

R16

III B.TECH. I SEM

SUPPLEMENTARY EXAMINATIONS

MARCH 2022



Subject Code: R16CC310E4

III B.Tech I Semester Supple Examinations, March-2022
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) Distinguish between intrinsic semiconductor and extrinsic semiconductor
- (b) Define latching current and holding current
- (c) What is piezo-electric effect
- (d) list out the different types of Electrical welding
- (e) What are the chemical effects of ultrasonics?
- (f) Define transfer function

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

PART-B

4 X 12 = 48

2. (a) Describe the working of PN junction Diode with forward & reverse biasing
- (b) Explain the input and output characteristics of a transistor in CB configuration
3. (a) Explain the construction and static V-I characteristics of SCR
- (b) Explain about speed control of DC motor using SCR
4. (a) Explain the working principle of Thermocouple transducer
- (b) What are the applications of ultrasonics
5. (a) Explain the principle of induction heating
- (b) Explain the principle of resistance welding
6. (a) State the need for PLC & Explain the PLC system with block diagram
- (b) Mention some applications of PLCs in the industry applications of PLC
7. (a) Explain open loop and closed loop systems with the help of a block diagram
- (b) What is control system and explain different types of control systems



Subject Code: R16CC31OE6

III B.Tech I Semester Supple Examinations, March-2022

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) Explain the design calculation for a 4 stroke petrol engine in brief.
- (b) Define flip flops and its types with suitable diagrams.
- (c) List out the microcomputer applications in automotive systems.
- (d) Define engine performance terms: volumetric efficiency and calibration.
- (e) Briefly explain the types of actuators.
- (f) Illustrate the concept of GPS navigation system.

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

PART-B

4 X 12 = 48

2. (a) Define engine and engine block with suitable diagram.
- (b) Why are only vertical forces considered in suspension analysis and how to include the braking and acceleration reactions?
3. (a) Explain the working principle of field effect transistor with systematic diagram.
- (b) Compare between combinational and sequential circuit. Also discuss the use of multiplexer (IC 74151) in auto motives.
4. (a) Explain the microprocessor architecture in brief with suitable diagram.
- (b) What is the significance of digital to analog and analog to digital converters in auto motive engineering.
5. (a) Explain engine functions and its control with a neat sketch.
- (b) Discuss electronic fuel control configuration.
6. (a) Explain the working of Crank angle position sensors/detonation sensors and oxygen sensors.
- (b) Give the classification of different type of actuators.
7. (a) Explain briefly about voice recognition cell phone dialling.
- (b) Discuss control signal multiplexing with suitable diagram.



Subject Code: R16CC310E11

III B.Tech I Semester Supple Examinations, March-2022
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.

PART-A

1. (a) Give the present institutional framework for water management.
- (b) Define capital cost and opportunity cost.
- (c) List the different ways to control water logging.
- (d) Define consumptive & non consumptive demands.
- (e) How water is helpful in employment generation
- (f) What is Integrated Water Resources Management?

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

PART-B

4 X 12 = 48

2. (a) Elaborate the history of water resources development in India. [07]
- (b) Discuss in detail national water policy for surface and ground water. [05]
3. (a) Elaborate the sentence "Water as economic good". [06]
- (b) Explain the global and national perspectives of water crisis. [06]
4. (a) Explain the procedure for estimation of ground water draft in water resource system. [08]
- (b) Elaborate the use of geo-informatics for flood management. [04]
5. (a) Define irrigation efficiency. Explain how to determine the same. [04]
- (b) Describe the various forecasting methods for water demand in domestic and industrial sector. [08]
6. (a) What is the minimum flow required and water quality management for aquaculture? [06]
- (b) Explain in detail the direct and indirect benefits of water resources development. [06]
7. (a) Discuss the use of data driven techniques for Integrated Water Resources Management. [06]
- (b) Explain the physical, chemical and biological analysis of water. [06]

Subject Code: R16CE3101

III B.Tech I Semester Supple Examinations, March-2022

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

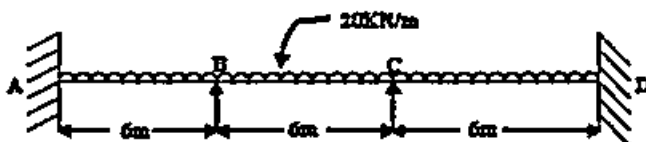
1. (a) Draw Propped cantilever
- (b) What is strain energy?
- (c) Draw different types of beams
- (d) What is kinematic redundancy?
- (e) Define the term Distribution factor
- (f) Write briefly the importance of Kani's Method compared with other methods?

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

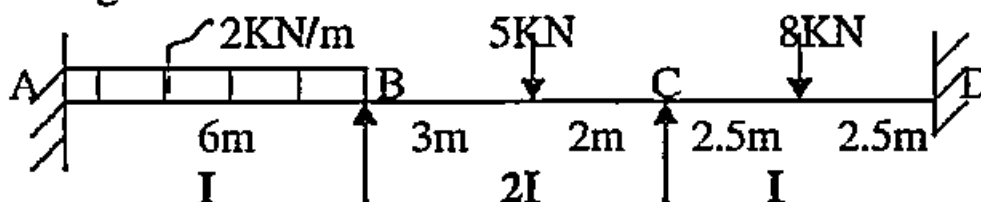
PART-B

4 X 12 = 48

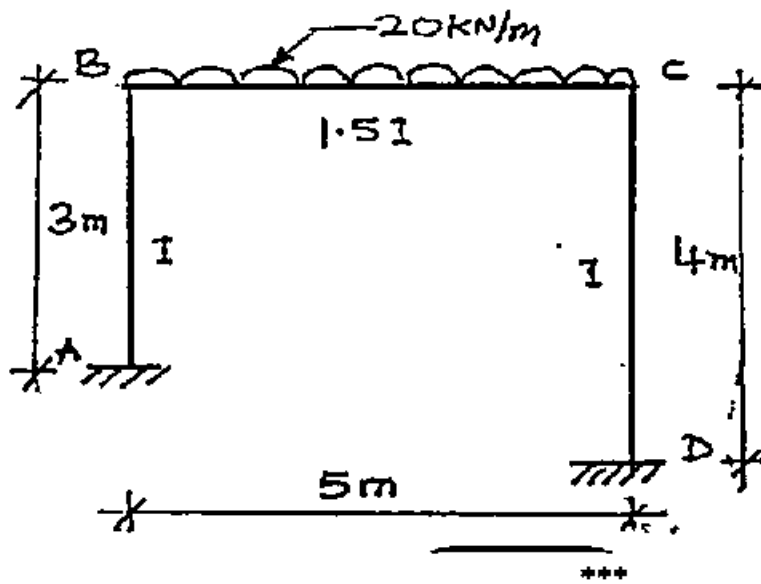
2. A propped cantilever of span 9.2m is fixed at one end and propped at the other end and carries a UDL of 12.7kN/m on its whole span. Calculate the prop reaction and draw the shear force and bending moment diagrams
3. Find the maximum bending moment and locate the point of inflection for a propped cantilever beam of span 8 m due to a uniformly varying load, whose intensity is 10 kN/m at the fixed support and 2 kN/m at the simple support
4. A two span continuous beam ABC is fixed at A and simply supported at B and C. The span AB=6m and span BC=5m. The span AB carries a UDL of 23 kN/m and span BC carries a central point load of 26kN. EI is constant for the whole beam. Find the moments and reactions at all the supports and draw the bending moment diagram using Clapeyron's theorem of three moments
5. Analyse the continuous beam in figure by slope-deflection method and draw shear force and bending moment diagram. EI is constant



6. Analyse the continuous beam shown in Fig. by moment distribution method and draw the bending moment diagram



7. Analyse the portal frame and draw BMD





Subject Code: R16CE3102

III B.Tech I Semester Supple Examinations, March-2022

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) Explain the hydration process of cement.
- (b) What is bleeding and segregation in concrete?
- (c) Which zone sand is the finest sand?
- (d) Write about different types of Admixtures
- (e) Why compaction of concrete is required.
- (f) What is the gradation of aggregate?

