Biological analysis of water.

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Subject Code: R16CC31OE4

**III B.Tech I Semester Supple Examinations, October-2020**  
**INDUSTRIAL ELECTRONICS (OPEN ELECTIVE-I)**  
**(ME)**

**Time: 3 hours**

**Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B  
All questions carry equal marks of 12.

**PART-A**

1. (a) What are the applications of a transistor?
- (b) Draw Volt-Ampere Characteristics of an SCR.
- (c) Discuss working principle of LVDT.
- (d) What is meant by electric welding?
- (e) Write merits of industrial automation.
- (f) Write your comment on stability of open loop control system

[2+2+2+2+2+2]

**PART-B**

4 X 12 = 48

2. (a) Discuss the working of PN junction diode in forward and reverse bias conditions with neat sketches.
- (b) Draw various transistor configurations and describe them.
3. (a) With a connection diagram, explain operation of half controlled rectifier.
- (b) What are various commutation techniques applied to turn off SCR. Explain any two of them with neat diagrams.
4. (a) What is a transducer? Make a comparison between mechanical, electrical and electronic transducers.
- (b) Explain the working principle of a Tacho-Generator.
5. (a) With the help of a diagram, explain the working principle of AC resistance welding.
- (b) What is dielectric heating? Discuss its methods.
6. (a) Discuss the operation of basic PLC system with its block diagram.
- (b) Why industrial automation is required? Discuss the role of microcontrollers in industrial automation.
7. (a) Make a comparison between open loop and closed control systems on stability aspect.
- (b) Discuss operation of closed loop control system with its block diagram.

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Subject Code: R16CC31OE6

III B.Tech I Semester Supple Examinations, October-2020  
AUTOMOTIVE ELECTRONICS (OPEN ELECTIVE-I)  
(ECE)

Time: 3 hours

Max Marks: 60

Question Paper Consists of Part-A and Part-B.

Answering the question in Part-A is Compulsory & Four Questions should be answered from Part-B  
All questions carry equal marks of 12.

PART-A

1. (a) What is the functionality of Engine control block in car
- (b) Draw the schematic symbol of diode and draw its transfer characteristics
- (c) What is the use of program counter in CPU
- (d) Define the term BSFC
- (e) List out the different types of actuators and mention where they are used.
- (f) Expand the term HUD and write what is the use of this.

[2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. (a) List the major components of the engine and explain any three components
- (b) Explain about spark pulse generation
3. (a) Explain the use of feedback in op Amps and derive the output voltage equation for summing amplifier
- (b) Explain about four stage synchronous counter with JK flip-flop
4. (a) Explain about microprocessor internal architecture
- (b) Explain about digital to analog convertors with circuit diagram and output voltage characteristics?
5. (a) Explain about electronic engine control system
- (b) Explain about electronic fuel control system
6. (a) Explain the working of engine crankshaft angular position sensor
- (b) Explain about magnetic Reluctance Position Sensor
7. (a) Explain the Collision Avoidance Radar warning System with block diagram
- (b) Explain about control signal multiplexing with block diagram





Subject Code: R16CE3101

III B.Tech I Semester Supplementary Examinations, October 2020  
STRUCTURAL ANALYSIS-II

(CE)

Time: 3 hours

Max Marks: 60

Question Paper Consists of Part-A and Part-B.

Answering the question in Part-A is Compulsory & Four Questions should be answered from Part-B  
All questions carry equal marks of 12.

PART-A

1. (a) Define the principle of Consistent deformation.
- (b) What is an indeterminate truss? Write down the various types of indeterminate trusses.
- (c) How the Clapeyron's theorem of three moments can be applied to overhanging beams?
- (d) Write down the equilibrium equations used in slope-deflection method?
- (e) Distinguish between Distribution factor and Carry over factor.
- (f) Write down the various steps in analysis of a beam by Kani's method.

[2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. Analyse the propped cantilever beam loaded as shown in the Fig. 1. Draw the Shear force and bending moment diagrams.

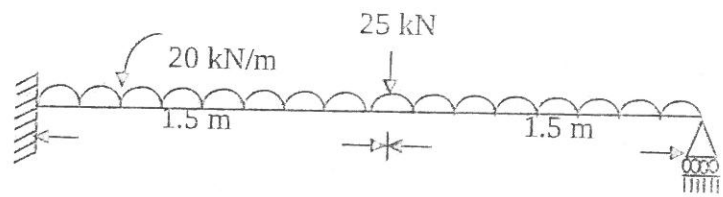


Fig. 1

3. Using Strain Energy method, analyse the beam supported and loaded as shown in Fig. 2.

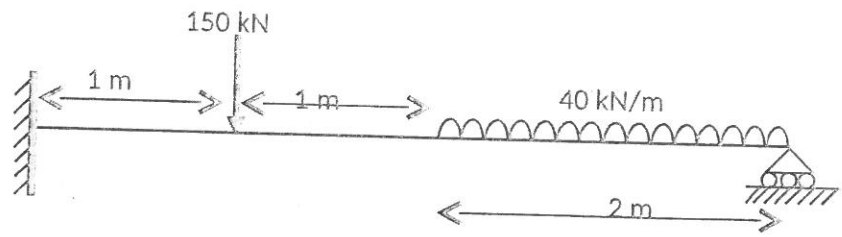


Fig. 2

4. Analyse the continuous beam supported and loaded as shown in Fig.3. Use Clapeyron's theorem of three moments. Adopt  $E = 200 \text{ GPa}$  and  $I = 90 \times 10^6 \text{ mm}^4$ .

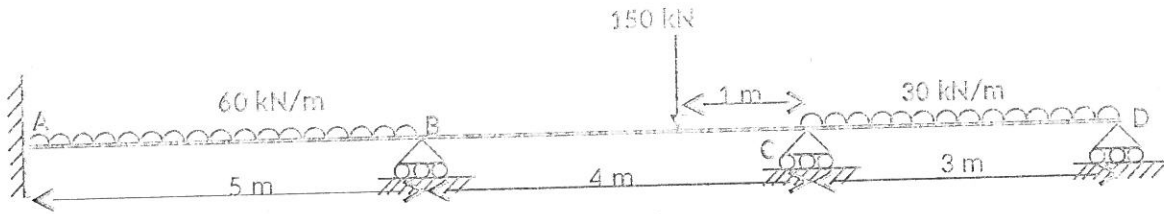


Fig. 3

5. Using slope-deflection method, analyse the frame supported and loaded as shown in Fig.4. Draw the bending moment diagram.

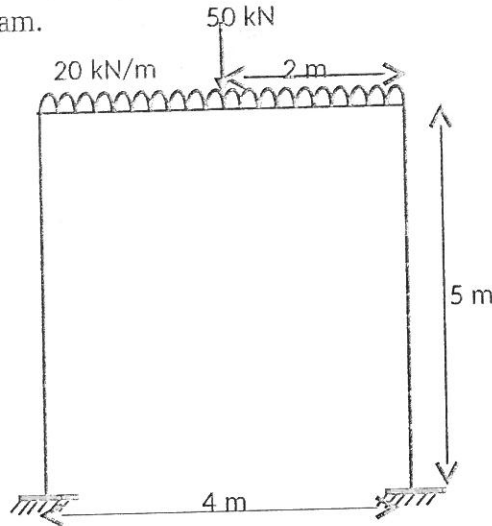


Fig. 4

6. Analyse a continuous beam shown in Fig.5, by moment distribution method.

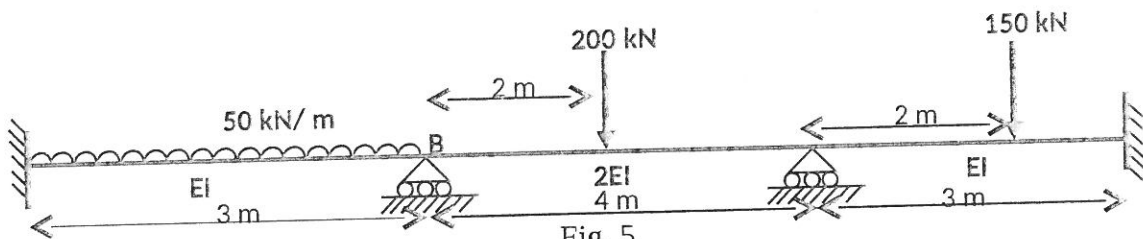


Fig. 5

7. Using moment distribution method, analyse the frame supported and loaded as shown in Fig.6. Draw the bending moment diagram. Assume constant flexural rigidity.

