B.Tech.(III Sem.)(R17) (Suppl.)

# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)

A.Y. 2019-20

## B.Tech. (III Semester) (R17) Supplementary Examinations, November 2020

## TIME TABLE

**TIME : 2.00 PM to 5.00 PM**

| DATE | ASE | CE | CSE | ECE | EEE | EIE | IT | ME |
|---|---|---|---|---|---|---|---|---|
| 23-11-2020 (Monday) | 17FE07 - Numerical Methods and Fourier Analysis | 17FE07 - Numerical Methods and Fourier Analysis | 17FE08 - Probability and Statistics | 17FE07 - Numerical Methods and Fourier Analysis | 17FE07 -Numerical Methods and Fourier Analysis | 17FE07 - Numerical Methods and Fourier Analysis | 17FE07 - Numerical Methods and Fourier Analysis | 17FE07 - Numerical Methods and Fourier Analysis |
| 24-11-2020 (Tuesday) | 17AE01 - Engineering Fluid Mechanics | 17EE51 - Fundamentals of Electrical Engineering | 17FE03 - Environmental Science | 17CI01 - Computer Programming | 17EE02 - Electric and Magnetic Fields | 17FE03 - Environmental Science | 17FE03 - Environmental Science | 17FE03 - Environmental Science |
| 25-11-2020 (Wednesday) | 17AE02 - Engineering Thermodynamics | 17CE04 - Strength of Materials - I | 17CI03 - Discrete Mathematical Structures | 17EC05 - Signals and Systems | 17EE03 - Network Theory - I | 17EE53 - Electrical Technology | 17CI07 - OOPs through Java | 17EC50 - Basic Electronics Engineering |
| 26-11-2020 (Thursday) | 17AE03 - Strength of Materials | 17CE05 - Engineering Geology | 17CI04 - Python Programming | 17EC06 - Random Variables and Stochastic Processes | 17EE04 - Digital Logic Circuit Design | 17EI02 - Transducers | 17IT01 - Operating System Principles | 17ME03 - Thermodynamics |
| 27-11-2020 (Friday) | 17AE04 - Elements of Aerospace Engineering | 17CE06 - Mechanics of Fluids | 17CI05 - Data Structures | 17EC07 - Pulse and Switching Circuits | 17CI05 - Data Structures | 17EC03 - Analog Electronic Circuits | 17CI02 - Digital Logic Design | 17ME04 - Mechanics of Solids |
| 28-11-2020 (Saturday) | 17ME05 - Metallurgy and Material Science | 17CE07 - Concrete Technology | 17CI06 - Computer Architecture | 17EC08 - Analog Integrated Circuits | 17EE05 - Power Generation and Utilization | 17EC04 - Digital Electronic Circuits | 17CI09 - Data Base Management Systems | 17ME05 - Metallurgy and Material Science |
| 30-11-2020 (Monday) | 17PD03 - Professional Ethics and Human Values | 17PD03 - Professional Ethics and Human Values | --- | 17PD03 - Professional Ethics and Human Values | 17PD03 - Professional Ethics and Human Values | --- | --- | --- |

NOTE: (i) Any omissions or clashes in this time table may please be informed to the Controller of Examinations immediately.
(ii) Even if government/JNTUK/College declares holiday on any of the above dates, the examinations shall be conducted as notified only.
(iii) For any clarification in respect of the above examinations, please contact the Controller of Examinations.

Date: 09-11-2020

CONTROLLER OF EXAMINATIONS

PRINCIPAL

Copy to: 1. All H.o.Ds for N.A.
2. All Notice Boards

| H.T.No | | | | | | | | | | |
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R17

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)
L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.::A.P.