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

PART-B

4 X 12 = 48

2. (a) What are the different types of Portland cement and explain in detail. **[6M + 6M]**
(b) Write briefly about the various test carried out on cement.
3. (a) Explain the testing procedure of coarse aggregates for the following **[6M +6M]**
i) Specific gravity ii) bulk-density and iii) moisture content of aggregates.
(b) In a slump test, suppose the slump is a True slump. Do you think workability is good or poor and why?
4. (a) Differentiate between plasticizer and superplasticizer? **[6M +6M]**
(b) How workability of concrete is affected by addition of chemical admixtures?
5. (a) What are the main point considered in concrete mix design as per IS: 10262. **[6M +6M]**
(b) Write about non-destructive tests; i) rebound hammer test and ii) USPV test.
6. (a) What is the difference between High Strength Concrete & High Performance Concrete. **[6M]**
(b) What do you understand by carbonation of concrete? How is it tested? **[6M]**
7. (a) What are the different methods of curing of concrete? **[6M +6M]**
(b) Write about i) Light Weight Concrete ii) Self compacting concrete



Subject Code: R16CE3103

III B.Tech I Semester Supple Examinations, March-2022

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) Define void ratio and porosity
(b) define liquid limit and liquidity index
(c) what is Darcy's law, write the expression for discharge and explain the terms in that
(d) What is quick sand condition? How it will control
(e) Define over consolidation ratio. How to find the degree of consolidation?
(f) What is Mohr-Coulomb theory for shear strength of soils

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

PART-B

4 X 12 = 48

2. (a) Establish the relationship between degree of saturation, specific gravity of soil solids, moisture content, and void ratio
(b) A soil sample has a porosity of 35%, the specific gravity of solids is 2.65. Calculate (A) void ratio, (B) dry density (C) bulk unit weight if the soil is 30% saturated and (D) unit weight if the soil is completely saturated (E) bulk or apparent specific gravity.
3. (a) write short notes on the methods of determination of Atterberg limits
(b) Explain step by step procedure of classification of soils as per Unified soil classification
4. (a) State the principle of Darcy's law for laminar flow of water through saturated soils.

(b) Calculate the coefficient of permeability of soil sample, 6cm in height and 50cm² in cross sectional area, if a quantity of water equal to 430ml passed down in 10 minutes under an effective constant head of 40cm
5. (a) Define Quick sand condition and Derive the expression for critical hydraulic gradient.
(b) A rectangular foundation 2m x 4m, transmits a uniform pressure of 450kN/m² to the underlying soil. Determine the vertical stress at a depth of 1m below the foundation at a point within the loaded area, 1m away from a short edge and 0.5m away from a long edge. Use Boussinesq's theory
6. (a) Explain Terzaghi's theory of one-dimensional Consolidation?
(b) The total anticipated settlement due to consolidation of a clay layer under a certain pressure is 150mm. If 45mm of settlement has occurred in 9 months. What is the expected settlement in 18 months.
7. (a) Explain the confined compression test. Also draw Mohr's circle for this test.
(b) In a drained triaxial compression test conducted on dry sand, failure occurred at a deviatoric stress of 220kN/m² when the cell pressure is 60kN/m². Calculate the angle of shearing resistance and the inclination of failure plane to the major principal plane.



Subject Code: R16CE3104

III B.Tech I Semester Supple Examinations, March-2022
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.

PART-A

- 1) (a) Define characteristic loads and characteristics strength
- (b) Distinguish under and over reinforced beams
- (c) Imply supported beam of span 5m is subjected to UDL 20kN/m, what is the depth required based on serviceability criteria
- (d) what is braced and un-braced column
- (e) Mention the critical sections for one way and two way shear in footings with diagrams
- (f) Distinguish one way and two way slab

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

PART-B

4 X 12 = 48

2. (a) Distinguish characteristics of under reinforced and over reinforced beams
- (b) A reinforcement concrete beam 300mm wide by 600mm total depth has a span of 8 metres. Find the necessary tension reinforcement at the centre of the span to enable the beam to carry a load of 6000N/m in addition to its own weight; Use working stress method
3. Using the following data and determine the moment of resistance of T-beam section.
Width of flange = 600 mm, Depth of flange = 110 mm, Width of rib = 250 mm,
Depth of rib = 390 mm, $A_{sc} = 800 \text{ mm}^2$. Effective concrete cover = 50 mm, $A_{st} = 1500 \text{ mm}^2$
4. A reinforced concrete beam of rectangular section has width of 300mm and effective depth of 550mm at a effective cover of 50mm. The beam is reinforced with 6 bars of 20mm diameter on tension side. Three of the tension bars are bent up at 45° near the support section. design the shear reinforcement if the beam is subjected to factored UDL of 100kN/m over a span of 7m Use m20 grade concrete and Fe:415 grade steel.
5. Design a short column of size 400mm x 400mm under biaxial bending for the factored load (P_u) 800 kN and factored moment $M_{ux} = 80 \text{ kN-m}$, $M_{uy} = 60 \text{ kN-m}$. Moments due to minimum eccentricity are less than the values given above. Use M20 concrete and Fe: 415 steel.
6. Design a footing for a column 30cm x 30cm carrying an axial service load of 1200kN. The net bearing capacity of the soil is 220kN/m². Use M20 concrete and Fe:415 steel.
7. A hall in a building of clear dimension 12mX8m is to be provided a floor consisting of a continuous slab cast monolithically with 230 mm wide beams spaced at 3.6 m c/c and supported on 230 mm wall at ends. The floor is to support a live load of 2 kN/m², Partition load of 1.0 kN/m² and finishes at 1.0 kN/m² Design the continuous slab taking M-20 grade of concrete and Fe-415 steel.

Subject Code: R16CE3105

III B.Tech I Semester Supplementary Examinations, March 2022

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) Explain briefly the recommendations of Jayakar Committee.
- b) Explain the role of kerb.
- c) Discuss thirtieth highest hourly volume.
- d) Explain briefly on Unified Soil classification system.
- e) Write short notes on contact pressure.
- f) Explain mud pumping in rigid pavements?

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

PART-B

- 2) a) Explain the functional classification of highways as per Nagpur Plan. [8+4]
- b) Explain briefly the classification of road pattern.
- 3) a) Explain briefly about 'PIEV' theory. [4+8]
- b) Find out the length of transition curve length for the following data. Radius of horizontal curve = 400m. Design speed = 100kmph, length wheel base = 6.2m, number of lanes = 2, location at the rain fall = heavy, terrain condition = hilly, 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 7m.
- 4) a) Distinguish between collision and condition diagrams? Explain different measures to be adopted for the reduction of accidents. [4+8]
- 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) How do you determine the flakiness index of road aggregates? What are the prescribed limits of flakiness index for the road aggregates given by IRC? [8+4]
- b) What are the different tests to be organized on bitumen sample and explain how the test results are used for selecting as binding material in road construction?