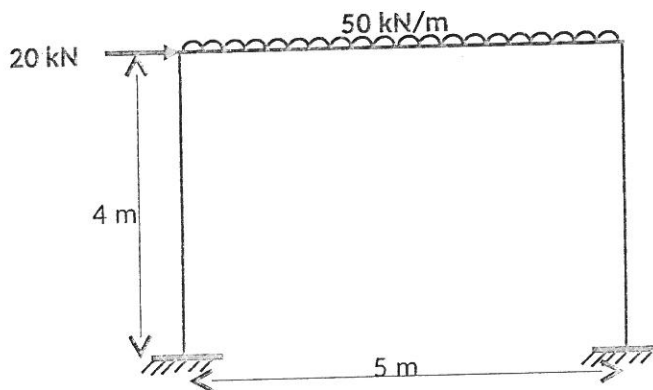


Fig. 6

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Subject Code: R16CE3102

III B.Tech I Semester Supple Examinations, October-2020

CONCRETE TECHNOLOGY

(CE)

Time: 3 hours

Max Marks: 60

Question Paper Consists of Part-A and Part-B.

Answering the question in Part-A is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

PART-A

1. (a) What are the products of hydration of cement?
- (b) What is alkali aggregate reaction?
- (c) Distinguish between bleeding and segregation of concrete.
- (d) What are the parameters affecting the compressive strength of concrete?
- (e) Write down the various measures to prevent corrosion of reinforcement bars.
- (f) List out the various applications of high strength concrete.

[2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. (a) Explain the compound composition of OPC.
2. (b) Explain the various important physical properties of cement.
3. (a) Explain the classification of aggregates used in the concrete construction.
3. (b) Explain the various characteristics of aggregates used in concrete.
4. (a) Define workability of concrete and explain the factors influencing the workability of concrete.
4. (b) Explain the objectives of curing of concrete and the various methods of curing.
5. (a) Using BIS method, design M 25 grade of concrete for RCC columns using the following data:
  - (i) Maximum size of aggregate : 20 mm
  - (ii) Degree of quality control : Good
  - (iii) Type of exposure : Moderate
  - (iv) Cement : 43 Grade
  - (v) Sand : Zone II
5. (b) Explain the various NDT methods of testing.
6. (a) Explain Creep and shrinkage of concrete and factors influencing.
6. (b) What is durability of concrete? And explain the various tests to determine durability of concrete.
7. Explain properties and applications of the following:
  - (a) High performance concrete
  - (b) Self-compacting concrete
  - (c) Shotcrete.

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**Subject Code: R16CE3103**

**III B.Tech I Semester Supple Examinations, October-2020**

**GEOTECHNICAL ENGINEERING-I**

**(CE)**

**Time: 3 hours**

**Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

**PART-A**

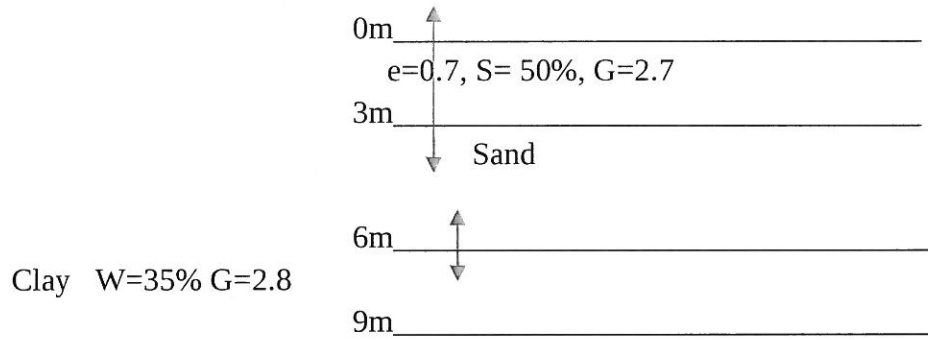
1. (a) What are the various soil deposits occurring in India.
- (b) Write about the suitability of constant and variable head methods in the determination of coefficient of permeability in soils.
- (c) What is effective stress.
- (d) Write the test specifications for IS light and IS heavy compaction test.
- (e) What are the laboratory test used in determining the shear strength of saturated clay.
- (f) The liquid limit of a soil is 56% and its plasticity index is 15%. In what state of consistency is this material at a water content of 45%.

[2+2+2+2+2+2]

**PART-B**

**4 X 12 = 48**

2. (a) Explain geologic cycle with a neat diagram. [4]
- (b) Explain how various types of soils are formed in nature. [8]
3. The PL and LL of a soil are 33% and 45%. The percentage volume change from LL to dry state is 36% of the dry volume. Similarly the percentage volume change from PL to dry state is 24% of dry volume. Determine A) Shrinkage limit of the soil B) Shrinkage ratio of the soil. [6+6]
4. (a) Write briefly about various indirect methods used for the determination of permeability in soils. [6]
- (b) A horizontal stratified soil deposit consists of 3 uniform layers. The permeability of these layers is  $8 \times 10^{-4}$  cm/s,  $52 \times 10^{-4}$  cm/s and  $6 \times 10^{-4}$  cm/s and their thicknesses are 7, 3 and 10 m respectively. Evaluate the effective average permeability of the deposit in horizontal and vertical direction. [6]
5. (a) The time required for 50% consolidation of a 25mm thick clay layer (drainage at both top and bottom) in the laboratory is 2 min 20 sec. How long (in days) will it take for a 3 m thick clay layer of the same clay in the field under same pressure increment to reach 50% consolidation? In the field, there is a rock layer at the bottom of the clay. [6]
- (b) Write about various parameters influencing the compaction behaviour of a soil. [6]
6. (a) Draw total stress, pore pressure and effective stress distribution diagrams for subsoil conditions as shown in the figure, water table was located at 3m below the surface. [6]
- (b) If the water table rises by 3m find the effective stress at 9m depth. [3]
- (c) If the water table falls by 3m find the effective stress at 9m depth. [3]



7. (a) Explain Mohr-Coulomb failure theory with neat diagram. [6]
- (b) An unconfined compression test was conducted on an undisturbed sample of clay. The sample had a diameter of 38mm and was 85mm long. The failure measured by the proving ring was 29N and the axial deformation of the sample at failure was 13 mm. Determine unconfined compressive strength and the undrained shear strength of clay. [6]

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**Subject Code: R16CE3104**

**III B.Tech I Semester Supple Examinations, October-2020**

**DESIGN AND DRAWING OF CONCRETE STRUCTURES**

**(CE)**

**Time: 3 Hours**

**Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

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**PART-A**

1. (a) Determine the limiting moment of resistance of a reinforced concrete beam of section 230 mm × 400 mm effective depth, reinforced with 4 bars of 16 mm diameter in tension zone. Use M 25 grade concrete and Fe 415 steel. [2 M]
- (b) Define the limiting percentage of steel reinforcement. [2 M]
- (c) Distinguish between anchorage length and development length. [2 M]
- (d) What are the modes of failure of short and long columns? [2 M]
- (e) What are the factors influencing the design of combined footings? [2 M]
- (f) Differentiate the structural behaviour of one-way slab and two-way slab. [2 M]

**PART-B**

**4 × 12 M= 48 M**

2. A reinforced concrete floor slab of 100 mm thick is supported by RCC beams of width 230 mm and spaced at 3.0 m c/c. The beams are simply supported on 300 mm × 300 mm columns with a clear span of 4.5 m and cast monolithic with the slab. The imposed live load on the floor is 2.0 kN/m<sup>2</sup> and the floor finish is 1 kN/m<sup>2</sup>. Design a T-beam section using Working stress method. Adopt M 20 grade of concrete and Fe 415 steel.
3. Design the reinforcement for a simply supported beam of span 6.0 m subjected to factored uniformly distributed imposed load of 50 kN/m. The size of the beam section is limited to 300 mm × 450 mm (Effective depth). Adopt M 20 grade concrete and Fe 415 steel.
4. A simply supported RC beam of an effective span of 6 m has rectangular cross- section 300 mm × 500 mm (overall depth). The beam is reinforced with 4 bars of 20 mm diameter of which two bars are curtailed at 1.2 m from the supports. Design the shear reinforcement if the beam is subjected to uniformly distributed load of 50 kN/m. Sketch the reinforcement details. Use M 20 concrete and Fe 415 steel.
5. Design the reinforcement of a short column 400 mm × 500 mm subjected to a factored axial load of 1600 kN along with ultimate moments of 150 kNm and 100 kNm about major and minor axes respectively. Use M 25 concrete and Fe 415 steel. Sketch the reinforcement details.
6. Design an isolated rectangular footing for a column of section 300 mm × 450 mm subjected to an axial service load of 1000 kN. The safe bearing capacity of soil is 175 kN/m<sup>2</sup>. Use M25 grade of concrete and Fe415 steel. Draw the reinforcement details of the footing.
7. Design a reinforced concrete slab of size 5 m × 6 m with two adjacent edges discontinuous. The slab is subjected to a live load of 3 kN/m<sup>2</sup> and floor finish of 1 kN/m<sup>2</sup>. Use M 25 grade concrete and Fe 415 steel.

