R16

III B.TECH I SEM

SUPPLEMENTARY EXAMINATIONS

MARCH 2025

Narasaraopeta Engineering College (Autonomous)

KotappakondaRoad, Yellamanda (P.O), Narasaraopet- 522601, Guntur District, AP.

Subject Code: R16CE3101

III B.Tech I Semester Supple Examinations, March-2025

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) List any four methods used for computation of deflection in structures

(b)Write a short note on unit load method.

(c)Draw SFD and BMD for Cantilever beam with UDL

(d)Write the formula for deflection for a cantilever beam with point load at end.

(e)Define distribution factor and carry over factor.

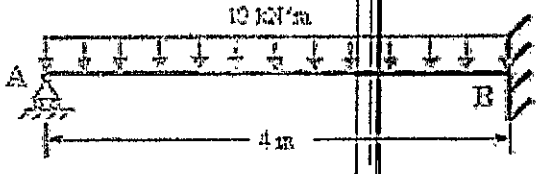
(f)What are the reasons for sway in portal frames?

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

PART-B

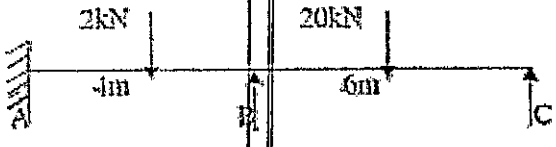
4 X 12 = 48

2. Analyse the following beam using consistent deformation method and draw the bending moment diagram.

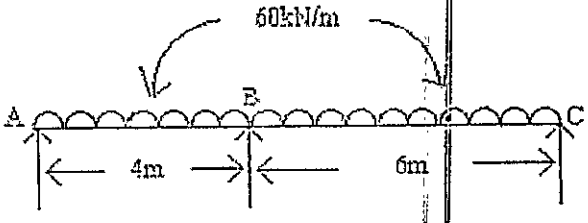


3. Derive an expression for strain energy due to bending moment.
4. Analyse the continuous beam shown in below Figure. Use three-moment equation.

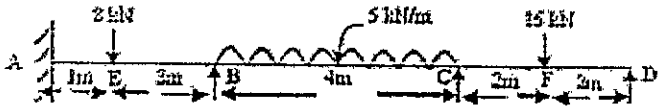
Draw S.F and B.M diagrams.



5. Analyse the two span continuous beam loaded as shown in Fig by the slope deflection method. The end supports are simply-supported. Sketch the B.M and S.F. diagrams.



6. Draw BMD for the Continuous beam shown in figure below by using Moment Distribution method.



7. Analyze the portal frame by moment distribution method. Draw the bending moment diagram and sketch the deflected shape of the structure. The two columns of AB and CD of 5m height with I, Beam BC of span 5m, with 2I. The beam BC carries an udl of 15 kN/m. The supports at A and D are fixed.

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Narasaraopeta Engineering College (Autonomous)

Kotappakonda Road, Yellamanda (P.O), Narasaraopet-522601, Guntur District, AP.

Subject Code: R16CE3103

III B.Tech I Semester Supple Examinations, March-2025

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) Draw the Phase Diagram of Partially Saturated Soil.
   (b) What is Plasticity Chart?
   (c) Describe Darcy's Law?
   (d) Define Total stress and Effective stress.
   (e) Briefly explain e-p and e-logp curves.
   (f) How do we define failure in soils? According to Mohr-Coulomb criterion, how is the failure plane recognized and how is shear strength defined?

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

PART-B

4 X 12 = 48

2. (a) Derive the relation between void ratio and Porosity **4M**
   (b) By three phase soil system, prove that the degree of saturation 'S' as ratio in terms of unit weight 'ϒ', void ratio 'e', specific gravity of soil grains 'G' and unit weight of water '$ϒ_w$' is given by the expression. $ϒ = [G+Se / 1+e] ϒ_w$ **8M**

3. (a) State Stoke's law. List out the assumptions and limitations of Stoke's law. **6M**
   (b) Give the group symbols for following soils
   i) Liquid limit 40% and Plastic limit 22%
   ii) Liquid limit 20% and Plastic limit 14%
   Passing through 4.75 mm sieve 70% and passing through 75micron sieve 15%, coefficient of curvature 3, coefficient of uniformity 7, PI= 3. **6M**