B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

**17FE07-NUMERICAL METHODS AND FOURIER ANALYSIS**
(ASE,CE,ECE,EEE,EIE,IT&ME)

Time : 3 hours Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks

| Q.No | Questions | Marks | CO | BL |
|---|---|---|---|---|
| 1(a) | Calculate a root of the equation $xe^x = \cos x$ by the method of False Position. | 6M | CO1 | L2 |
| (b) | Evaluate $\int_0^1 e^{-x^2} dx$ taking h = 0.2 using Trapezoidal rule. | 6M | CO1 | L2 |
| | **(OR)** | | | |
| 2(a) | Evaluate $\int_0^1 \frac{1}{1+x^2} dx$ by dividing the interval (0,1) in to four equal parts by using Simpsons one-third rule. | 6M | CO1 | L2 |
| (b) | Find a root of the equation $x + \log x = 2$ by Newton-Raphson method | 6M | CO1 | L2 |
| | | | | |
| 3(a) | Find $y$ when $x$ =1.35 using gauss backward interpolation formula from the following table<br>x: 1 \| 1.2 \| 1.4 \| 1.6 \| 1.8 \| 2<br>y: 0.0 \| -0.112 \| -0.016 \| 0.336 \| 0.93 \| 2 | 6M | CO2 | L2 |
| (b) | Find the interpolation polynomial for the following data<br>$x$: 0 \| 1 \| 2 \| 5<br>$f(x)$: 2 \| 3 \| 12 \| 147 | 6M | CO2 | L2 |
| | **(OR)** | | | |
| 4(a) | Given $\sin 45^0 = 0.7071$, $\sin 50^0 = 0.7660$, $\sin 55^0 = 0.8192$ and $\sin 60^0 = 0.8660$. Find $\sin 52^0$ using Newton's interpolation formula. | 6M | CO2 | L2 |
| (b) | If the interval difference is unity, prove that $\Delta \tan^{-1}\left(\frac{n-1}{n}\right) = \tan^{-1}\left(\frac{1}{2n^2}\right)$ | 6M | CO2 | L2 |
| | | | | |
| 5(a) | By using RK-third order formula find $y(0.25)$ when $\frac{dy}{dx} = 1 + xy$ and $y(0) = 1$. | 6M | CO3 | L2 |

| | | | | |
|---|---|---|---|---|
| (b) | Solve the differential equation $\frac{dy}{dx} = x + y$ subject to y(0) =1 and by Picard's method and hence find y(0.2) | 6M | CO3 | L3 |
| | **(OR)** | | | |
| 6. | Apply Euler method to find the solution of $\frac{dy}{dx} = \frac{y-x}{y+x}$, with $y(0) = 1$ for $0 \le x \le 0.1$ with h= 0.025 | 12M | CO3 | L3 |
| | | | | |
| 7(a) | Fit a Straight line $y = a + bx$ to the following data by the method of least squares.<br>x: 0, 1, 2, 3, 4<br>y: 1.0, 1.8, 3.3, 4.5, 6.3 | 6M | CO4 | L4 |
| (b) | Fit an equation of the form $y = ab^x$ to the following data by the method of least squares.<br>x: 2, 3, 4, 5, 6<br>y: 144, 172.8, 207.4, 248.8, 298.5 | 6M | CO4 | L4 |
| | **(OR)** | | | |
| 8. | Fit a second degree parabola to the following data using method of least squares.<br>x: 0, 1, 2, 3, 4<br>y: 1, 1.8, 1.3, 2.5, 6.3 | 12M | CO4 | L3 |
| | | | | |
| 9(a) | Find the Fourier series for $f(x) = 2x - x^2$ *in* $0 < x < 3$. | 6M | CO5 | L3 |
| (b) | Find the Fourier transform of f(x) defined by f(x) = $e^{\frac{-x^2}{2}}$, $-\infty < x < \infty$ | 6M | CO5 | L3 |
| | **(OR)** | | | |
| 10(a) | Find the Fourier sine transform of $f(x) = \frac{e^{-ax}}{x}$ and deduce that $\int_0^\infty \frac{e^{-ax} - e^{-bx}}{x} \sin sx\, dx = \tan^{-1}\left(\frac{s}{a}\right) - \tan^{-1}\left(\frac{s}{b}\right)$ | 6M | CO5 | L3 |
| (b) | Obtain the Fourier series for $f(x) = x - x^2$ in the interval $(-\pi, \pi)$ hence show that $\frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \cdots = \frac{\pi^2}{12}$ | 6M | CO5 | L2 |

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L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.::A.P.