- 6) a) Explain various factors influencing pavement design. [4+8]
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 = 3×10^5 kg/cm²
Modulus of subgrade reaction = 5.4 kg/cm³, Poisson's Ratio = 0.15.
- 7) a) What are the various types of flexible pavement failures? Explain briefly. [8+4]
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, March-2022
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) What is meant by transposition of transmission lines?
- (b) When will be the voltage regulation of transmission line is negative?
- (c) What s difference between actual loading and surge impede loading?
- (d) What are the different types of power system transients?
- (e) What are the factors that are to be considered to decrease corona loss?
- (f) What is the necessity of using sag template?

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

PART-B

4 X 12 = 48

2. (a) Derive the expression for the inductance per phase of a 3-phase transmission of unsymmetrical spacing and assume that it is not transposed.
- (b) Calculate the capacitance per phase of a three-phase three-wire transposed system when the conductors are arranged at the corners of a triangle with sides measuring 1.5 m, 2.5m, and 3.0m. Diameter of each conductor is 1.5 cm?
3. (a) Draw the phasor diagram for a nominal – π circuit of a transmission line and derive expressions for sending end voltage and current?
- (b) A transmission line has a series impedance of $25 + j50 \Omega$ and shunt admittance of $4 \times 10^{-4} \text{U}$ Find the A, B, C, D constants based on nominal – τ method? Find the no load sending-end voltage and the voltage rise from the sending end to the receiving end if the receiving-end voltage is 220 kV?
4. (a) Using rigorous method, derive expressions for sending end voltage and current for a long transmission line?
- (b) A three-phase, 50 Hz, 500 km long transmission line has three conductors each of 0.6 cm radius spaced at the corners of triangle of sides 2 m, 3.5 m and 4.5 m. The resistance of each conductor is 0.4 ohms per km. Find the no load sending end voltage and the voltage rise from the sending end to the receiving end if the receiving-end voltage is 220 kV?

5. (a) Explain the variation of current and voltage on overhead line when one end of the line is switched on with source of e.m.f V , the other end is (i) open circuited and (ii) short circuited?
- (b) An overhead line with inductance and capacitance per km length of 1.3 mH and 0.09 mF respectively is connected in series with an ungrounded cable having inductance and capacitance of 0.2 mH / km and 0.3 μ F / km, respectively .Calculate the values of reflected and refracted (transmitted) waves of voltage and current at the junction due to a voltage surge of 100 kV travelling to the junction?
6. (a) What is the necessity of power factor improvement? Explain synchronous condenser method of power factor improvement?
- (b) A 110 kV, 3-Phase, 50 Hz transmission line, 175 km long consists of three 1 cm diameter stranded copper conductors spaced in 3 m delta arrangement. Temperature taken at 26°C and barometric pressure as 74 cm. Assume surface irregularity factor $m = 0.85$ (Roughness factor), m_v for local corona= 0.72 and m_v for general corona=0.82. Find (i). Disruptive voltage (ii). Visual corona voltage for local corona (iii). Visual corona voltage for general corona.
7. (a) Obtain expressions for the sag and maximum tension when the supports are at the same level?
- (b) What are the different factors that affect the string efficiency to be less than 100 %? Briefly describe different methods of improving string efficiency?



Subject Code: R16EE3102

III B.Tech I Semester Supple Examinations, March-2022
POWER ELECTRONICS
(EEE)

①
23/16

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) Draw a neat sketch of Turn-on Characteristics of a SCR.
(b) What is meant by phase control in the converter operation?
(c) Give the advantages of three phase ac to dc converters.
(d) What are meant by sequence control in ac voltage controllers?
(e) What is the effect of load inductance on the load current waveform of DC chopper?
(f) Why thyristors are not preferred for inverters?

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

PART-B

4 X 12 = 48

- (a) Describe the switching characteristics of power MOSFET and IGBT and compare them?
(b) Explain the common technique for current sharing of parallel connected SCRs. Prove that string efficiency of two parallel connected SCRs is less than unity.
- (a) What is effect of source inductance in single phase full converter with RL load?
(b) A single phase semi converter is connected to RLE load with $R = 5 \Omega$, $L = 5 \text{ mH}$, and $E = 80 \text{ V}$. This converter circuit is supplied from 230 V, 50 Hz ac supply. (i) Determine the average load current $\alpha = 60^\circ$. (ii) in the bridge circuit, one thyristor is open circuited due to fault, at this condition what will be the average load current.
- (a) With neat circuit diagram describe the circulating mode dual converter. Write the disadvantages of circulating mode dual converter.
(b) A three phase full converter is connected to a load resistance of 5Ω and it is supplied from a 230 V, 50 Hz ac supply, If the firing angle of thyristor is $\alpha = 60^\circ$, Draw the relevant waveforms and determine (i) average output voltage, (ii) average output current, (iii) rms output voltage and (iv) rms output current.
- (a) Explain the operating principle of mid-point type single phase to single phase step-up cycloconverter. Mention the conduction of various thyristors in the waveforms.
(b) A single phase half-wave ac voltage controller is connected with a RL load of $R = 6 \Omega$, $L = 6 \text{ mH}$ with an input voltage of 230 V, 50 Hz. If the firing angle of thyristor is 30° , determine (i) RMS output voltage, (ii) Power delivered to load.
- (a) Explain the operation of boost converter in the CCM mode and obtain the expression for amplitude of ripple current.
(b) Describe how four quadrant operation is possible with the dc chopper, explain in brief.

7. (a) Explain the working of a 1-phase full bridge inverter with 120° of conduction. Draw the relevant output waveforms
- (b) A 50 Hz single phase full bridge produces a square wave voltage across load when operating from a 300 V DC supply, the AC load consists of a resistance of 30Ω in series with inductance 15 mH. Determine the frequencies and r.m.s values of the lowest order harmonics in the AC load current.



Subject Code: R16EE3103

III B.Tech I Semester Supple Examinations, March-2022

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) Define deflecting torque and controlling torque.
- (b) What is meant by Phantom loading?
- (c) What is potentiometer? Write its applications
- (d) Explain the concept of the loss of charge method used in measuring insulation resistance.
- (e) Define core loss and write methods to measure core loss.
- (f) List out the advantages of digital meters.

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

PART-B

4 X 12 = 48

2. (a) Explain the principle of working of a PMMC instrument with neat diagram.

(b) A current transformer has a single turn primary and 200 secondary turns. The magnetizing current is 90 A and core loss current is 40 A. Secondary circuit phase angle is 28 degrees. Calculate the actual primary current and ratio error, when the secondary current is 5 A.
3. (a) Explain with neat diagram Single phase induction type energy-meter and discuss its errors.
b) A dynamometer type wattmeter with its voltage coil connected across the load side of the instrument reads 200 watts. If the load voltage be 150 volts, what power is being taken by load? The voltage coil branch has a resistance of 2600 Ohms
4. (a) With a circuit diagram describe principle of operation of DC Crompton's Potentiometer.
(b) Describe the construction and working principle of AC polar type potentiometer and how it is standardized.
5. (a) Explain kelvin's double bridge for measurement of low resistance with neat circuit and phasor diagram.
(b) Explain how capacitance is measured using Schering Bridge.
6. (a) Explain the operation of Ballistic Galvanometer with a neat diagram.
(b) Discuss the procedure for the determination of flux density in a ring specimen.
7. (a) Explain how voltage and current can be measured using CRO.
(b) Explain the working of Digital frequency meter and Digital multimeter.