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**Subject Code: R16CE3105**

**III B.Tech I Semester Supple Examinations, October-2020**

**TRANSPORTATION ENGINEERING-I**

**(CE)**

**Time: 3 hours**

**Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

**PART-A**

1. (a) what are the factors affecting highway alignment?
- (b) what is the purpose of providing horizontal curves in highways?
- (c) Define peak hour factor
- (d) what is abrasion?
- (e) write a note on critical combination of stresses in rigid pavements.
- (f) what is rutting in pavements?

[2+2+2+2+2+2]

**PART-B**

4 X 12 = 48

2. (a) Explain the preparation of master plan in highways. [6+6]
- (b) Describe briefly the classification of road pattern.
3. (a) Find out the length of transition curve length for the following data. Radius of horizontal curve = 450m. Design speed = 90kmph, length wheel base = 6.1m, number of lanes = 4, location at the rain fall = heavy, terrain condition = rolling, superelevation is introduced by rotating the edges with reference to centre line and the rate of introduction of superelevation is 1 in 150. Width of highway is 14m. [6+6]
- (b) Write a note on cross section elements in highways with neat diagram.
4. (a) Explain the basic parameters in traffic engineering. [6+6]
- (b) The average normal flow of traffic on cross roads A and B during design period are 400 and 250 PCU per hour, the saturation flow values on these roads are estimated as 1850 and 1400 PCU per hour respectively. The all red time required for pedestrian crossing is 16 seconds. Design two phase traffic signal by Webster's method?
5. (a) Explain the marshall method of mix design pavement mixes. [8+4]
- (b) Define the following terms  
i) impact load, ii) sudden load and iii) gradual load
6. (a) Explain the design of flexible pavements using IRC method. [7+5]
- (b) Compute the stresses due to wheel loads for the following data. Pavement thickness = 20cm, Wheel load = 4100kg, Radius of contact area = 18cm, Modulus of elasticity of concrete =  $3 \times 10^5$  kg/cm<sup>2</sup>, Modulus of subgrade reaction = 5.4 kg/cm<sup>3</sup>, Poisson's Ratio = 0.15.
7. (a) What are the various types of flexible pavement failures? Explain briefly. [6+6]
- (b) What are requirements of filler and sealer materials for using them in the construction of cc pavements?







Subject Code: R16EE3101

III B.Tech I Semester Supple Examinations, October-2020

POWER SYSTEM TRANSMISSION LINES

(EEE)

Time: 3 hours

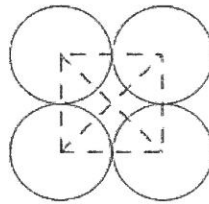
Max Marks: 60

Question Paper Consists of Part-A and Part-B.

Answering the question in Part-A is Compulsory & Four Questions should be answered from Part-B  
All questions carry equal marks of 12.

PART-A

1. (a) Find the geometric mean radius of a conductor in terms of the radius 'r' of an individual strand for four equal strands as shown in Figure.



- (b) What are the units of generalised constants of a transmission line?  
(c) What is surge impedance loading of a 3-phase, 400 kV transmission line with surge impedance of 400 ohm.  
(d) A transmission line of surge impedance  $Z_c$  is terminated through a resistance R. Give the coefficients of refraction and reflection.  
(e) What is meant by disruptive critical voltage?  
(f) Why the voltage distribution across the string of suspension insulators is not uniform?

[2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. (a) Derive the expression for the inductance of a 3-phase transmission line with (i) symmetrical (ii) unsymmetrical spacing. Assume regular transposition in (ii).  
(b) There are 6 conductors in a Double circuit transmission line. Each conductor has a radius of 12 mm. the 6 conductors are arranged horizontally. The centre to centre distance between all the conductors is 2 m. The sequences of conductors are from left to right as follows: a, b, c, a', b', c'. Calculate the inductance per km per phase of the system.
3. (a) Determine the sending end voltage and efficiency by nominal- $\pi$  method of a line, given resistance of line  $24 \Omega$ , inductive reactance  $48.98 \Omega$  and capacitive reactance  $1.2 \mu F$ . The line delivers 40 MW at 132 kV and 0.8 p.f lagging.  
(b) A 3-phase, 50 Hz transmission line has resistance, inductance and capacitance per phase of  $10 \Omega$ , 0.1 H and  $0.9 \mu F$  respectively and delivers at a load of 35 MW at 132 kV and 0.8 p.f lagging. Determine the efficiency and regulation of the line using nominal-T method.

4. (a) Explain surge impedance and significance of surge impedance loading of long transmission lines.
- (b) A three-phase, 765-kV, 50-Hz transposed line is composed of four ACSR 45/7 conductors per phase with flat horizontal spacing of 14 m. The conductors have a diameter of 3.625 cm and a GMR of 1.439 cm. The bundle spacing is 45 cm. The line is 400 Km long, a lossless line is assumed. Determine the transmission line surge impedance  $Z_c$ , phase constant  $\beta$ , wavelength  $\lambda$ , the surge impedance loading SIL, and the ABCD constant.
5. (a) Derive the expression for reflection and refraction coefficients of voltage and current waves for the cases (i) terminated through resistance (ii) terminated through cable.
- (b) A surge of 10 kV magnitude travels along a cable towards its junction with an overhead line. The inductance and capacitance of the cable and overhead line are respectively 0.3 mH, 0.4  $\mu$ F and 1.5 mH, 0.012  $\mu$ F per km. Find the voltage rise at the junction due to the surge.
6. (a) Describe how series and shunt capacitors can minimize the voltage drop in the line.
- (b) Find the disruptive critical and visual corona voltages of a grid line operating at 132 kV. The following data is given:  
Conductor diameter = 1.9 cm, conductor spacing = 3.81 cm, temperature = 44°C, barometric pressure = 73.7 cm, conductor surface factor: fine weather = 0.8, rough weather = 0.66.
7. (a) Explain the methods of equalizing potential across the string of insulators.
- (b) At a river crossing an overhead transmission line has a span of 560m with supports at 15m and 95m above water level. The weight of the conductor is 0.394 kgf/m. If the tension is adjusted to 1200 kgf, determine the clearance of the conductor above water level at a point 215m from the base of the tallest tower.

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Subject Code: R16EE3102

III B.Tech I Semester Supple Examinations, October-2020  
POWER ELECTRONICS  
(EEE)

Time: 3 hours

Max Marks: 60

Question Paper Consists of Part-A and Part-B.

Answering the question in Part-A is Compulsory & Four Questions should be answered from Part-B  
All questions carry equal marks of 12.

PART-A

- (a) Define Latching and Holding currents.  
(b) What is the most effective method of turning on an SCR? Explain  
(c) Write the advantages of freewheeling diode.  
(d) Explain the major difference between voltage controller and a cycloconverter  
(e) What is a motoring chopper? Give expression for input and output voltage.  
(f) What are the control strategies for the regulation of output voltage in ac voltage controller?