B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

**17AE01-ENGINEERING FLUID MECHANICS**
(AE)

Time : 3 hours JC7 Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks
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**UNIT-I**

1(a) The space between two parallel plates kept 3 mm apart is filled with an oil of dynamic viscosity 0.2 Pa.s. What is the shear stress on the lower fixed plate, if the upper plate is moved with a velocity of 1.5m/s? [6M]

(b) Find the absolute pressure at a depth of 5 m below the surface of a liquid of relative density of 0.85. The barometer reading on the surface is 750 mm of mercury. [6M]

**(OR)**

2(a) Derive the expression for pressure at any given altitude for the earth's atmosphere within the troposphere. [6M]

(b) Calculate the atmospheric pressure at an elevation of 3500 m above sea level, given the temperature and atmospheric pressure at sea level to be 288 K and 101325 Pa respectively. [6M]

**UNIT-II**

3(a) Check whether the stream function $\psi = 5xy$ is irrotational and if so, determine the corresponding potential function $\varphi$. [6M]

(b) Drive the acceleration of a fluid particle in a velocity field and give detailed physical explanation of each term. [6M]

**(OR)**

4(a) Water flows at a uniform velocity of 3 m/s into a nozzle that reduces the diameter from 10 cm to 2 cm. Calculate the water velocity leaving the nozzle and the flow rate. [6M]

(b) Verify whether the following stream functions represent irrotational flow

i) $\psi = y^2 - x^2$ ii) $\psi = Ax^2y^2$ iii) $\psi = Ax = By^2$ [6M]

**UNIT-III**

5 Derive the Hagen Poiseuille relations for flow through pipe having length L, diameter D, head loss $h_f$, fluid viscosity $\mu$, fluid density $\rho$ and flow rate of Q. [12 M]

**(OR)**

6(a) Define and express Hydraulic diameter for flow through pipes. [6M]

(b) Explain the following dimensionless number
a) Reynolds number b) Froude's number c) Euler's number
d) Weber number e) Mach number. [6M]

**UNIT-IV**

7(a) Explain the construction and working of Francis Turbine with neat sketch. [6M]

(b) Draw the inlet and outlet velocity triangles of Francis turbine. Consider the discharge at outlet is radial and vane is radial at inlet. [6M]

**(OR)**

8(a) The runner of a reaction turbine running at 200 rpm has internal and external diameter 0.5 m and 1 m respectively. The flow is inward with the inlet guide angle of 10 degrees to the tangent to the wheel. The discharge at outlet is radial. The flow velocity at inlet and outlet are the same and is 2 m/s. The width of the turbine at inlet is 0.25 m. Find the runner blade angles and width of the runner at outlet. [6M]

(b) Define and express unit speed, unit discharge and unit power of hydraulic turbine. [6M]

**UNIT-V**

9(a) A single acting reciprocating signal running at 50 rpm has a stroke length of 0.25m.The delivery and suction heads are 50m and 5m. The piston diameter is 0.15m. Find discharge capacity of pump in $m^3$/sec. What is the theoretical power required to operate the pump? [6M]

(b) Derive an expression for specific speed of a centrifugal pump. [6M]

**(OR)**

10(a) A centrifugal pump is running at 1000rpm. The outlet vane angle of impeller is $45^0$ and velocity of flow at outlet is 2.5 m/s, when the pump is working against a total head of 20m. If the manometric efficiency of the pump is 80%, determine a) diameter of the impeller and b) width of the impeller at the outlet. [6M]

(b) A 5kW electric motor is used for pumping water from a well with a depth of 30 m. Find the overall efficiency of the centrifugal pump, if discharge from the pump is 1.25 litre/s. [6M]

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B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

**17AE02-ENGINEERING THERMODYNAMICS**
(AE)

Time : 3 hours | Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks
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**UNIT-I**

1(a) What you understand by thermodynamic equilibrium? Explain. [6M]

(b) A certain thermometer is calibrated using the ice (i) and steam (s) points as fixed points at a temperature of 0°C and 100°C respectively. The function of thermometric substance is taken as t = a log x + b instead of linear function p = ax + b. show that [6M]

$$t = 100\,\frac{\log\frac{x}{x_i}}{\log\frac{x_s}{x_i}}$$

**(OR)**

2(a) Why does free expansion has zero work transfer? Explain. [6M]

(b) A piston-cylinder device initially contains 0.07 $m^3$ air at 130 kPa and 180°C. The nitrogen is now expanded to a pressure of 80 kPa polytropically with polytropic exponent whose value is equal to specific heat ratio (called isentropic expansion). Determine the final temperature and the boundary work done during the process. [6M]