Subject Code: R16EE3105

III B.Tech I Semester Supplementary Examinations, March 2022
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) Discuss the concepts of impulse function.
- (b) Explain about the convergence of the Fourier series.
- (c) Derive the Fourier transform of unit step signal.
- (d) Distinguish between LTI and LTV systems?
- (e) What is aliasing?
- (f) Define auto correlation and cross correlation.

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

PART-B

4 X 12 = 48

2. (a) Find and sketch the first derivatives of the following signals:
 $(i) x(t) = u(t) - u(t - a), a > 0$
 $(ii) x(t) = t[u(t) - u(t - a)], a > 0$
- (b) Derive the expression by which the mean square error can be evaluated?
3. (a) Expand the function $f(t)$ by trigonometric Fourier series over the interval (0,1). In this interval $f(t)$ is expressed as $f(t) = At$.
- (b) Develop the relationship between Trigonometric Fourier series and Exponential Fourier series.
4. (a) Find the Fourier transform of symmetrical gate pulse and sketch the spectrum.
- (b) State and Prove multiplication and integration property of Fourier transform.
5. (a) The transfer function of an LTI system is $H(\omega)$ is $\frac{16}{4 + j\omega}$. Find the response $y(t)$ for an input $x(t) = u(t)$.
- (b) Derive the relationship between Bandwidth and Rise Time.
6. What is sampling? Explain the need for sampling and clearly discuss the process of sampling low pass signals and derive conditions for optimum reconstruction of signal.
7. (a) Find the convolution of the signals $x(t) = e^{-2t}u(t); h(t) = u(t+2)$.
- (b) Prove that the correlation and convolution functions are identical for even signals.



Subject Code: R16ME3101

III B.Tech I Semester Supple Examinations, March-2022
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 are continuous chips?
- (b) What is the working principle of an Engine Lathe?
- (c) Differences between drilling and a boring.
- (d) Classify the Milling machines.
- (e) What are the specifications of a grinding wheel?
- (f) List the uses of Jigs and Fixtures.

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

PART-B

4 X 12 = 48

2. (a) Explain Merchant's force diagram with a neat sketch and State the assumptions made in the development of such a diagram. [6]
- (b) Discuss about single point cutting tool nomenclature. [6]
3. (a) Define gear box and with a neat sketch explain its construction. [6]
- (b) What are the different types of work holding devices and discuss about turret lathe with neat sketch. [6]
4. (a) Discuss the features of a twist drill with its functions. [6]
- (b) What are the operation's performed on Planar machine Explain? [6]
5. (a) Discuss briefly the horizontal milling machine. [6]
- (b) What is indexing and Discuss about the types of Indexing in milling machine. [6]
6. (a) Explain briefly about honing and lapping operations with their applications. [6]
- (b) What is [6]
 - i) Lapping
 - ii) Honing
 - iii) Broaching operations.
7. Discuss about the types of clamping & work holding devices. [12]



Subject Code: R16ME3102

III B.Tech I Semester Supple Examinations, March-2022

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

1. (a) State any four thermodynamic properties to be Rankine cycle working fluid
- (b) Distinguish boiler mountings and accessories
- (c) Explain critical pressure ratio
- (d) What is the need of compounding of turbines?
- (e) Draw a neat sketch of diaphragm gauge
- (f) With sketch explain various processes in a simple Brayton cycle

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

PART-B

4 X 12 = 48

2. (a) With a neat sketch explain the working of modified Rankine cycle
- (b) Liquid octane at 25°C is burned with 400% theoretical air at 25°C in a steady-state process. Determine the adiabatic flame temperature.
3. (a) Draw a neat sketch of any water tube boiler and explain functioning.
- (b) Define draught. Explain working of forced draught chimney with schematic diagram
4. (a) In a nozzle steam expands from 12 bar and 300°C to 6 bar with flow rate of 5 kg/s. Determine throat and exit area if exit velocity is 500 m/s and velocity at inlet to nozzle is negligible. Also find coefficient of velocity at exit. Coefficient of velocity is the ratio of actual velocity of fluid at nozzle exit to the velocity at exit considering isentropic flow through nozzle.
- (b) Write a short note on degree of saturation
5. (a) Explain the compounding of steam turbines with a neat sketch.
- (b) A Parson's reaction turbine has mean diameter of blades as 1.6 m and rotor moving at 1500 rpm. The inlet and outlet angles are 80° and 20° respectively. Turbine receives steam at 12 bar, 200°C and has isentropic heat drop of 26 kJ/kg. 5% of steam supplied is lost through leakage. Determine the following considering horsepower developed in stage to be 600 hp. (a) the stage efficiency (b) the blade height.
6. (a) Explain the working of surface condenser with a neat sketch.
- (b) What are the reasons for instrumentation of steam power plant? Explain.
7. (a) Derive an expression for specific work output of gas turbine cycle in non-dimensional form.
- (b) Explain the working of turbo jet engine and variation of system parameter with neat sketch.



Subject Code: R16ME3103

III B.Tech I Semester Supple Examinations, March-2022

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

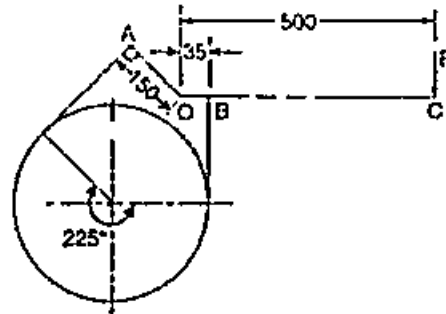
1. (a) A 60 mm diameter shaft running in a bearing carries a load of 1000 N. If the coefficient of friction between the shaft and bearing is 0.03, find the power transmitted when it runs at 1200 r.p.m.
- (b) Define uniform wear theory for single plate clutch.
- (c) List the applications of brakes.
- (d) State any two differences between static balancing and dynamic balancing.
- (e) What do you mean by vibrations? Explain with any two examples in your daily life.
- (f) Explain about torsional vibrations.

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

PART-B

4 X 12 = 48

2. (a) A body, resting on a rough horizontal plane required a pull of 180 N inclined at 30° to the plane just to move it. It was found that a push of 220 N inclined at 30° to the plane just moved the body. Determine the weight of the body and the coefficient of friction **8M**
- (b) State the differences between Boundary friction and film friction. **4M**
3. (a) A single plate clutch, with both sides effective, has outer and inner diameters 200 mm and 100 mm respectively. The maximum intensity of pressure at any point in the contact surface is not to exceed 0.1 N/mm^2 . If the coefficient of friction is 0.3, determine the power transmitted by a clutch at a speed 2000 r.p.m. **4M**
- (b) Explain the working of cone clutch with a neat sketch. **8M**
4. A differential band brake, as shown in figure, below has an angle of contact of 225° . The band has a compressed woven lining and bears against a cast iron drum of 350 mm diameter. The brake is to sustain a torque of 350 N-m and the coefficient of friction between the band and the drum is 0.3. Find i) The necessary force (P) for the clockwise and anticlockwise rotation of the drum; and ii) The value of 'OA' for the brake to be self locking, when the drum rotates clockwise. **12M**



All dimensions in mm.