[2+2+2+2+2+2]

PART-B

4 X 12 = 48

- (a) Explain the static V-I characteristics of SCR [5]  
(b) Draw the dynamic characteristics of SCR and explain different switching times and explain the need for series, parallel connection of SCR [7]
- (a) Draw the voltage and current waveforms of a single phase half controlled bridge converter circuit with freewheeling diode, R-L load and determine (i) average dc load current [7]  
(ii) rms load current.  
(b) A single phase full-wave ac voltage controller feeds a load of  $R=30\Omega$  with an input voltage of 230V, 50Hz. Firing angle for both the thyristors is  $65^\circ$ . Calculate (i) rms value of output voltage. (ii) Average and rms current of thyristors. [5]
- (a) Explain the effect of source inductance on three phase full converter in detail. [6]  
(b) Describe the principle operation of three phase dual converter in circulating mode with necessary circuit and waveforms? [6]
- (a) Explain the operation of AC voltage controller with R load [5]  
(b) Discuss the working of a single phase bridge type cycloconverter with RL loads and for continuous waveform operation with neat circuit diagram and output rms voltage and current wave form for  $f_o = 4 f_s$ . [7]
- (a) Explain the principle of operation of the buck-boost converter. What are its disadvantages over the buck and boost converter. [6]  
(b) A simple d.c. chopper is operating a frequency of 2 kHz from a 96 V d.c. source to supply a load resistance of 8 ohm. The load time constant is 6 ms. If the average load voltage is 57.6 V, find the  $T_{on}$  period of the chopper and the average load current. [6]
- (a) What are the different pulse width modulation techniques used for inverter? Explain them in detail. [6]  
(b) Discuss the operating principle of a three phase voltage source inverter with  $120^\circ$  mode of operation of switches. [6]





**Subject Code: R16EE3103**

**III B.Tech I Semester Supple Examinations, October-2020**

**ELECTRICAL MEASUREMENTS**

**(EEE)**

**Time: 3 hours**

**Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B  
All questions carry equal marks of 12.

**PART-A**

1. (a) Will you interpret the purpose of shunts in the voltmeter?
- (b) Define creeping in energy meter.
- (c) What is the use of potentiometer in the field of electrical measurement?
- (d) Identify the detectors used in AC bridges.
- (e) Write the equation of motion.
- (f) What are Lissajous patterns in CRO?

[2+2+2+2+2+2]

**PART-B**

**4 X 12 = 48**

2. (a) Describe the features of PMMC instruments. (8)
- (b) Obtain the expression for deflecting torque and control torque. (4)
3. (a) Write about the unbalanced systems used for measuring active and reactive powers. (6)
- (b) Explain the principle of operation used in Single phase induction type energy meter. (6)
4. (a) Brief the operation of D.C. Crompton's potentiometer. (7)
- (b) Illustrate the working of coordinate type AC potentiometer. (5)
5. (a) Write a note on (6+6)
  - (i) Measurement of low resistance using Kelvin's double bridge
  - (ii) Measurement of frequency using Wien's bridge
6. (a) Detail about the Ballistic galvanometer. (8)
- (b) How potentiometers are used in Core loss measurements? (4)
7. (a) Describe the procedure used in measuring phase difference using CRO. (6)
- (b) With a neat sketch, illustrate the operation of Ramp type Digital frequency meter. (6)

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**Subject Code: R16EE3104**

**III B.Tech I Semester Supple Examinations, October-2020**  
**MICROPROCESSOR AND MICROCONTROLLERS**  
**(EEE)**

**Time: 3 hours**

**Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B  
All questions carry equal marks of 12.

**PART-A**

1. (a) Draw the 8086 flag register.
- (b) List out different addressing modes of 8086 microprocessor.
- (c) What is the difference between microprocessor and microcontroller?
- (d) Explain difference between serial and parallel communication
- (e) Define baud rate.
- (f) Draw the PSW register of 8051 microcontroller and explain.

[2+2+2+2+2+2]

**PART-B**

**4 X 12 = 48**

2. (a) Explain Register organization in 8086 microprocessor.
- (b) Draw and explain the internal architecture of 8086 processor.
3. (a) With examples explain different addressing modes supported by 8086.
- (b) Draw and explain 8086 timing diagram during write operation.
4. (a) Draw the architecture of 8051 microcontroller and explain its features in detail.
- (b) Explain with algorithms for implementation of FOR loop and IF-THEN-ELSE.
5. (a) Draw the interfacing diagram of D/A converter with 8086 microprocessor along with 8255 PPI and explain its operation.
- (b) Draw the interfacing diagram of 8257 DMA with 8086 CPU and explain its operation
6. (a) Explain how the interrupts are handled in 8051.
- (b) What is the purpose of using I/O ports of 8051? Classify and explain them in detail?
7. (a) Explain the interfacing of seven segment display to 8051 with diagram
- (b) Explain the interfacing of ADC and DAC to 8051 with diagram

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Subject Code: R16EE3105

**III B.Tech I Semester Supple Examinations, October-2020**  
**SIGNALS AND SYSTEMS**  
**(EEE)**

Time: 3 hours

Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B  
All questions carry equal marks of 12.

**PART-A**

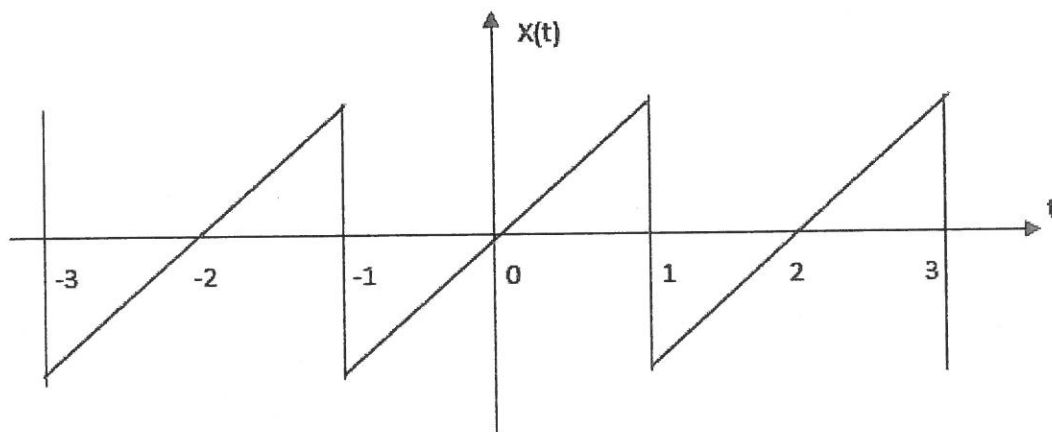
1. (a) Define periodic and aperiodic signals?
- (b) Write the properties of Fourier series?
- (c) State time shifting property of Fourier transform?
- (d) Define system and signal bandwidth?
- (e) What is aliasing? How can it to be reduced?
- (f) State Parseval's theorem?

[2+2+2+2+2+2]

**PART-B**

4 X 12 = 48

2. (a) Briefly explain the basic operations on signals?
  - (b) Explain how a function can be approximated by a set of orthogonal functions?
3. (a) Find the trigonometric Fourier series for the periodic signal  $x(t)$  shown below:

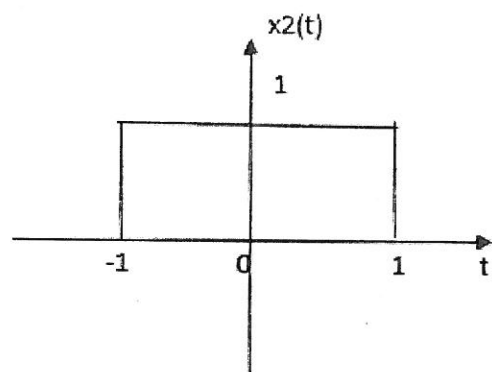
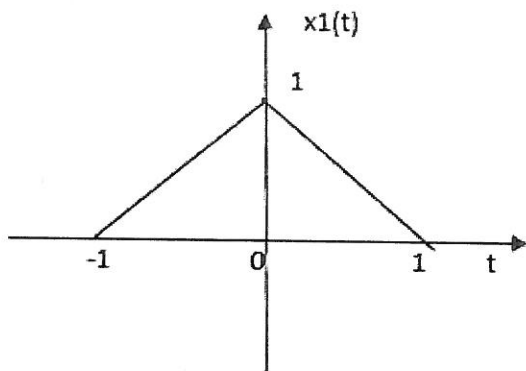


- (b) Find the complex exponential Fourier series coefficient of the signal  
 $x(t) = \sin(3\pi t) + 2\cos(4\pi t)$

4. (a) State and prove differentiation and integration properties of Fourier transform? [8M]
  - (b) What is the significance of Hilbert transform? [4M]
5. (a) Explain about LTI system by taking an example?
  - (b) Discuss about causality and physical reliability of a system?