**UNIT-II**

3(a) Apply first law of thermodynamics and prove that internal energy is a property of system. [6M]

(b) A gas of 4 kg contained in a piston-cylinder machine. The gas undergoes a process for which $PV^{1.5}$ = C.The initial conditions are 3 bar, 0.1 $m^3$ and the final volume is 0.2 $m^3$. The specific internal energy of the gas decreases by 4.6 kJ/kg. There are no significant changes in potential energy and kinetic energy. Determine the net heat transfer for the process. [6M]

**(OR)**

4(a) A turbine operates under steady flow conditions, receiving steam at the following state: pressure 1.2 Mpa, temperature 188°C, velocity 33.3 m/s. The steam leaves the turbine at the following state: pressure 20 kPa, velocity 100 m/s. Heat is lost to the surroundings at the rate of 2.09 kJ / s. If the rate of steam flow through the turbine is 0.42kg/s. What is the power output of the turbine in kW? [6M]

(b) Derive the steady flow energy equation for flow through nozzle. State necessary assumptions. [6M]

**UNIT-III**

5(a) Establish the equivalence between Kelvin Planck and Clausius statements. [6M]

(b) A refrigeration plant for a food store operates as a reversed Carnot heat engine cycle. The store is to be maintained at a temperature of – 5°C and the heat transfer from the store to the cycle is at the rate of 5 kW. If heat is transferred from the cycle to the atmosphere at a temperature of 25°C, calculate the power required to drive the plant. [6M]

**(OR)**

6(a) Derive the isentropic relations for ideal gas. [6M]

(b) A heat engine is supplied with 1130 kW of heat at constant temperature of 292°C and rejects heat at 5°C. The following results were obtained. Determine whether the results report a reversible cycle or irreversible or impossible.(i) Heat rejected is 834 kW. (ii) If heat rejected is 556 kW. (iii) If heat rejected is 278 kW. [6M]

**UNIT-IV**

7. Two insulated tanks A and B are connected by a valve. Tank A has a volume of 1 $m^3$ and initially contains oxygen at 300 kPa, 10 °C. Tank B has a volume of 2 $m^3$ and initially contains ethane at 200 kPa, 50 °C. The valve is opened and remains open until the resulting gas mixture comes to a uniform state. Determine the final pressure and temperature. [12M]

**(OR)**

8(a) Discuss the phase change process of pure substance by using Temperature (T)- Entropy(S) diagram. [6M]

(b) A vessel having a capacity of 0.05$m^3$ contains a mixture of saturated water and saturated steam at a temperature of 245°C. The mass of the liquid present is 10kg. Find the following; (i)The pressure, (ii) The mass. (iii)The specific volume, (iv) The specific enthalpy. [6M]

**UNIT-V**

9(a) Derive the expression for thermal efficiency of Otto cycle with the help of P-V and T-S diagrams. [6M]

(b) In a gas turbine plant working on the Brayton cycle, the air at the inlet is at 27°C, 0.1 MPa. The pressure ratio is 6.25 and the maximum temperature is 800°C. Find (i) the compressor work per kg of air, (ii) the turbine work per kg of air, (iii) the heat supplied per kg of air, (iv) the cycle efficiency. [6M]

**(OR)**

10(a) Carnot cycle is not practicable for steam power plant. Justify. [6M]

(b) An engine working on the Otto cycle has an air standard cycle efficiency of 56% and rejects 544kJ/kg of air. The pressure and temperature of air at the beginning of compression are 0.1Mpa and 60°c respectively. Compute (i) the compression ratio of the engine(ii) the work done per kg of air, (iii) the pressure and temperature at end of the compression. [6M]

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# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
## (AUTONOMOUS)

L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.:: A.P.

B.Tech. (III Semester) Regular/Supplementary Examinations

## 17AE03-STRENGTH OF MATERIALS

(AE)

Time : 3 hours | Max. Marks : 60

Answer one question from each unit.