5. (a) Why is balancing necessary for high speed engines? 4M

(b) A, B, C and D are four masses carried by a rotating shaft at radii 100, 125, 200 and 150 mm respectively. The planes in which the masses revolve are spaced 600 mm apart and the mass of B, C and D are 10 kg, 5 kg, and 4 kg respectively. Find the required mass A and the relative angular settings of the four masses so that the shaft shall be in complete balance. 8M

6. The mass of a single degree damped vibrating system is 7.5 kg and makes 24 free oscillations in 14 seconds when disturbed from its equilibrium position. The amplitude of vibration reduces to 0.25 of its initial value after five oscillations. Determine

1. stiffness of the spring

2. logarithmic decrement, and

3. damping factor, i.e. the ratio of the system damping to critical damping. 12M

7. (a) Determine the natural frequency of free transverse vibration due to uniformly distributed load acting over a simply supported shaft. 5 M

(b) A shaft 50mm diameter and 3 m long is simply supported at the ends and carries three loads of 1250N, 950N, 650N at 3m, 5m, 7m from the left support. The Young's modulus for shaft material is 200 GN/m². Find the frequency of transverse vibration. 7M

Subject Code: R16ME3104

III B.Tech I Semester Supple Examinations, March-2022
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) Calculate the series factor of R20 series?
- (b) Define notch sensitivity?
- (c) What are the types of failure occurred in riveted Joints?
- (d) What is the difference between cotter joint and knuckle Joint?
- (e) List any 2 flexible couplings explain why are those called flexible ?
- (f) What is surge in spring?

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

PART-B

4 X 12 = 48

2. (a) A manufacturer is interested in starting a business with five different models of tractors ranging from 7.5 to 75 kW capacities. Specify power capacities of the models. There is an expansion plan to further increase the number of models from five to nine to fulfil the requirement of farmers. Specify the power capacities of the additional models.
- (b) A wall bracket with a rectangular cross-section is shown in Fig.1: Wall Bracket. The depth of the cross-section is twice of the width. The force P acting on the bracket at 60° to the vertical is 5kN. The material of the bracket is grey cast iron FG 200 and the factor of safety is 3.5. Determine the dimensions of the cross-section of the bracket. Assume maximum normal stress theory of failure.

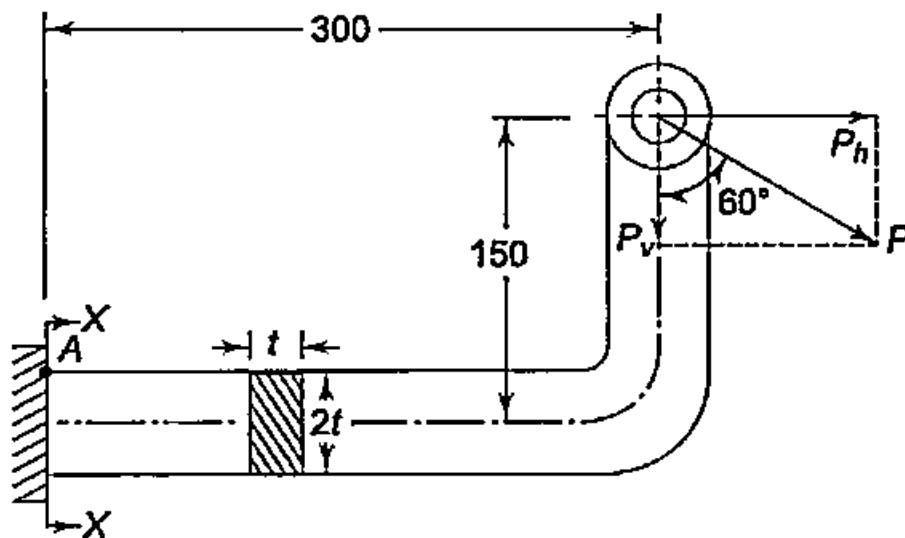


Fig 1 : Wall Bracket

3. (a) A cantilever beam made of cold drawn steel 40C8 ($\sigma_{ud} = 600 \text{ N/mm}^2$ and $\sigma_{yt} = 380 \text{ N/mm}^2$) is shown in Fig.2. The force P acting at the free end varies from -50 N to $+150 \text{ N}$. The expected reliability is 90% and the factor of safety is 2. The notch sensitivity factor at the fillet is 0.9. Determine the diameter ' d ' of the beam at the fillet cross-section using Goodman curve as failure criterion.

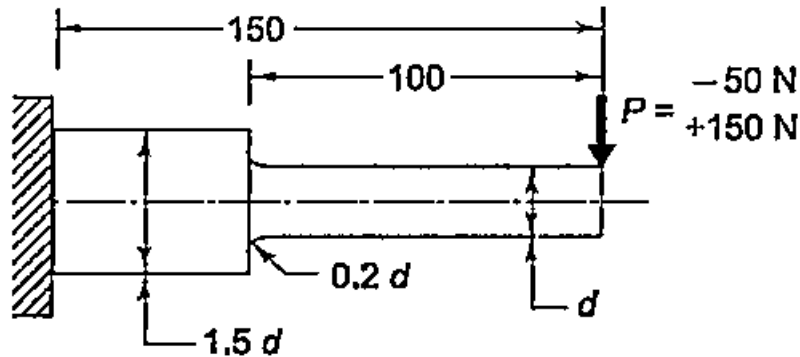


Fig:2

- (b) A round shaft made of a brittle material and subjected to a bending moment of 15 N-m is shown in Fig.3. The stress concentration factor at the fillet is 1.5 and the ultimate tensile strength of the shaft material is 200 N/mm^2 . Determine the diameter d , the magnitude of stress at the fillet and the factor of safety.

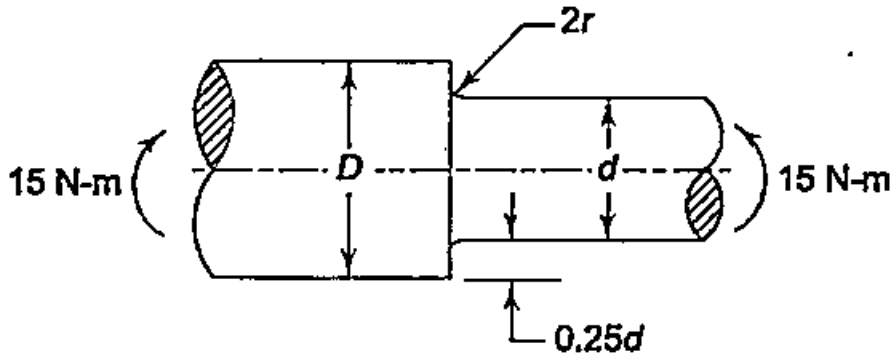


Fig:3

4. (a) A plate, 75 mm wide and 10 mm thick, is joined with another steel plate by means of single transverse and double parallel fillet welds, as shown in Fig.4. The joint is subjected to a maximum tensile force of 110 kN . The permissible tensile and shear stresses in the weld material are 140 and 100 N/mm^2 respectively. Determine the required length of each parallel fillet weld.

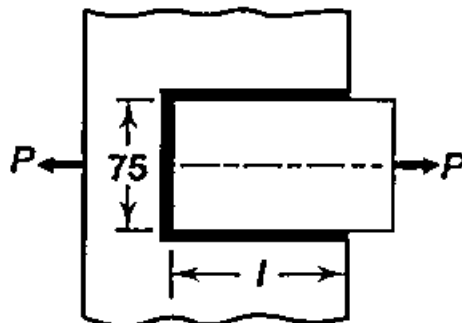


Fig:4

- (b) Two plates, each 5 mm thick, are connected by means of four rivets as shown in Fig.5. The permissible stresses for rivets and plates in tension, shear and compression are 80 , 60 and 120 N/mm^2 respectively. Calculate : (i) diameter of the rivets; (ii) width of the plate; and (iii) efficiency of the joint.