6. (a) State and prove sampling theorem?  
(b) Explain in detail how the signal is reconstructed from its samples?

7. (a) State the properties of convolution?  
(b) Find the cross-correlation between triangular and gate function as shown below:



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Subject Code: R16EE3106

III B.Tech I Semester Supple Examinations, October-2020

RENEWABLE ENERGY SOURCES

(EEE)

Time: 3 hours

Max Marks: 60

Question Paper Consists of Part-A and Part-B.

Answering the question in Part-A is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

PART-A

1. (a) List the advantages of Solar energy over conventional energy sources
- (b) What is the function of an energy storage system?
- (c) Explain the limitations and possible environmental impacts of wind energy
- (d) What are the environment impacts of geothermal energy?
- (e) Write the disadvantages of Thermoelectric Power Generation
- (f) What are the advantages of MHD System?

[2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. (a) Describe the main features of various types of renewable energy resources
- (b) Explain how the solar radiation is determined on tilted surface for Indian conditions.
3. (a) With suitable schematic, describe the construction and working of solar pond electric-power plant
- (b) Explain briefly about the "Solar Thermal Energy Storage"
4. (a) Explain in detail about the configuration of Horizontal and vertical axis wind turbine
- (b) What are biomass conversion technologies? Draw a schematic diagram to explain various conversion technologies and products.
5. (a) List out various types of Geothermal resources.
- (b) Describe the concepts of converting wave energy into mechanical or electrical energy.
6. (a) What are the "thermoelectric effects". Explain any one.
- (b) Analyse the working of a "Thermoelectric generation, derive the expression for its power output.
7. (a) What is MHD Generation? How does it work?
- (b) Explain with a neat sketch the working of an open cycle MHD system.

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**Subject Code: R16ME3101**

**III B.Tech I Semester Supple Examinations, October-2020**

**METAL CUTTING AND MACHINE TOOLS**

**(ME)**

**Time: 3 hours**

**Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

**PART-A**

1. (a) What do you understand by machinability?
- (b) Give the main difference between live centre and dead centre.
- (c) What are the work holding devices of boring?
- (d) Difference between compound indexing and differential indexing.
- (e) How will you express 'grade' and 'structure' of a grinding wheel?
- (f) What is meant by clearance as applied to jigs and fixtures?

**[2+2+2+2+2+2]**

**PART-B**

**4 X 12 = 48**

2. (a) What is a chip breaker? Describe the different types of chips produced during metal machining with neat sketches.  
(b) In an orthogonal cutting operation on a work piece of width 2.5mm, the uncut chip thickness was 0.25mm and the tool rake angle was zero degree. It was observed that the chip thickness was 1.25mm. The cutting force was measured to be 900N and the thrust force was found to be 810 N (i) Find the shear angle. (ii) If the coefficient of friction between the chip and the tool, was 0.5, what is the machining constant C.
3. (a) List out various lathe attachments  
(b) Explain the difference between single spindle and multi spindle lathe.
4. (a) Discuss the principle of operation of a shaper with a neat sketch.  
(b) Explain the types of drilling machines used in machine shop. State the working principle of drilling machine.
5. (a) Differentiate between up milling and down milling explain their application.  
(b) What are the various work holding devices in milling explain their advantages.
6. Sketch and explain the three methods of external cylindrical centre less grinding.
7. Explain with the aid of suitable sketches, the principles of jig and fixture design.

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Subject Code: R16ME3102

III B.Tech I Semester Supple Examinations, October-2020

HEAT POWER ENGINEERING

(ME)

Time: 3 hours

Max Marks: 60

Question Paper Consists of Part-A and Part-B.

Answering the question in Part-A is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

PART-A

- (a) Define adiabatic flame temperature  
(b) How do you classify boilers?  
(c) What is degree of super saturation and under cooling?  
(d) Distinguish between impulse and reaction turbines  
(e) Explain the principle of turbine flow meter  
(f) What is the difference between a jet engine and a rocket engine?

[2+2+2+2+2+2]

PART-B

4 X 12 = 48

- (a) Describe briefly about the Rankine cycle and derive its thermal efficiency. [6]  
(b) In a thermal power plant operating on a reheat cycle steam at 50 bar and 500°C enters a high pressure turbine and leaves at 10 bar. Then this steam is reheated to 500°C before it is fed to a low pressure turbine. The condenser is maintained at 0.05 bar. Calculate the thermal efficiency of the power plant, the mass flow rate of steam for a net power output of 20 MW and the quality of steam at the exit of the low pressure turbine. [6]
- (a) A boiler evaporates 8 kg of water per kg of coal fired from feed water at 46°C when working at 10 bar absolute. Determine the equivalent evaporation from and at 100°C per kg of coal fired when the steam produced is (a) 0.92 dry (b) Dry saturated (c) Superheated to 250 °C. [6]  
(b) Derive the condition for maximum discharge through a chimney in natural draught. [6]
- (a) Discuss the effects of friction on the performance of nozzles. Also show these effects on T-s and h-s diagrams. [6]  
(b) Convergent-divergent nozzle operates with steam entering at 30 bar, 300°C and leaving at 5 bar, 800 m/s. Assuming negligible inlet velocity and the friction to occur in only divergent portion of nozzle with mass flow rate of 10 kg/s, determine, (a) the efficiency for expansion in divergent portion of nozzle, (b) the velocity of steam at throat. [6]
- (a) Explain the working of an impulse turbine. [6]  
(b) An impulse turbine has a mean blade ring diameter of 60 cm and runs at 3000 rpm. The ratio of mean blade speed to jet velocity is 0.45 and the nozzle angle relative to the direction of blade motion is 20°. The relative velocity at outlet from the blading is 88 % of that of entry. Determine a) The blade inlet angle b) The blade outlet angle, if the steam is to discharge from the blades in an axial direction and c) The axial thrust per kg of steam flowing per second. [6]

6. (a) What do you understand by condenser? How does condenser improve performance of steam power plant? [6]
- (b) A surface condenser having vacuum of 715 mm Hg and temperature of 32°C has cooling water circulated at 800 kg/min. The cooling water entering condenser becomes warmer by 14°C. The condensate is available from condenser at 25 kg/min. The hot well temperature is 30°C. Barometer reading is 765 mm of Hg. Determine the mass of air in kg/m<sup>3</sup> of condenser volume and dryness fraction of steam entering. [6]
7. (a) Compare the influence of reheating, regeneration and intercooling on performance of gas turbine cycle. [6]
- (b) Explain the classification of Rocket Engines and write few applications of Rocket Propulsion. [6]

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**Subject Code: R16ME3103**

**III B.Tech I Semester Supple Examinations, October-2020**  
**MACHINE DYNAMICS AND VIBRATIONS**  
**(ME)**

**Time: 3 hours**

**Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B  
All questions carry equal marks of 12.

**PART-A**

1. (a) What do you understand by film lubrication? Explain.
- (b) Though cone clutches provide high frictional torque, yet they have become obsolete. Why?
- (c) What do you understand by gradient resistance in case of a wheeled vehicle?
- (d) Two masses in different planes are necessary to rectify the dynamic unbalance. Comment.
- (e) Define the terms vibration isolation and transmissibility.
- (f) Distinguish between transverse and torsional vibrations.

**[2+2+2+2+2+2]**

**PART-B**

**4 X 12 = 48**

2. (a) Do you recommend the uniform pressure theory or uniform wear theory for the friction torque of a flat collar? Explain. [4+8]

(b) A force of 2.4kN parallel to the plane surface is required to just move a body up an inclined plane, the angle of inclination being  $8^\circ$ . When the angle of inclination is increased to  $12^\circ$ , the force required increases to 3kN. Determine the weight of the body and the coefficient of friction.

3. (a) What is a clutch? Make a sketch of a single-plate clutch. [5+7]

(b) A single-plate clutch, having two active surfaces, transmits 10kW of power and the maximum torque developed is 120N.m. Axial pressure is not to exceed  $100\text{kN/m}^2$ . Outer diameter of the friction plate is 1.3 times the inner diameter. Determine these diameters and the axial force exerted by the springs. Assume uniform wear and take coefficient of friction as 0.25.