4. (a) List out the factors effecting permeability of soils. **4M**
   (b) What will be the ratio of average permeability in horizontal direction to that of the vertical direction for a soil deposit consisting of three horizontal layers, if the thickness and permeability of second layer are twice of those of the first and those of the third layer twice those of second? **8M**

5. (a) Briefly explain the construction of Newmark's Influence chart and briefly explain its usage? **8M**
   (b) A Rectangular area 2 x 4 m carries a u: d. l of $8t/m^3$ at the ground surface. Find the vertical pressures at 5 m below the center and corner of loaded area using Boussinesq's equation. **4M**

6. (a) What is Relative compaction? How to control the field compaction process with Proctor's SM needle method? **4M**

(b) Saturated soil of 5 m thick lies above an impervious stratum and below a pervious stratum. It has a compression index of 0.25 with $k = 3.2\times10^{-10}$ m/sec. Its void ratio at a stress of 147 kN/m^2 is 1.9. Compute (i) The change in voids ratio due to increase of stress to 196 kN/m^2 (ii) Coefficient of volume compressibility (iii) Coefficient of consolidation (iv) Time required for 50% consolidation. **8M**

7. (a) What are the three drainage conditions under which shear strength tests can be conducted? **6M**

(b) An unconfined compression test was conducted on an undisturbed sample of clay. The sample had a diameter of 37.5 mm and was 80 mm long. The load at failure measured by the proving ring was 27 N and the axial deformation of the sample at failure was 14 mm. Determine the unconfined compressive strength and the undrained shear strength of the clay. **6M**

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Narasaraopeta Engineering College (Autonomous)

Kotappakonda Road, Yellamanda (P.O), Narasaraopet- 522601, Guntur District, AP.

Subject Code: R16CE3105

III B.Tech I Semester Supple Examinations, March-2025

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) List out the different classifications of roads.
   (b) Define stopping sight distance.
   (c) Give the significance of PCU in traffic studies.
   (d) List out any 4 different tests on road aggregates.
   (e) What are the design factors to be considered while designing flexible pavements.
   (f) Why Alligator cracking occurs in pavements?

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

PART-B

4 X 12 = 48

2. (a) What are the significant recommendations of Jayakar committee report? Mention how this helped in road development in India? **(6+6)**
   (b) Discuss the Bombay road plan and its salient features and Compare it with Lucknow road plan.

3. (a) Explain the factors influencing the geometric elements. **(6+6)**
   (b) Enumerate the steps for practical design of superelevation considering mixed traffic.

4. (a) Enumerate the different methods of carrying out traffic volume studies. Indicate the principle of each **(4+8)**
   (b) The average normal flow of traffic on cross roads A and B during design period are 320 and 380 PCU per hour, the saturation flow values on these roads are estimated as 1700 and 1320 PCU per hour respectively. The all red time required for pedestrian crossing is 15 seconds. Design two phase traffic signal by Webster's method?

5. (a) List the desirable properties of bitumen. What are the various tests carried out on bitumen?
   (b) Explain the step by step procedure for conducting Marshall method of bituminous mix design. **(4+8)**

6. (a) What are the factors to be considered in design of flexible pavements and indicate their significance. **(4+8)**
   (b) Calculate the stresses at interior, edge and corner of a rigid pavement using Westergaard's stress equations. Use the following data: Comment on the results P = 6000 kg, $E = 3x10^5$ kg/cm^3 , h=18 cm, μ=0.15, K=6.5 kg/cm^3 , a=15 cm

7. (a) Explain the construction steps for cement concrete roads. **(6+6)**
   (b) Mention the major failures in flexible pavements and their causes.

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Kotappakonda Road, Yellamanda (P.O), Narasaraopet- 522601, Guntur District, AP.