All questions carry equal marks

| Q.No | Questions | Marks |
|---|---|---|
| 1(a) | Define the following (i) Poisson's ratio (ii) modulus of rigidity. An elastic rod of 25 mm in diameter,200 mm long extends by 0.25mm under a tensile load of 40Kn.Find the intensity of stress, strain and the elastic modulus for the material of the rod. | 6M |
| (b) | A reinforced concrete column is 300mm* 300mm in section. The column is provided with 8 bars of 20mm diameter. the column carries a load of 360kn.Find the stress in concrete and the steel bars. Take $E_S=2.1*10^5$ N/mm$^2$ and $E_C=0.14*10^5$ N/mm$^2$. | 6M |
| | **(OR)** | |
| 2(a) | A steel bar 50mm wide,12mm thick and 300mm long is subjected to an axial pull of 84kn.Find the changes in the length, width, thickness and the volume of the bar .Take $E=2*10^5$ N/mm$^2$ and poisons ratio=0.32. | 6M |
| (b) | A bar 12 mm in diameter gets stretched by 3mm under a steady load of 8000N.What stress would be produced in the same bar by a weight of 800N which falls vertically through a distance of 80mm on to a rigid collar at its end? The bar is initially un stressed. Take $E=2*10^5$N/mm$^2$. | 6M |
| | | |
| 3. | The intensity of loading on a simply supported beam of 5m span increases uniformly from 8Kn/m at one end to 16Kn/m at the other end. Find the position and magnitude of the maximum bending moment. Also draw S.F.D and B.M D. | 12M |
| | **(OR)** | |
| 4. | A beam AB 10m long is simply supported at its ends A and B. It carries a UDL of 20Kn/m for a distance of 5m from the left end A and concentrated load of 40kn at a distance of 2m from the right end B. Draw S.F.D and B.M.D for the beam. | 12M |
| | | |
| 5(a) | A cast iron pipe of internal diameter 450mm is 15 mm thick and is supported on a spam of 8m.Find the maximum stress in the pipe when it is full of water. Take specific weight of cast iron is 71600N/m$^3$ and that of water is 9810N/m$^3$. | 6M |
| (b) | A tube of steel of 5mm bore with a wall thickness of 0.5mm is 1m long and is full of mercury. It is placed in a horizontal position supported at its ends. If steel and mercury weigh $7.7*10^{-5}$ N/mm$^3$ and $1.36*10^{-4}$ N/mm$^3$ respectively, find the maximum stress in the tube. | 6M |
| | **(OR)** | |
| 6(a) | In a tensile test, a test piece is 25mm in diameter,200mm gauge length stretched 0.0975mm under a pull of 50,000N.In a torsion test, the same rod twisted 0.025 radian over a length of 200 mm, when a torque of 400Nm was applied. Evaluate the poisons ratio and three elastic moduli for the material. | 6M |

| | | |
|---|---|---|
| (b) | A hollow steel shaft 240 mm external and 160mm internal diameter is to be replaced by a solid alloy shaft. If both the shafts should have the same polar modulus, find the diameter of the latter and the ratio of the torsional rigidities. Take C for steel is 2.4*c for alloy. If alternatively .the 2 shafts should have the same torsional rigidity, find the ratio of their polar moduli. | 6M |
| | | |
| 7(a). | The principal stresses at a point in a bar are 200N/mm² (tensile) and 100N/mm² (compressive).Determine the resultant stress in magnitude and direction on a plane inclined at 60° to the axis of the major principal stress. Also determine the maximum intensity of shear stress in the material at the point. | 6M |
| (b) | A bolt is subjected to an axial pull of 8KN and a transverse shear force of 3KN.Determine the diameter of the bolt required based on (i)Maximum principal stress theory (ii) maximum shear stress theory (iii) maximum strain energy theory take elastic limit in simple tension equal to 270N/mm² and poisions ratio is 0.3 and a factor of safety is 3. | 6M |
| | **(OR)** | |
| 8(a) | A timber beam is simply supported at the ends and carries a concentrated load at mid span. The maximum longitudinal stress is p and the maximum shear stress is q. Find the ratio of the span to the depth of the beam ignoring the self weight of the beam if p=12N/mm² and q=1N/mm².Find the ratio of the span to the depth. | 6M |
| (b) | A simply supported wooden beam of span 1.3m having a cross section 150mm wide by 250mm deep carries a concentrated load w at the center. Allowable working stresses are σ=7N/mm²(bending) q=1N/mm² (Shear ), what is safe load w. | 6M |
| | | |
| 9(a) | A cast iron beam 40mm wide and 80mm deep is simply supported on a span of 1.2m.The beam carries a point load of 15KN at the centre. Find the deflection at the centre. Take E=10800N/mm². | 6M |
| (b) | A steel beam is simply supported at the ends on a span of 8m,and carries a UDL of 8KN/m on the whole span. In addition a connection made to the beam at 5m from the left end exerts a downward load of 80KN together with a clockwise couple of 60KNM acting in the plane of bending of the beam. Determine the location and magnitude of the maximum deflection.$I_{xx}$ for the beam section is $4.79*10^8 mm^4$ and E =200KN/mm² | 6M |
| | **(OR)** | |
| 10(a) | A thin cylinder cube with closed ends has an internal diameter of 50mm and a wall thickness of 2.5mm.The tube is axially loaded in tension with a load of 10KN and is subjected to an axial torque of 500Nm under an internal pressure of 6N/mm².Determine the principal stresses on the outer surface of the tube and the maximum shear stress. | 6M |
| (b) | A pipe of 200mm internal diameter and 100mm thickness contains a fluid at a pressure of 6N/mm² find the maximum and minimum hoop stress across the section. | 6M |