4. (a) Discuss the effectiveness of a band brake under various conditions. [4+8]

(b) A band and block brake has 10 blocks and each block subtends an angle of  $15^\circ$  at the centre of the wheel. The two ends of the band are fixed to pins on the opposite sides of the brake fulcrum at distances of 40mm and 200mm from it. Determine the maximum force required to be applied on the lever at a distance of 300mm from the fulcrum to absorb 250kW of power at 280rpm. The effective diameter of the drum is 840mm. Take  $\mu=0.35$ .

5. (a) What do you mean by primary and secondary unbalance in reciprocating engines? [4+8]
- (b) A single-cylinder reciprocating engine has a reciprocating mass of 60kg. The crank rotates at 60rpm and the stroke is 320mm. The mass of the revolving part at 160mm radius is 40kg. If two thirds of the reciprocating parts and the whole of the reciprocating parts and the whole of the revolving part are to be balanced, determine the
- Balance mass required at a radius of 350mm
  - Unbalanced force when the crank has turned  $50^\circ$  from the top-dead centre.
6. (a) Show that the ratio of two successive amplitudes of oscillations is constant in a damped vibratory system. [5+7]
- (b) A machine weighing 3.5kg vibrates in a viscous medium. A harmonic exciting force of 40N acts on the machine and produces resonant amplitude of 18mm with a period of 0.2second. Determine the damping coefficient.
7. (a) Describe Dunkerley's method to find the natural frequency of a shaft carrying several loads. [5+7]
- (b) A 22mm wide and 45mm deep steel bar is freely supported at two points that are 800mm apart and carries a load of 180kg mid way between them. Determine the natural frequency of the transverse vibration, neglecting the weight of the bar. Also find the frequency of vibration if an additional load of 180kg is distributed uniformly along the length of the shaft. Take  $E=250\text{GN/m}^2$ .

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Subject Code: R16ME3104

III B.Tech I Semester Supple Examinations, October-2020

PRINCIPLES OF MACHINE DESIGN

(ME)

Time: 3 hours

Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B  
 All questions carry equal marks of 12.

**PART-A**

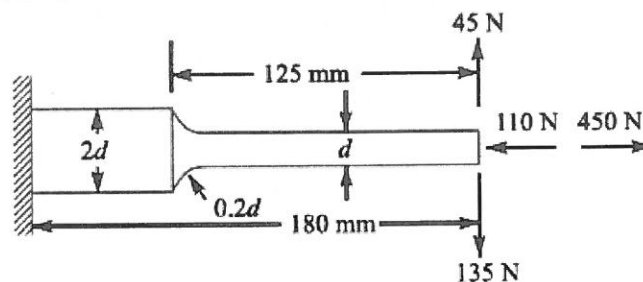
1. (a) Brief on Design Considerations of Castings
- (b) Explain the necessity of failure criteria lines in designing members with fluctuating loads, with an illustration.
- (c) Mention the advantages of welded joints over riveted joints
- (d) What are the main functions of a knuckle joint?
- (e) Differentiate between Muff and Flange coupling with a line diagram.
- (f) Elaborate the significance of nipping in leaf spring

[2+2+2+2+2+2]

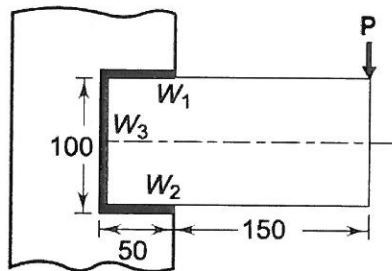
**PART-B**

4 X 12 = 48

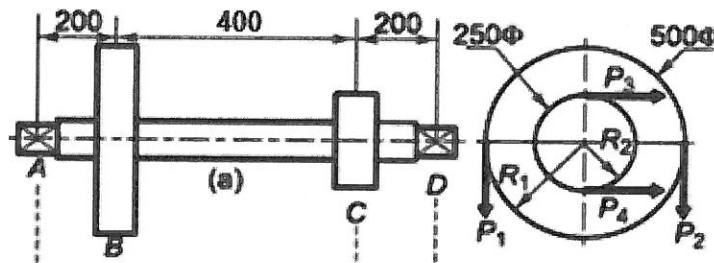
2. (a) A rotating shaft made of plain carbon steel with 20 mm diameter is subjected to a steady torque of 68 N-m, axial load of 5000N, and maximum bending moment of 86 N-m. Calculate the factor of safety available based on Maximum Distortion Energy theory. Assume yield strength as 400 MPa for plain carbon steel. If all other data remaining same, what maximum yield strength of shaft material would be necessary using a factor of safety of 1.5 based on Maximum Shear Stress theory of failure.
  - (b) Discuss briefly about preferred numbers and their role in Standardisation.
3. A steel structural member is subjected to a transverse load at its end that varies from 45 N up to 135 N down as the axial load varies from 110 N (compression) to 450 N (tension), as shown in Fig. Determine the required diameter at the change of section for infinite life using a factor of safety of 2 at 90% reliability. The strength properties are as follows: Ultimate strength = 550 MPa, Yield strength = 470 MPa, Endurance limit = 275 MPa. The stress concentration factors for bending and axial loads are 1.5 and 1.7 respectively, at the change of cross-section. Take size factor = 0.85 and surface finish factor = 0.9.



4. A welded connection, as shown in Fig., is subjected to an eccentric force of  $P = 50 \text{ kN}$  in the plane of the welds. Determine the size of the weld, if the permissible shear stress for the weld is  $68 \text{ N/mm}^2$ . Assume static conditions.



5. The layout of a transmission shaft carrying two pulleys B and C and supported on bearings A and D is shown in Fig. Power is supplied to the shaft by means of a vertical belt on the pulley B, which is then transmitted to the pulley C carrying a horizontal belt. The maximum tension in the belt on the pulley B is  $2.6 \text{ kN}$ . The angle of wrap for both the pulleys is  $180^\circ$  and the coefficient of friction is  $0.24$ . The shaft is made of plain carbon steel 30C8 ( $S_{yt} = 400 \text{ N/mm}^2$ ) and the factor of safety is  $2$ . Determine the shaft diameter on strength basis.



6. Design a cast iron protective flange coupling used to connect two shafts and transmit  $9 \text{ kW}$  power at  $800 \text{ rpm}$ . The design torque is  $25\%$  more than the rated torque. The shafts, keys and bolts are made of plain carbon steel 30C8 ( $S_{yt} = 400 \text{ N/mm}^2$ ) and the factor of safety is  $5$ . Assume,  $S_{yc} = 1.5 S_{yt}$  and  $S_{sy} = 0.5 S_{yt}$ . Consider allowable shear stress for cast-iron as  $14 \text{ MPa}$ .
7. A safety valve,  $50 \text{ mm}$  in diameter, is to blow off at a pressure of  $1.5 \text{ MPa}$ . It is held on its seat by means of a helical compression spring, with an initial compression of  $25 \text{ mm}$ . The maximum lift of the valve is  $10 \text{ mm}$ . The spring index can be taken as  $6$ . The spring is made of cold-drawn steel wire with ultimate tensile strength of  $1500 \text{ N/mm}^2$  and modulus of rigidity of  $81,370 \text{ N/mm}^2$ . The permissible shear stress for the spring wire may be taken as  $30\%$  of the design tensile strength. Design the spring for: (i) wire diameter (ii) mean coil diameter; (iii) number of active turns; (iv) total number of turns; (v) solid length; (vi) free length; and (vii) pitch.

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**Subject Code: R16ME3105**

**III B.Tech I Semester Supple Examinations, October-2020**

**OPERATIONS RESEARCH**

**(ME)**

**Time: 3 hours**

**Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

**PART-A**

1. (a) Define Model and what are the different types of OR models?
- (b) Explain about duality principle
- (c) How do you solve restrictions in assignment problems?
- (d) Differentiate CPM and PERT.
- (e) Define a) Saddle point and b) Pure Strategy in theory of games
- (f) Explain about different Phases of Simulation

[2+2+2+2+2+2]

**PART-B**

**4 X 12 = 48**

2. Solve the following LPP.

Min  $Z = x_1 - 3x_2 + 2x_3$  subject to

$$3x_1 - x_2 + 3x_3 \leq 7,$$

$$-2x_1 + 4x_2 \leq 12,$$

$$-4x_1 + 3x_2 + 8x_3 \leq 10 \text{ and}$$

$$x_1, x_2, x_3 \geq 0$$

3. The Bombay Transport company has trucks available at four different sites in the following numbers. Site A- 5 trucks, site B-10 trucks, site C-7 trucks, site D- 3 trucks. Customers W, X and Y require trucks as follows. Customer W-5 trucks, customer X-8 trucks, customer Y-10 trucks.