Subject Code: R16EE3103

III B.Tech I Semester Supple Examinations, March-2025

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 the term "Sensitivity" of an Instrument.
   (b) Define phantom loading.
   (c) Define Substitution method
   (d) write down the Advantages of Crompton potentiometer
   (e) How the Flux Density is Measured?
   (f) List out the advantages of X-Y records over strip chart recorder

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

PART-B

4 X 12 = 48

2. (a) Discuss with a neat sketch and explain the working principle of PMMC Instrument.
   (b) An electric current of 3 Ampere is flowing through a resistance of 10 ohms. It was found that the resistance was 0.2% greater than what was specified as rated and the ammeter measurement was 0.5% more than the true value. Determine the relative error in power measurement.
3. (a) Explain with a neat sketch the construction and working of a single-phase Dynamometer type Wattmeter.
   (b) A 50A , 230 V meter on full load test makes 61 revolutions in 37 seconds . If the normal disc speed is 520 revolutions per Kwh , find the percentage error .
4. (a) How do you Standardize a Potentiometer? Explain with a neat diagram.
   (b) Estimate the way to measure the phase angle using ratio transformer?
5. (a) Explain the theory and working principle of Hay's Bridge. Derive the relation for finding unknown resistance and inductance.
   (b) In a balanced network, AB is a resistance of 500 ohm in series with an inductor of 0.18H, BC and DA are non-inductive resistances of 1 k ohm each and CD consists of a resistance R in series with a capacitor C. A potential difference of 5 V at a frequency of $5000/2\pi$ is applied between points A and C. Determine the values of R and C.
6. (a) Explain the measurement of iron losses through Wattmeter method with setup and derive the expression for total iron losses.
   (b) The Coil of instrument has 42.5 turns. The mean width of the coil is 2.5cm and the axial length of the coil is 2 cm. If the flux density is 0.1 Wb/m2, Calculate the torque on the moving coil in NM
7. (a) With a help of functional block diagram, explain the operation of a Cathode Ray Oscilloscope.
   (b) Describe the principle of operation of LUX meter

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Subject Code: R16EE3104

III B.Tech I Semester Supple Examinations, March-2025

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) List different registers of 8086 microprocessor
   (b) Explain the different minimum mode pins of 8086 microprocessor
   (c) What is an assembler?
   (d) Differentiate between BSR and I/O modes of 8255 PPI
   (e) What is the significance of PSEN pin of 8051 microcontroller?
   (f) List out applications of Microcontroller

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

PART-B

4 X 12 = 48

2. (a) What is the length of the instruction Queue in 8086? Discuss the use of the queue. Explain the reason for limiting the length of the queue
   (b) List out the difference between 80386 and 80486

3. (a) Draw the timing diagrams of minimum mode read operation and explain in detail
   (b) Explain the data transfer instructions with examples

4. (a) Define addressing mode and explain different addressing modes presented in 8086 microprocessor
   (b) Explain the data transfer instructions with examples

5. (a) Draw the 8257 DMA architecture and explain its operation along with register organization of DMA
   (b) Draw the internal architecture of 8259 PIC and explain the operation of each block in detail

6. (a) Write the salient features of 8051 family of microcontrollers
   (b) Draw the architecture of 8051 Microcontroller and explain its futures in detail.

7. (a) Explain the concept of Keyboard Interfacing of 8051 microcontroller along with diagram
   (b) Write short notes on ADC and DAC Interfacing.

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Subject Code: R16EE3105

III B.Tech I Semester Supple Examinations, March-2025

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) What are the major classifications of the signal.
   (b) What are the types of Fourier series? Write down the exponential form of the Fourier series representation of a periodic signal?
   (c) State and prove Convolution in time domain.
   (d) Explain in detail discrete time signal and continuous time signal.
   (e) Test whether the signal $y(t) = ax(t) + b$ is linear or nonlinear.
   (f) What is sampling theorem and what are its applications?