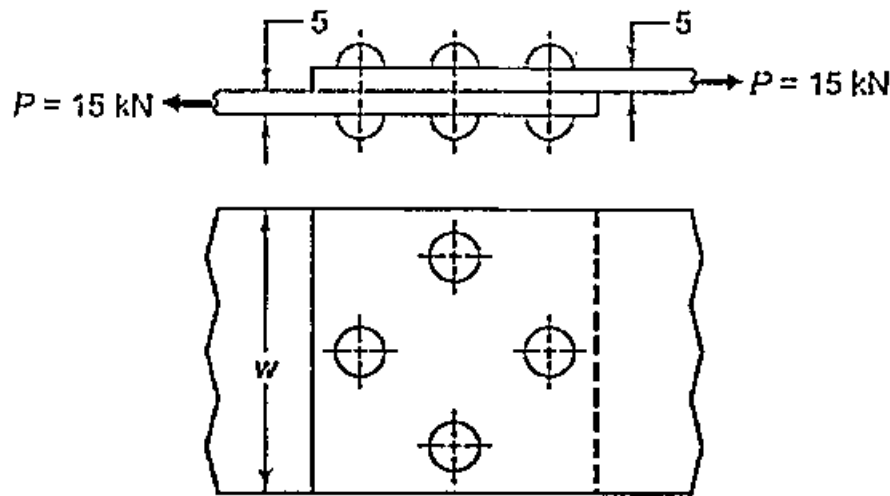


Fig:5

5. (a) Design a knuckle joint to connect two circular rods subjected to an axial tensile force of 50 kN. The rods are co-axial and a small amount of angular movement between their axes is permissible. Design the joint and specify the dimensions of its components. Select suitable materials for the parts.
- (b) The layout of an intermediate shaft of a gear box supporting two spur gears B and C is shown in Fig.6. The shaft is mounted on two bearings A and D. The pitch circle diameters of gears B and C are 900 and 600 mm respectively. The material of the shaft is steel FeE 580 ($\sigma_{ut} = 770$ and $\sigma_{yt} = 580$ N/mm²). The factors k_b and k_t of ASME code are 1.5 and 2.0 respectively. Determine the shaft diameter using the ASME code. Assume that the gears are connected to the shaft by means of keys.

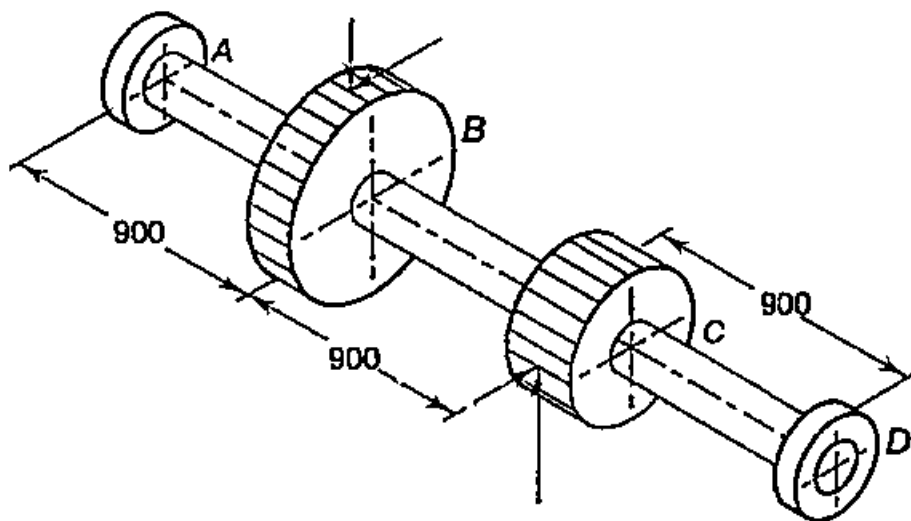


Fig:6

6. Design a split muff coupling to transmit 50 kW power at 120 rpm. The shafts, key and clamping bolts are made of plain carbon steel 30C8 ($\sigma_{yt} = 400$ N/mm²). The yield strength in compression is 150% of the tensile yield strength. The factor of safety for shafts, key and bolts is 5. The number of clamping bolts is 8. The coefficient of friction between sleeve halves and the shaft is 0.3.
- (i) Calculate the diameter of the input and output shafts.

(ii) Specify the length and outer diameter of the sleeve halves.

(iii) Find out the diameter of clamping bolts assuming that the power is transmitted by friction.

(iv) Specify bolt diameter using standard empirical relations.

(v) Specify the size of key and check the dimensions for shear and compression criteria

7. Design a helical compression spring subjected to a maximum force of 1250 N. The deflection of the spring corresponding to the maximum force should be approximately 30mm. The spring index can be taken as 6. The spring is made of patented and cold-drawn steel wire. The ultimate tensile strength and modulus of rigidity of the spring material are 1090 and 81 370 N/mm² respectively. The permissible shear stress for the spring wire should be taken as 50% of the ultimate tensile strength. Design the spring and calculate:

(i) wire diameter; (ii) mean coil diameter; (iii) number of active coils; (iv) total number of coils; (v) free length of the spring; and (vi) pitch of the coil. Draw a neat sketch of the spring showing various dimensions.

Subject Code: R16ME3105

III B.Tech I Semester Supplementary Examinations, March 2022
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) List any two types of operation research models.
- (b) What is mean by degenerate solution for a transportation problem?
- (c) Explain the significance of crashing the project network.
- (d) What is Kendall's notation of waiting line model?
- (e) What are Maxi-min and Mini-max principles?
- (f) What are advantages and disadvantages of Simulation?

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

PART-B

4 X 12 = 48

2. Solve the following Linear Programming problem.

$$\begin{aligned} \text{Minimize } Z &= -3x_1 + x_2 + x_3 \\ \text{Subject to } &x_1 - 2x_2 + x_3 \leq 11 \\ &-4x_1 + x_2 + 2x_3 \geq 3 \\ &2x_1 - x_3 = -1 \\ &x_1, x_2, x_3 \geq 0 \end{aligned}$$

3. Solve the following Transportation problem for minimum transportation cost. Cell entries represent unit transportation costs.

Origin	Destination				Supply
	D ₁	D ₂	D ₃	D ₄	
O ₁	6	1	9	3	70
O ₂	11	5	2	8	55
O ₃	10	12	4	7	70
Demand	85	35	50	45	

4. The time estimates (in months) of all activities of a project are as given

Activity	1-2	1-3	1-4	2-5	3-5	4-6	5-6
t_o	1	1	2	1	2	2	3
t_m	1	4	2	1	5	5	14
t_p	7	7	8	1	14	8	15

- a) Find the expected duration to complete the project

b) What is the probability that the project will be completed

- i. 4 Months earlier than expected
- ii. 4 Months later than expected

5. In a bank, with a single server there are two chairs for waiting customers. On an average one customer arrives every 10 minutes and each customer takes 5 minutes for getting served. Arrival rate is randomly distributed according to Poisson distribution.

- a. The probability that an arrival will get a chair to sit on,
- b. The probability that an arrival will have to stand, and
- c. Expected waiting time of a customer.

6. Obtain the optimal strategies for both persons and the value of the game for zero-sum two person games whose pay-off matrix is as follows

		Player B	
		B ₁	B ₂
Player A	A ₁	1	-3
	A ₂	3	5
	A ₃	-1	6
	A ₄	4	1
	A ₅	2	2
	A ₆	-5	0

7. A firm is considering replacement of equipment whose first cost is Rs.4000 and the scrap value is negligible at the end of any year. Based on experience, it has been found that the maintenance cost is zero during the first year and it is Rs.1000 for the second year. It increases by Rs. 300 every year thereafter. When the equipment should be replaced, if interest rate is 12%?