Variable costs getting trucks to the customers are

From A to W-Rs 7, to X-Rs 3 and to Y-Rs 6. From B to W-Rs 4, to X-Rs 6 and to Y-Rs 8

From C to W-Rs 5, to X-Rs 8 and to Y-Rs 4. From D to W-Rs 8, to X-Rs 4 and to Y-Rs 3.

Solve the above transportation problem.

4. Six jobs go first on m/c A, then on B and lastly on m/c C. the order of the completion of jobs has no significance. The following table gives m/c time for the six jobs and three m/cs. Find the sequence of the jobs that minimize elapsed time to complete the jobs. Find also idle times of the m/c A, m/c B and m/c C.

| Jobs | Processing Times |       |       |
|------|------------------|-------|-------|
|      | m/c A            | m/c B | m/c C |
| 1    | 8                | 3     | 8     |
| 2    | 3                | 4     | 7     |
| 3    | 7                | 5     | 6     |
| 4    | 2                | 2     | 9     |
| 5    | 5                | 1     | 10    |
| 6    | 1                | 6     | 9     |

5. The mean arrival rate to a service center is 3 /hour and service rate is 10 min. Assuming poisson arrival rate and exponential service time, determine the following

(i) Utilization factor, (ii) Expected number of units in the system, (iii) Expected number of units in the queue (iv) expected time customer has to wait in the system (v) Average time a customer waits before being served.

6. Solve the given game whose pay off matrix to A is given

|     | I | II | III | IV | V | VI |
|-----|---|----|-----|----|---|----|
| I   | 0 | 0  | 0   | 0  | 0 | 0  |
| II  | 4 | 2  | 0   | 2  | 1 | 1  |
| III | 4 | 3  | 1   | 3  | 2 | 2  |
| IV  | 4 | 3  | 7   | -5 | 1 | 2  |
| V   | 4 | 3  | 4   | -1 | 2 | 2  |
| VI  | 4 | 3  | 3   | -2 | 2 | 2  |

7. A firm is thinking of replacing a particular machine whose cost is Rs 12,200/- the scrap value is 200. Maintenance cost is shown below. Suggest the best replacement.

| Year | 1   | 2   | 3   | 4    | 5    | 6    | 7    | 8   |
|------|-----|-----|-----|------|------|------|------|-----|
| Cost | 220 | 500 | 800 | 1200 | 1800 | 2500 | 3200 | 400 |

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**Subject Code: R16EC3101**

**III B.Tech I Semester Supple Examinations, October-2020**

**LINEAR AND DIGITAL IC APPLICATIONS**

**(ECE)**

**Time: 3 hours**

**Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

**PART-A**

1. (a) List features of 741 op-amp.
- (b) An 8 bit D/A converter as a resolution of 8mV/bit. Find the analog output voltage for the input 10111010.
- (c) What is the significance of VCO in PLL?
- (d) How to drive CMOS gate to TTL gate?
- (e) What is a shift register?
- (f) What is the importance of constraints in VHDL?

[2+2+2+2+2+2]

**PART-B**

**4 X 12 = 48**

2. (a) Draw and explain the operation of op-amp based sample and hold circuit. And also draw the input and output waveforms. [6M]
- (b) Define the following terms: (i) Slew Rate. (ii) Thermal drift. [6M]
3. Explain the working of A to D converter using successive approximation method. [12M]
4. (a) Design an active high pass filter with cutoff frequency of 4KHz. [6M]
- (b) Explain the working of an Astable multivibrator using IC555 with circuit diagram. [6M]
5. (a) Differentiate different logic families and mention their advantages and disadvantages. [4M]
- (b) Describe TTL driving CMOS and CMOS driving TTL, interfacing techniques. [8M]
6. (a) Design a Priority encoder circuit and which 74XX series IC is used for it. [6M]
- (b) Design a 4-bit universal shift register and explain its working in detail [6M]
7. (a) Explain the syntax of a VHDL Entity declaration and architecture definition. [6M]
- (b) Explain structural, data flow and behavioral modelling styles using VHDL with suitable examples. [6M]

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**Subject Code: R16EC3102**

**III B.Tech I Semester Supple Examinations, October-2020**  
**DIGITAL COMMUNICATIONS**  
**(ECE)**

**Time: 3 hours**

**Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B  
All questions carry equal marks of 12.

**PART-A**

1. (a) Draw the block diagram of Digital communication system?  
(b) Draw the signal space diagram of amplitude shift keying?  
(c) Explain the probability of error using matched filter?  
(d) Define Entropy and information rate?  
(e) Explain about Hamming code?  
(f) Compare time domain approach and transform domain approach in convolution code?  
[2+2+2+2+2+2]

**PART-B**

**4 X 12 = 48**

2. (a) What are the advantages of digital communication system over analog communication system?  
(b) Draw the block diagram of PCM scheme. Explain each block in detail.
3. (a) Explain the working of BFSK?  
(b) A bit stream 1011111011 is to be transmitted using ASK, FSK and PSK techniques. Draw the waveforms of above-mentioned modulation techniques.
4. (a) With the neat sketch explain Base band signal receiver?  
(b) Find the error probability of ASK and BPSK?
5. (a) Explain the Shannon Fano algorithm with an example?  
(b) Explain the trade-off between bandwidth and signal to noise ratio?
6. (a) Explain the error detection and error correction capabilities of linear block codes?  
(b) Write a short note of Binary cyclic codes?
7. (a) Explain encoding of convolution codes in time domain approach?  
(b) Explain the decoding process using Viterbi algorithm?

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**Subject Code: R16EC3103**

**III B.Tech I Semester Supple Examinations, October-2020**

**ANTENNA AND WAVE PROPAGATION**

**(ECE)**

**Time: 3 hours**

**Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

**PART-A**

1. (a) What is the radiation resistance of half wave dipole antenna.
- (b) Define the term half-power beam width of an antenna.
- (c) What is the directivity of isotropic antenna?
- (d) What is the advantage of using helical antenna over straight wire antenna?
- (e) What is the role of distance criterion in antenna measurements?
- (f) In which frequency band Tropospheric scattering is used.

[2+2+2+2+2+2]

**PART-B**

4 X 12 = 48

2. (a) Define the terms: [3+3=6]
  - i) Effective length
  - ii) Effective aperture area.
- (b) Calculate effective length and effective aperture area of antenna whose radiation resistance is 73 ohms. [6]
3. (a) Write a short note on small loop antenna? [6]
- (b) What is the effective area of a half-wave dipole operating at 500MHZ? [6]
4. (a) Explain in detail about Broadside and End-fire arrays. [8]
- (b) A broadside array operating at 100 cm wavelength consists of four half wave dipoles spaced 50 cm. Each element carries radio frequency current in the same phase and magnitude 0.5 Amp. Calculate the radiated power. [4]
5. (a) What are the advantages of Rhombic antenna over a single wire antenna? List out the design equations associated with a Rhombic antenna. [6]
- (b) Explain the designing of 5-element yagi-uda antenna? [6]
6. (a) What is the principle of equality of path length? How is it applicable to Horn antennas? [6]
- (b) Explain the working principle of lens antenna. [6]
7. (a) Classify the fading and discuss the features of fading in skywave propagation. [6]
- (b) Write a notes on i) Ionospheric Abnormalities ii) Virtual height [6]

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**Subject Code: R16CS3101**

**III B.Tech I Semester Supple Examinations, October-2020**  
**DESIGN AND ANALYSIS OF ALGORITHMS**  
**(CSE)**

**Time: 3 hours**

**Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B  
All questions carry equal marks of 12.

**PART-A**

1.

- What are the characteristics of an algorithm?
- State the applications of divide and conquer approach
- What is a minimum cost spanning tree?
- Define principle of optimality
- What is state space tree?
- Define a dead node.