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H.T.No | | | | | | | | | | |

28 NOV 2020

R17

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L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.:: A.P.

B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

## 17ME05-METALLURGY AND MATERIAL SCIENCE

(AE&ME)

Time : 3 hours | Max. Marks : 60

Answer one question from each unit
All questions carry equal Marks

| Q.No | Questions | Marks |
|---|---|---|
| 1. | What is Atomic Packing factor and extend your discussion to find APF to BCC, FCC and HCP structures? | 12M |
| | **(OR)** | |
| 2(a) | What is importance of alloying? Explain Hume Rothery Principles of alloying. | 6M |
| (b) | Compare various types of solid solutions. | 6M |
| 3(a) | Explain Eutectic reaction with a neat sketch. | 6M |
| (b) | Construct the Equilibrium diagram for Bi – Cd System to a scale and find (i) Amount of eutectic in 20% Cd alloy and (ii) Free Cd in 70% alloy with the following data.<br>Melting temperature of Bi is 271°C;<br>Melting temperature of Cd is 321°C,<br>Eutectic Temperature is 144°C;<br>Eutectic Composition is 39.7 % Cd. | 6M |
| | **(OR)** | |
| 4. | Staring from Iron allotropy, Explain Iron – Iron Carbide Equilibrium diagram with a neat sketch. | 12M |
| 5. | Write a short note on<br>(i) Stain less Steel (ii) HSS (iii) Alloy steel (iv) Mild Steel. | 12M |
| | **(OR)** | |
| 6(a) | Discuss the necessity of Aluminum alloys over plain Aluminum and write about Al alloys designation. | 6M |
| (b) | Differentiate Brass and Bronze. | 6M |
| 7(a) | Enumerate the differences between Hot working and Cold working Process. | 6M |
| (b) | Explain TTT diagram of eutectoid steel. | 6M |
| | **(OR)** | |
| 8(a) | What is Hardenability and demonstrate Jominy End quench test? | 6M |
| (b) | Elaborate Age Hardening Process in Detail. | 6M |
| 9(a) | Discuss in detail Hand Lay Up Process. | 6M |
| (b) | Explain Filament Winding Process with a neat sketch. | 6M |
| | **(OR)** | |
| 10. | Classify Composite materials and mention the phenomena, applications and advantages of Metal Matrix composites over other Composites. | 12M |

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30 NOV 2020

H.T.No | | | | | | | | | | |

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B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