Subject Code: R16EC3101

III B.Tech I Semester Supple Examinations, March-2022
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) Justify the selection of differential amplifier, where one differential amplifier has a CMRR of 100dB and another has CMRR of 10dB. Which differential amplifier you will prefer and why?
(b) List important specifications of Digital to Analog converters indicating their typical values.
(c) Build the typical connection diagram of 555 IC Timer and what are its features
(d) Explain about CMOS steady state electrical behaviour.
(e) Draw a full adder using two half adders. Write its truth table.
(f) Distinguish the process of simulation and synthesis.

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

PART-B

4 X 12 = 48

2. (a) Discuss the operation of logarithmic amplifier with the help of a neat circuit diagram and derive the expression for its output voltage. [6]
(b) Design an Op-amp circuit which can give the output as $V_o = 3V_1 - 3V_2 + 2V_3 + 6V_4$. [6]
3. (a) Calculate the output voltage for an input of 00110101. The logic levels used in an 8-bit R-2R ladder type DAC are LOGIC '1' = +4volts and logic '0' = 0 volts. [6]
(b) Deduct the expression for the duty cycle of Astable multivibrator using IC 555 with a neat circuit and waveforms. [6]
4. (a) Design a wide band pass filter with $f_L = 100$ Hz, $f_H = 2$ KHz and a pass band gain = 10. Draw the frequency response and calculate 'Q' factor for the filter. [6]
(b) Discuss the importance of the terms pertaining to PLL: i) free-running frequency f_o , (ii) lock range, (iii) capture range, and (iv) Pull-in time. [6]
5. (a) Compare CMOS, TTL and ECL with reference to logic levels, DC noise margin, propagation delay and fan-out. [8]
(b) Elaborate the importance of totem pole arrangement. [4]
6. (a) Design a 32 input to 5 output priority encoder using four 74LS148 and gates [6]
(b) Write a VHDL program for a positive edge Triggered 'T-flip flop. [6]
7. (a) Explain the operation of Synchronous SRAM with the help of its internal architecture. [8]
(b) Write the differences in writing code for sequential and combinational circuits with case study. [4]



Subject Code: R16EC3102

III B.Tech I Semester Supple Examinations, March-2022

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) Explain the advantages and disadvantages of DM.
(b) Sketch the ASK waveform for the input data "0101".
(c) Compare the probability of error of different modulation techniques.
(d) Calculate entropy when $P_k=0$ and when $P_k=1$.
(e) What are the advantages and disadvantages of block codes and convolutional codes?
(f) Discuss the procedure to generate systematic code word in cyclic code.

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

PART-B

4 X 12 = 48

2. (a) Deduce the expression for Signal to Quantization noise ratio in Delta modulation and discuss Granular noise and slope overload error in Delta modulation [8]
(b) Discuss the process of uniform and non-uniform type quantization. [4]
3. (a) Assume the binary sequence 0101101011 is applied to DPSK transmitter.
i) Sketch the resulting waveform at the transmitter output.
ii) Applying this waveform to the DPSK receiver show that the original binary sequence is reconstructed in the receiver output. [8]
(b) Explain the Generation and Detection of QPSK Signals with the help of block diagram and mathematical descriptions. [4]
4. (a) How matched filter is different from an optimum filter? Derive an expression for impulse response of matched filter. [6]
(b) Calculate P_e for the coherent and non-coherent demodulation schemes. For the Binary data is transmitted over a telephone line with usable bandwidth of 2400Hz using the FSK signalling scheme. The transmit frequencies are 2025 and 2225Hz, and the data rate is 350 bits/Sec. The average signal to noise power ratio at the output of the channel is 8dB. [6]
5. (a) Assume that the dash is three times as long as the dot and has one-third the probability of occurrence. [4]
(i) Calculate the information in a dot and that in a dash
(ii) Calculate the average information in the dot-dash code.
(b) Apply Shannon-Fano coding procedure for the following message ensemble and also determine its efficiency. [8]

X	X1	X2	X3	X4	X5	X6
P	0.4	0.2	0.12	0.08	0.08	0.12

6. (a) Design an encoder for the (7, 4) binary cyclic code generated by $g(x) = 1+x+x^3$ and verify its operation using the message vector (1110). [6]

(b) Evaluate the syndrome, $S(x)$. The generator polynomial for a (15, 7) cyclic code, $g(x) = 1+x^4+x^6+x^7+x^8$. Find the code vector (in systematic form) for the message polynomial, $m(x) = x^2+x^3+x^4$. Assume that the first and last bits of the code vector suffer Transmission errors. [6]

7. (a) Using Transform domain approach of convolutional codes, find coded sequence for the given rate $\frac{1}{2}$ encoder with generator sequences $g_1 = (1, 0, 1)$, $g_2 = (0, 1, 1)$ and message $m = (10111 \dots)$. [8]

(b) Differentiate time domain approach and transform domain approach. [4]



Subject Code: R16EC3103

III B.Tech I Semester Supple Examinations, March-2022
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) Define Beam area. How does it relate with Directivity of antenna?
- (b) A magnetic field strength of $5 \mu\text{A/m}$ is required at a point on $\theta = \pi/2$ which is 2 km from an antenna in air. Neglecting ohmic losses, how much power must the antenna transmit if it is a half-wave dipole?
- (c) What is the main disadvantage of binomial array?
- (d) Define travelling wave radiators? List out the difference between resonant and travelling wave radiators.
- (e) List the features of lens antenna.
- (f) What is skip distance?

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

PART-B

4 X 12 = 48

2. (a) Explain the working principle of single wire antenna. [8+4]
- (b) Derive the relation between Directivity and effective aperture of an antenna.
3. (a) Calculate the power gain of a Half wave dipole whose ohmic losses and directive gain are 7 ohms and 1.64 respectively.
- (b) What is the radiation resistance of antenna? Derive the expression for radiation resistance of half wavelength dipole antenna. [6+6]
4. (a) Distinguish between broad side array and end fire array. [12]
5. (a) Explain the working principle of Yagi – Uda antenna with neat sketch. [6+6]
- (b) Explain the working of folded dipole antenna.
6. (a) Explain the radiation mechanism of microstrip antenna. [8+4]
- (b) Describe the different types of microstrip antennas.
7. (a) What is sky wave propagation? Explain radio wave bending in ionosphere. [8+4]
- (b) Define i) critical frequency. ii) Wave Tilt.



Subject Code: R16EC3104

III B.Tech I Semester Supplementary Examinations, March 2022
COMPUTER ORGANIZATION AND MICROPROCESSORS
(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) $(-27)_{10}$ can be represented in a signed magnitude format and in a 1's complement format as
- (A) 111011 & 100100 (B) 100100 & 111011
(C) 011011 & 100100 (D) 100100 & 011011
- (b) What are the advantages of RISC over CISC?
(c) Define Interrupt.
(d) What is a Signal Description of 8086
(e) What is an assembler?
(f) How does a Stepper Motor move?