[2+2+2+2+2+2]

**PART-B**

**4 X 12 = 48**

- (a) Illustrate briefly on Big oh Notation, Big Omega Notation and Theta Notations  
(b) Discuss space complexity and time complexity
- (a) Design a quick sort algorithm  
(b) Apply Strassen's matrix algorithm to compute  $A \times B$ .

$$A = \begin{bmatrix} 1 & 3 \\ 7 & 5 \end{bmatrix} \quad B = \begin{bmatrix} 6 & 8 \\ 4 & 2 \end{bmatrix}$$

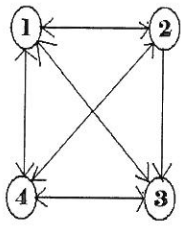
- (a) Solve Knapsack instance  $M = 6$ , and  $n = 3$ . Let  $P_i$  and  $W_i$  are as shown below.

| $i$ | $P_i$ | $W_i$ |
|-----|-------|-------|
| 1   | 1     | 2     |
| 2   | 2     | 3     |
| 3   | 5     | 4     |

- Solve the following Job Sequencing with Dead lines problem

$$(p_1, p_2, p_3, p_4) = (100, 10, 15, 27); (d_1, d_2, d_3, d_4) = (2, 1, 2, 1); n = 4$$

5. (a) Find the optimal tour for the given graph



$$\text{Cost matrix} = \begin{bmatrix} 0 & 8 & 8 & 9 \\ 10 & 0 & 15 & 20 \\ 5 & 9 & 0 & 10 \\ 6 & 13 & 12 & 0 \end{bmatrix}$$

(b) Find the minimum no of operations required for the following chain matrix multiplication using dynamic programming  $A(5, 3) * B(3, 4) * C(4, 2) * D(2, 6)$

6. (a) Write the algorithm for N-queens problem

(b) Solve the following sum of sub sets problems

i)  $n=6 \quad m=30$

$w[1:6] = \{5, 10, 12, 13, 15, 18\}$

ii)  $n = 5 \quad m = 17$

$w[1:5] = \{2, 7, 8, 9, 15\}$

7. (a) Plan the following instance of the knapsack problem by the LC branch and bound algorithm.

$n = 4; p = \{10, 10, 12, 18\} ; w = \{2, 4, 6, 9\}; m = 15$

(b) Solve TSP problem having the following cost-matrix using branch and bound technique.

|   | A | B | C | D |
|---|---|---|---|---|
| A | X | 5 | 2 | 3 |
| B | 4 | X | 1 | 5 |
| C | 4 | 2 | X | 3 |
| D | 7 | 6 | 8 | X |

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**Subject Code: R16CS3103**

**III B.Tech I Semester Supple Examinations, October-2020**  
**COMPILER DESIGN**  
**(CSE)**

**Time: 3 hours**

**Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from **Part-B**  
All questions carry equal marks of 12.

**PART-A**

1. (a) Write a LEX program to identify comments in the program. ✓
  - (b) What are the problems with top down parsing? ✓
  - (c) Differentiate between LR and LL Parsers. ✓
  - (d) What are the different types of three address statements? ✓
  - (e) List the characteristics of peephole optimization. ✓
  - (f) Mention the issues to be considered while applying the techniques for code optimization. ✓
- [2+2+2+2+2+2]

**PART-B**

**4 X 12 = 48**

2. (a) What is regular expression? Write the regular expressions for the patterns of identifiers and float constants. ✓ [6+6]
- (b) Describe the lexical errors and various error recovery strategies with suitable examples. ✓
3. (a) Construct a Context-Free Grammar (CFG) for roman numerals. ✓ [6+6]
- (b) Explain the Non-Recursive predictive parsing with an example. ✓
4. (a) Construct an operator precedence parser for the following grammar [6+6]  
S → iEtS | iEtSeS | a  
E → b | c | d  
Where a,b,c,d,e,i,t are terminals.
- (b) Explain the process of handling "Dangling-ELSE" ambiguity. ✓
5. (a) Write the quadruple, triple, indirect triple for the statement  $x := y^* - z + y - *z$ . ✓ [6+6]
- (b) List the typical semantic errors and explain how they can be rectified. ✓
6. (a) Discuss the various attributes of a Symbol Table. ✓ [6+6]
- (b) Explain the equation for computing live variable in a given flow graph. ✓
7. (a) Discuss the role of semantic preserving transformations and dominators in code optimization. ✓
- (b) How to schedule the instructions to produce optimized code? Explain. ✓ [6+6]







**Subject Code: R16CS3104**

**III B.Tech I Semester Supple Examinations, October-2020**

**COMPUTER NETWORKS**

**(CSE)**

**Time: 3 hours**

**Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

**PART-A**

1. (a) What is the difference between connection oriented and connectionless service?
- (b) What is hamming code?
- (c) What is CSMA/CD protocol?
- (d) Distinguish packet switching and circuit switching.
- (e) Explain Berkeley socket.
- (f) What is DNS?

[2+2+2+2+2+2]

**PART-B**

**4 X 12 = 48**

2. (a) Explain OSI reference model. (8M)
- (b) Briefly explain about network topologies. (4M)
3. (a) What are the functions of data link layer ?Discuss design issues in data link layer. (6M)
- (b) Explain IEEE standards 802.3 and 802.11. (6M)
4. (a) Explain simple stop-and-wait protocol. (6M)
- (b) Explain Go-Back-N Protocol. (6M)
5. (a) Explain shortest path routing algorithm ? (8M)
- (b) Compare virtual circuit and datagram subnets. (4M)
6. (a) Briefly discuss about transport service primitives. (6M)
- (b) What is TCP? Explain how TCP transmits data from source to destination. (6M)
7. Explain any three of the following: (12M)
  - (a) Electronic mail Architecture
  - (b) MIME
  - (c) SMTP
  - (d) WWW

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**Subject Code: R16CS3107**

**III B.Tech I Semester Supple Examinations, October-2020**  
**SOFTWARE REQUIREMENTS AND ESTIMATION**  
**(CSE)**

**Time: 3 hours**

**Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B  
All questions carry equal marks of 12.

**PART-A**

1. (a) What are the good practices need to be followed in requirement engineering.
- (b) What are the principles and practices of requirement management?
- (c) What are the problems associated with estimating the cost of a project.
- (d) Define the terms Over estimation and under estimation.
- (e) List various tools available for requirements management.
- (f) Abbreviate COCOMO II and SLIM.

[2+2+2+2+2+2]

**PART-B**

4 X 12 = 48

2. (a) What do you mean by requirement gathering?
  - (b) Explain requirement elicitation in detail with diagram.
3. (a) Explain requirement traceability in detail.
  - (b) What is DFD and how is it best used . Draw an example DFD and explain in detail.
4. What is software estimation? Explain various software estimation techniques. Explain in detail.
5. Describe the terms: Schedule, size, cost and effort estimation in terms of a software project with a suitable example.
6. Write short note on following:  
(a) Caliber –RM      (b)XTie-RT      (c )Vital Link      (d)Requisite Pro
7. (a) Compute Function pont Value for a project with the following information domain characteristics: No.of user inputs=30,user outputs=42,user enquiries=08,no.of files=07,external files=06.Assume all complexity adjustment factor are moderate.
  - (b) Describe various desirable features in software estimation tools.

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**Subject Code: R16CS3108**

**III B.Tech I Semester Supple Examinations, October-2020**  
**NETWORK MANAGEMENT SYSTEMS**  
**(CSE)**

**Time: 3 hours**

**Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B**.

Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B

All questions carry equal marks of 12.

**PART-A**

1. (a) What is Network Provisioning?
- (b) What is Address translation group?
- (c) Write the goals of SNMP architecture.
- (d) What are Textual Conventions?
- (e) What are the advantages of RMON device?
- (f) Write about protocol adapters.

[2+2+2+2+2+2]

**PART-B**

4 X 12 = 48

2. (a) What are network management standards? Explain.
  - (b) Briefly explain Network Management functional groupings with neat diagram.
3. a) Explain SNMP network management architecture with a neat diagram.
  - b) Describe about the different formats of declaration of OBJECT IDENTIFIER.
4. a) Explain the SNMP protocol specifications.
  - b) Write about SNMP functional model.
5. a) Explain the changes made to the system group as well as SNMP group in SNMPv2.
  - b) Write notes on SNMPV2 management information base
6. (a) What is the use of port select group in ATM RMON? Explain the different tables involved in it.
  - (b) Explain the application layer functions of RMON2 MIB.
7. (a) Explain the network management system requirements.
  - (b) Discuss how a protocol analyser monitors the network.

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