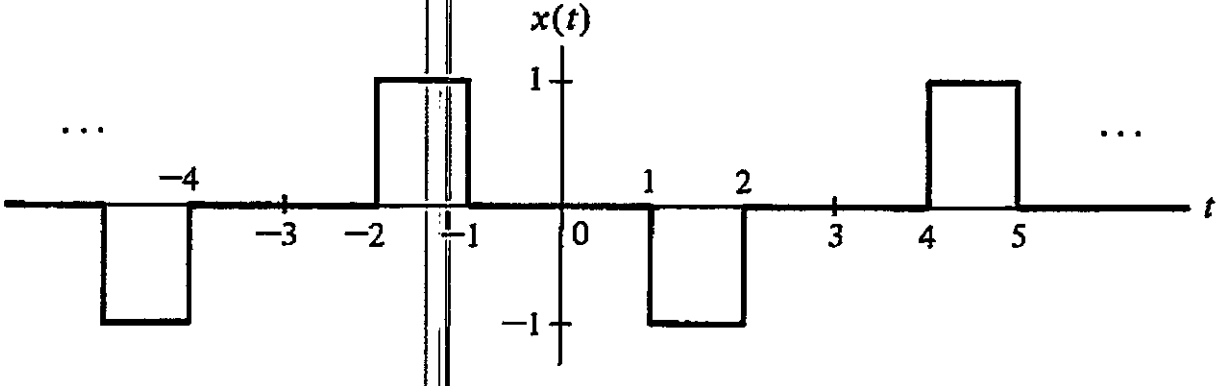
[2+2+2+2+2+2]

PART-B

4 X 12 = 48

2. (a) Differentiate between even and odd signals. How do these classifications aid in signal processing, and what mathematical properties can be exploited when dealing with even or odd signals? [8m]
   (b) Determine whether the following signals are energy or power signals
   i)$x(t)=tu(t)$ ii)$x(t)=u(t)e^{-at}$ [4m]

3. (a) By evaluating the Fourier series analysis equation, determine the Fourier series for the following signal. [12m]



4. (a) Derive the expressions for the trigonometric Fourier series coefficients [6m]
   (b) Prove that for a signal, auto correlation function and power spectral density forms a Fourier transform pair. [6m]

5. (a) State and prove the following properties of Fourier transform.
   (i) Multiplication in time domain. [4M]
   (ii) Linearity. [4M]
   (iii) Frequency shifting [4M]

6. (a) Define following properties of a continuous time system with simple examples. (i) Linearity and Non-linearity (ii) Time variance and Time invariance [6M]
   (b) Examine the following systems with respect to above properties. i. $y(t)=\sin\left[x(t)\right]$ (ii). $y(t)=sint.\left[x(t)\right]$ [6M]

7. A continuous time signal is given as: x(t) = 8 cos200πt Determine [12M]
   i. Minimum sampling rate
   ii. If fs=400Hz what is discrete time signal obtained after sampling.
   iii. If fs=150Hz what is discrete time signal obtained after sampling.

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Kotappakonda Road, Yellamanda (P.O), Narasaraopet- 522601, Guntur District, AP.

Subject Code: R16EE3106

III B.Tech I Semester Supple Examinations, March-2025

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) Discuss briefly about the limitations of renewable energy sources.
   (b) Give the application of Concentrating type Solar Energy Collectors
   (c) Explain the terms Lift force and Drag force w.r.t air flow over the blades of wind turbine.
   (d) What are the different sources of Geothermal energy.
   (e) Explain about the selection of materials for thermos electric power generation.
   (f) Write the advantages of MHD power generation.

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

PART-B

4 X 12 = 48

2. (a) Distinguish between Renewable sources and Non-renewable sources.
   (b) Write short notes on solar radiation on tilted surfaces.

3. (a) What are latent heat storage systems? Explain
   (b) Discuss different applications of solar Photovoltaic energy.

4. (a) Explain with a neat sketch the working of a wind energy systems(WECS) with main components
   (b) What is the difference between biomass and biogas? And how does bio mass conversion takes place?

5. (a) What are the merits and demerits of geothermal energy?
   (b) What are the important components of a tidal power plant?

6. (a) Explain about the Criterion for selection of material for thermo electric generators
   (b) Explain briefly about Seebeck effect, Thompson effect with relevant expressions.

7. (a) Explain the principle of MHD power generation system.
   (b) Explain important factors to be considered for selecting materials for MHD generator.

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Narasaraopeta Engineering College (Autonomous)

Kotappakonda Road, Yellamanda (P.O), Narasaraopet- 522601, Guntur District, AP.

Subject Code: R16ME3102

III B.Tech I Semester Supple Examinations, March-2025

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) Sketch the different processes of Rankine cycle on a T-S diagram.
   b) Write few advantages of water level indicator.
   c) Discuss the working of a thermodynamic nozzle.
   d) Explain principle of impulse turbine.
   e) How the steam flow in a turbine is measured?
   f) Differentiate between thrust power and propulsive power.