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

PART-B

4 X 12 = 48

2. (a) Draw and explain common Bus transfer. [6M]
(b) What are functions of ALU and explain. [6M]
3. Explain about Addressing Modes. [12M]
4. (a) Explain the following applications:
i) ROM ii) PROM iii) EPROM iv) EEPROM [2+2+2+2=8M]
(b) What are the advantages of using DMA transfers? [4M]
5. (a) What are the different segment registers in 8086? Why need memory segmentation? [4M]
(b) Explain about different registers used in 8086 organization. [8M]
6. What is an Interrupt? Explain about interrupt cycle of 8086. [12M]
7. Explain about 8257 DMA controller with neat diagram. [12M]



Subject Code: R16CS3101

III B.Tech I Semester Supple Examinations, March-2022
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. (a) What is performance measurement of an algorithm?
- (b) Write any two differences between divide-and-conquer and greedy method.
- (c) Write Control Abstraction of Greedy method.
- (d) State the principle of optimality
- (e) Draw the state-space tree along with answer nodes for 4-queens problem.
- (f) Define: i) LC – Search ii) Branch and Bound (BB).

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

PART-B

- 4 X 12 = 48

2. (a) Write different pseudo code conventions used to represent an algorithm.
- (b) What is space complexity? Illustrate with an example for fixed and variable part in space complexity.
3. (a) Discuss the working strategy of merge sort and illustrate the process of merge sort algorithm for the given data: 43, 36, 25, 78, 63, 57, 91 and 11
- (b) Derive the time complexity of the Quick sort algorithm for the worst case.
4. (a) Write a greedy algorithm for sequencing unit time jobs with deadlines and profits.
- (b) Discuss the single-source shortest paths algorithm with a suitable example.
5. (a) Construct an optimal travelling sales person tour using Dynamic Programming for the given data:

0	10	9	3
5	0	6	2
9	6	0	7
7	3	5	0

- (b) Solve the following instance of 0/1 KNAPSACK problem using Dynamic programming $n = 3$, $(W_1, W_2, W_3) = (2, 3, 4)$, $(P_1, P_2, P_3) = (1, 2, 5)$, and $m = 6$.

6. (a) What is a backtracking? Give the explicit and implicit constraints in 8 queen's problem.
- (b) Write an algorithm to determine the Hamiltonian Cycle in a given graph using backtracking.

7. (a) Explain FIFO Branch and Bound solution.

- (b) Draw the portion of the state space tree generated by LC branch and bound of knapsack problem for an instance $n=4$, $(P_1, P_2, P_3, P_4) = (10, 10, 12, 18)$, $(w_1, w_2, w_3, w_4) = (2, 4, 6, 9)$, and $m=15$.



Subject Code: R16CS3102

III B.Tech I Semester Supple Examinations, March-2022

OOAD THROUGH UML

(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 the importance of modularity and concurrency in OOAD.
- (b) Define conceptual clustering.
- (c) What is realization in UML?
- (d) Write the characteristics of well-structured interaction diagram.
- (e) Define process in behavioural modelling.
- (f) How do you model an API?

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

PART-B

4 X 12 = 48

2. (a) Explain briefly about SDLC?
 - (b) Discuss about the conceptual model of UML.
3. (a) write the differences between Basic Structural Modelling and Advanced Structural Modelling.
 - (b) Describe packages and its common modelling techniques with an example.
4. (a) How does one properly identify the classes and objects that are relevant to a particular application? Explain.
 - (b) Draw the class diagram for course registration system and explain common modelling techniques.
5. (a) Analyse Basic behavioural modelling with an example.
 - (b) Inference the Forward and Reverse engineering in use case diagrams.
6. (a) Build State chart diagram for railway management system.
 - (b) Apply Events and Signals in handling Exceptions
7. (a) Explain about Deployment Diagrams with common Modelling Techniques.
 - (b) Explain about Component Diagram with forward and reverse engineering.



Subject Code: R16CS3103

III B.Tech I Semester Supple Examinations, March-2022

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) Why is buffering used in lexical analysis
- (b) Eliminate left factoring from the grammar $S \rightarrow aSa/aa$
- (c) List three techniques for constructing LR parsing table
- (d) What does Abstract Syntax Tree (AST) mean?
- (e) List out limitations of the static memory allocation
- (f) Name the techniques in loop optimization

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

PART-B

4 X 12 = 48

- 2. (a) Summarize in detail about how the tokens are specified by the compiler with suitable example
- (b) Explain the following phases of compiler construction
 - i) Code Optimization ii) Code Generation iii) Table Management
- 3. (a) Describe the algorithm for FIRST and FOLLOW in parser
- (b) Consider the following context free grammar

$$E \rightarrow +EEV \mid EEV - EEV \mid xV \mid y$$

Find the leftmost derivation, rightmost derivation, and parse tree for the string: $+* - x y x y$

- 4. (a) Construct SLR parsing table for the following grammar

$$E \rightarrow E+T/T$$

$$T \rightarrow TF/F$$

$$F \rightarrow F*/a/b$$

- (b) Explain the several difficulties with the top-down parsing

- 5. (a) Show the intermediate code for the following code segment along with the required syntax direct translation scheme

```
while(i<10)
```

```
if ( i%2==0)
```

```
evensum=evensum+i
```

```
else
```

```
oddsun=oddsun+i
```

(b) Translate the following expression: $a = -b * d + c + (-b) * d$
into i) Quadruples ii) Triples

6. (a) Explain the Characteristics of peephole optimizations
(b) Summarize in detail about the various issues in code generation with suitable examples
7. (a) Explain the techniques for machine code optimization
(b) Explain with suitable example various sources of loop optimization



Subject Code: R16CS3104

III B.Tech I Semester Supplementary Examinations, March 2022
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) Explain different types of Networks
- (b) Define ETHERNET
- (c) Define CSMA and CDMA
- (d) Define Link State Routing Protocol
- (e) List out the duties of Transport layer
- (f) Differentiate between FTP and HTTP

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

PART-B

4 X 12 = 48

2. (a) Explain ISO/OSI Reference model with neat diagram?
- (b) Suppose a computer sends a frame to another computer on a bus topology LAN. The physical destination address of the frame is corrupted during the transmission. What happens to the frame? How can the sender be informed about the situation? Explain?
3. (a) List the responsibilities of the data link layer in the Internet model
- (b) Explain error detection and error correction techniques
4. (a) write in detail about Go Back N and Stop and Wait Protocol with suitable example
- (b) Discuss the MAC layer functions of IEEE 802.11?
5. (a) Define switching? Explain Virtual circuit switching techniques?
- (b) Explain Internet Protocol with the neat block diagram of IP header format?
6. (a) Explain the TCP Connection establishment and termination using Timeline diagram?
- (b) Describe the three way handshake protocol to establish the transport level connection
7. (a) Write in detail about Electronic Mail Architecture and its services
- (b) Explain the specific purposes of the DNS, HTTP, SMB, and SMTP/POP application layer protocols?



Subject Code: R16CS3108

III B.Tech I Semester Supple Examinations, March-2022

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) Define the principle and functions of OSI network management.
- (b) Draw the structure of ATM cell header.
- (c) Explain the SNMP communication protocol.
- (d) What is trap? List their types.
- (e) Explain briefly about BER.
- (f) What does Enterprise Management mean?

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

PART-B

4 X 12 = 48

2. Discuss about the OSI network management organizational model and information model with neat diagram.
3. Demonstrate the need of customer network management of a public network management.
4. Explain the Architecture of SNMP in detail.
5. Draw the SNMP Architecture and Explain Administrative Model of SNMPv2.
6. What is Remote Monitoring? Explain the relationship between control and data tables.
7. Compose System Management and Enterprise Management Solutions with an example.