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

PART –B

2. a) What is reheating? What the advantages of reheat Rankine cycle? [6]
   b) Explain the classification of steam boilers [6]

3. a) Explain the working of Babcock and Wilcox boiler with the help of a neat sketch [6]
   b) Define chimney efficiency and derive an expression for the same. [6]

4. In a steam power cycle, steam at 20 bar, 350°C is expanded to 0.1 bar. It then enters a condenser, where it is condensed to saturated liquid water. The pump feeds back the water into the boiler. Assume ideal processes; calculate per kg of steam the net work and cycle efficiency. [12]

5. In a single row impulse turbine the nozzle angle is 25° and the blade speed is 220 m/s. The steam speed is 540 m/s. The blade friction eco-efficient is 0.84. Assuming axial exit and a flow rate of 715 kg/hr, determine:
   (i) Blade angles,
   (ii) Absolute velocity of steam at exit, and
   (iii) The power output of the turbine. [12]

6. a) Describe with neat sketches the different types of a surface condensers [6]
   b) Discuss forced draught and induced draught systems used for cooling towers [6]

7. a) Explain the classification of rockets with neat sketches. [6]
   b) Explain about the open cycle and closed cycle turbines with neat sketches [6]

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Narasaraopeta Engineering College (Autonomous)

Kotappakonda Road, Yellamanda (P.O), Narasaraopet- 522601, Guntur District, AP.

Subject Code: R16ME3104

III B.Tech I Semester Supple Examinations, March-2025

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) Why is material selection important in the design of a product for manufacturing?
   (b) Define endurance limit?
   (c) What are the main types of riveted joints and where are they commonly used?"
   (d) List out the various types of stresses induced in shafts.
   (e) What is a split muff coupling, and what are its main advantages?
   (f) Define the term 'spring constant' and its significance in the context of Hooke's Law."

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

PART-B

4 X 12 = 48

2. (a) Discuss the key design considerations for casting, welding, and machined parts to ensure manufacturability and performance." [6]
   (b) Explain the concept of the limit system and describe the different types of fits with examples." [6]

3. (a) Explain the impact of fluctuating loads on machine components and describe the methods used to evaluate and design for fatigue failure. Include the significance of stress concentration factors, S-N curves, and fatigue strength [4]
   (b) "A steel rod of diameter 20 mm is subjected to a completely reversed bending stress. The ultimate tensile strength of the material is 600 MPa. Determine the endurance limit of the rod using the modified Goodman method, considering the following factors: surface factor = 0.85, size factor = 0.9, reliability factor = 0.868, and load factor = 1. The rod is designed for infinite life. Assume the endurance limit for the material in the unmodified condition is 0.5 times the ultimate tensile strength." [8]

4. (a) A structural beam is to be designed using a riveted joint to connect two plates. The dimensions of the plates are 100 mm wide and 10 mm thick. The allowable shear stress for the rivets is 100 MPa, and the allowable bearing stress on the plates is 120 MPa.

Given: The load applied to the beam is 50 kN. And The rivets used are of 12 mm diameter.

1. Calculate the number of rivets required based on the shear strength.
2. Verify if the rivet configuration satisfies the bearing stress criteria on the plates.
3. Determine if the design is adequate based on the given conditions. [8]

(b) what are the advantages of welded joints over rivetted joints [4]

5. (a) A circular shaft with a diameter of 50 mm is subjected to a torque of 200 Nm and an axial load of 10 kN. The shaft is made of a steel material with an ultimate tensile strength (UTS) of 600 MPa and a yield strength (YS) of 350 MPa.
   1. Calculate the maximum shear stress in the shaft due to the applied torque.
   2. Determine the axial stress in the shaft due to the applied axial load.
   3. Use the Maximum Shear Stress Theory to check if the shaft will fail under the given loading conditions. Consider the factor of safety (FoS) to be 2. [8]

   (b) "What is a spigot cotter joint? Describe its components, working principle, and applications." [4]

6. (a) A machinery setup consists of two shafts connected by a rigid coupling. The first shaft has a diameter of 40 mm, and the second shaft has a diameter of 50 mm. The setup is subjected to a torque of 150 Nm. The materials used for the shafts are both mild steel, with a yield strength of 250 MPa.
   1. **Calculate the maximum shear stress in each shaft due to the applied torque.**
   2. **Determine whether each shaft is safe under the applied loading conditions by calculating the factor of safety.**
   3. **Discuss the advantages and disadvantages of using rigid couplings in machinery applications.**

   [12]

7. (a) A helical spring is designed to support a load in a mechanical application. The spring has a mean diameter of 100 mm, consists of 10 coils, and is made of steel with a modulus of rigidity (shear modulus) of 80 GPa The wire diameter is 10 mm
   1. **Calculate the spring stiffness (stiffness constant) of the helical spring.**
   2. **Determine the maximum load the spring can support if the allowable shear stress is 150 MPa**
   3. **Discuss the significance of spring stiffness in mechanical design** **[12]**

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Narasaraopeta Engineering College (Autonomous)

Kotappakonda Road, Yellamanda (P.O), Narasaraopet- 522601, Guntur District, AP.

Subject Code: R16ME3105

III B.Tech I Semester Supple Examinations, March-2025

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) Briefly discuss about any two types of operations research models.
   (b) What is the Travelling Salesman Problem?
   (c) What is the key difference between PERT and CPM?
   (d) Explain the significance of queuing theory in operations research?
   (e) What is the minimax criterion in game theory?
   (f) What is mean by a stochastic simulation model. Give an example.

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

PART-B

4 X 12 = 48

2. Use Big-M method to solve the following LPP.
   Minimize $Z = 12x_1 + 20x_2$
   Subjected to $6x_1 + 8x_2 \geq 100$, $7x_1 + 12x_2 \geq 120$ and $x_1, x_2 \geq 0$

3. There are four jobs to be assigned to the machines. Only one job could be assigned to one machine. The amount of time in hours required for the jobs in a machine are given in the following table.

Job	Machines				
	A	B	C	D	E
1	4	3	6	2	7
2	10	12	11	14	16
3	4	3	2	1	5
4	8	7	6	9	6

4. The following information is given. Draw the network diagram and calculate

   a) Variance of each activity
   b) Critical path and expected project completion time
   c) The probability that the project will be completed in 1 week later than the expected time
   d) The probability that the project will be completed 2weeks earlier than the expected date.

Activity	1-2	2-3	2-4	3-5	4-6	5-6	5-7	6-7
Optimistic time(weeks)	3	3	2	4	4	0	3	2
Most likely time(weeks)	3	6	4	6	6	0	4	5
Pessimistic time(weeks)	3	9	6	8	8	0	5	8

5. Cars arrive at a toll gate according to Poisson distribution with mean 90 per hr. Average time for passing through the gate is 38 seconds. Drivers complain of long waiting time. Authorities are willing to decrease the passing time through the gate to 30 seconds by introducing new automatic devices. This can be justified only if under the old system the number of waiting cars exceeds 5. In addition, the percentage of the gate's idle time under the new system should not exceed 10%. Can the new device be justified?

6. Players A and B play a game in which each player has 3coins (20p, 25p, 50p). Each of them selects a coin without the knowledge of the other person. If the sum of the values of the coins is an even number, A wins B's coin. If that sum is odd number, B wins A's coin. Develop a payoff matrix with respect to player A. Also find the optimal strategies of the players & value of the game.

7. Describe the Phases of Simulation in the Modelling Process

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Narasaraopeta Engineering College (Autonomous)

Kotappakonda Road, Yellamanda (P.O), Narasaraopet- 522601, Guntur District, AP.

Subject Code: R16EC3101

III B.Tech I Semester Supple Examinations, March-2025

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 out the AC characteristics of op-amp.
   (b) What are the applications of ADC?
   (c) What is the significance of VCO in PLL?
   (d) How to drive CMOS gate to TTL gate?
   (e) How to convert JK flip-flop to D flip flop?
   (f) List different types of memories.

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

PART-B

4 X 12 = 48

2. (a) How op-amp is used as a differentiator? Explain. [4M]
   (b) Explain the working of non-inverting amplifier and derive the equation of its Gain. [8M]

3. (a) Explain the working of R-2R ladder DAC with neat circuit diagram. [6M]
   (b) Discuss the working of dual slope ADC with neat circuit diagram. [6M]

4. (a) Briefly discuss the Voltage Controlled Oscillator (VCO). [6M]
   (b) List the PLL applications in detail. [6M]

5. (a) Discuss the Diode and transistor logic with neat diagrams. [8M]
   (b) Comparison of CMOS, TTL and ECL. [4M]

6. (a) Design a Priority encoder circuit and which 74XX series IC is used for it. [6M]
   (b) Design a synchronous counter using 74XX ICs and explain its working with neat timing waveforms. [6M]

7. (a) Discuss about synchronous SRAMS internal structure briefly. [6M]
   (b) Write a VHDL programming for all logic gates using data flow modelling. [6M]

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Narasaraopeta Engineering College (Autonomous)

Kotappakonda Road, Yellamanda (P.O), Narasaraopet- 522601, Guntur District, AP.

Subject Code: R16EC3103

III B.Tech I Semester Supple Examinations, March-2025

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 efficiency of an antenna.
   (b) What is short magnetic dipole?
   (c) What is the advantage of terminating travelling wave antenna at one end other than feed?
   (d) What is zoning for Lens antenna?
   (e) In which frequency range space wave propagation is useful?
   (f) Define MUF.

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

PART-B

4 X 12 = 48

2. (a) Explain about radiation mechanism in a single wire. [6M]
   (b) Define Directivity and Power Gain of an Antenna. Estimate power gain (Gp) if R_{loss} = 10 ohms, R_{rad} = 0 ohms and D = 100. [6M]

3. (a) Compare monopole antennas and dipole antennas. [6M]
   (b) What are the main characteristics of a radiated wave in far field region? The components of a wave in far field region are E_θ=3mV/m and E_ϕ=4mV/m. Calculate the total electric and magnetic field in free space. [6M]

4. (a) Show that the directivity can be improved by using *n* elements in broadside or end fire array.
   (b) Prove that the level of secondary lobe is -13.5 dB below that of major lobe in a uniform linear array. [6M]

5. (a) Describe the characteristics of long wire travelling wave antennas; sketch their patterns for different lengths. [6M]
   (b) Explain the design considerations for monofilar helical antennas in various modes. [6M]

6. (a) What is the principle of equality of path length? How it is applicable to horn antenna? Obtain an expression for the directivity of pyramidal horn in terms of its aperture dimensions. [6M]
   (b) Design a microstrip antenna at operating frequency of 2 GHz and ε_r =2.2. Assume any other required data. [6M]

7. (a) Explain the "wave tilt of surface waves" in ground wave propagation. [6M]
   (b) Find the range of LOS system when the receive antenna and transmit antenna heights are 10 m and 100 m respectively. Take the effective earth's radius into consideration. [6M]

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Narasaraopeta Engineering College (Autonomous)

Kotappakonda Road, Yellamanda (P.O), Narasaraopet- 522601, Guntur District, AP.

Subject Code: R16EC3104

III B.Tech I Semester Supple Examinations, March-2025

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) Express the binary numbers from 0000 to 1111 in singed magnitude, 1's complement, and 2's complement forms. Write the observations
   (b)What categories of data are commonly supported by user-visible registers? Briefly explain the register organization of the processor.
   (c) Write the difference between isolated I/O and memory-mapped I/O. What are the advantages and disadvantages of each?
   (d) Explain the Register organization of 8086.
   (e) Describe the working of a stack in 8086.
   (f) Why stepper motor is required in industrial applications and explain.

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

PART-B

4 X 12 = 48

2. (a) Interpret the words computer architecture and computer organization. Relate the attributes with suitable examples
   (b) Discuss the possible ways of representing the floating-point numbers in computer memory with examples.

3. Explain the Addressing modes with an example for each.

4. What are the different types of Memories used in computer systems and explain their properties.

5. Draw and explain the architecture of 8086 in detail.

6. (a) Write an ALP to perform all Athematic operations in 8086
   (b) Sketch the interrupt structure of 8086 and represent the memory required for the interrupts and explain.

7. (a) Describe the control word format of 8255 in I/O and BSR mode.
   (b) Explain the interfacing of 8251 with 8086 with the necessary circuit diagram.

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