**17PD03-PROFESSIONAL ETHICS AND HUMAN VALUES**
(ASE,CE,ECE&EEE)

Time : 3 hours Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks

| Q.No | Questions | Marks | CO | BL |
|---|---|---|---|---|
| 1. | Illustrate an overview on 'engineering ethics'. | 12M | CO1 | L3 |
| | **(OR)** | | | |
| 2(a) | Differentiate the interpretations of Kohlberg's & Gilligan's moral development theories with an example. | 6M | CO1 | L2 |
| (b) | Demonstrate variety of moral issues and also on types of inquiry. | 6M | CO1 | L3 |
| | | | | |
| 3(a) | State the definition of value and list out various types of values. | 6M | CO2 | L1 |
| (b) | Identify the differences between morality and ethics. | 6M | CO2 | L1 |
| | **(OR)** | | | |
| 4(a) | Explain your views on "spirituality in work place". | 6M | CO2 | L2 |
| (b) | Define Civic virtue and explain its advantages. | 6M | CO2 | L2 |
| | | | | |
| 5(a) | Identify various aspects of industrial standards and its purpose. | 6M | CO3 | L1 |
| (b) | Draw the design of an interactive process from the concept 'Engineering as experimentation'. | 6M | CO3 | L4 |
| | **(OR)** | | | |
| 6(a) | Discuss the role of law in engineering. | 6M | CO3 | L2 |
| (b) | Explain the concept 'Codes of Ethics' in detail. | 6M | CO3 | L2 |
| | | | | |
| 7(a) | Define confidentiality. State the moral principles that justify confidentiality. | 6M | CO4 | L1 |
| (b) | Discuss the concept "Conflicts of interest". | 6M | CO4 | L2 |
| | **(OR)** | | | |
| 8(a) | Interpret in detail about occupational crime. | 6M | CO4 | L2 |
| (b) | Illustrate the concept of risk-benefit analysis. | 6M | CO4 | L3 |
| | | | | |
| 9(a) | Describe occupational crime and explain its types. | 6M | CO5 | L1 |
| (b) | Define MNC and state the impact of an MNC in the process of globalization. | 6M | CO5 | L1 |
| | **(OR)** | | | |
| 10(a) | Examine the role of an engineer as expert witness and advisor. | 6M | CO5 | L2 |
| (b) | State how computer can be considered as an object of unethical activity. | 6M | CO5 | L1 |

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# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
## (AUTONOMOUS)

L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.:: A.P.

B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

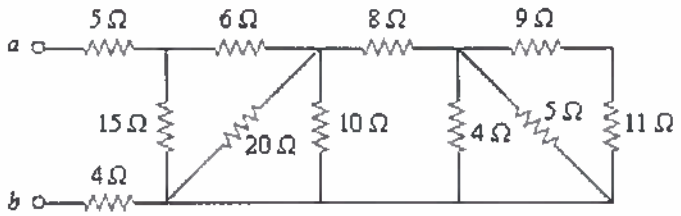
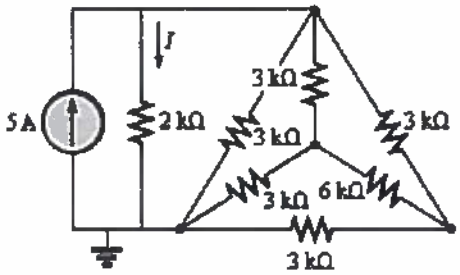
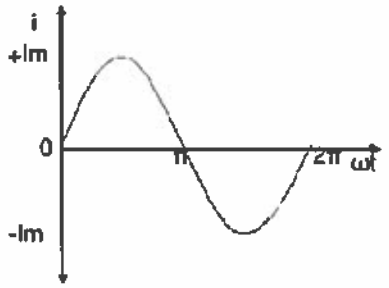
**17EE51-FUNDAMENTALS OF ELECTRICAL ENGINEERING**

(CE)

JC4

Time : 3 hours | Max. Marks : 60

Answer one question from each unit
All questions carry equal marks

| Q.No | Questions | Marks | CO | BL |
|---|---|---|---|---|
| 1(a) | Determine the equivalent resistance between the terminals a and b of fig.   | 6M | CO1 | L3 |
| (b) | Develop necessary equations in converting Star network to Delta network. | 6M | CO1 | L2 |
| | **(OR)** | | | |
| 2(a) | (i) Differentiate Active and Passive elements.<br>(ii) Tabulate V-I relationship across R,L,C elements. | 6M | CO1 | L1 |
| (b) | Find the current I in the network of Fig.   | 6M | CO1 | L3 |
| 3(a) | A sinusoidal voltage V=100 (Sin wt+30⁰) volts is applied to a series RL circuit. The current in the circuit is given by I=5Sin (wt-30°) amps. Determine (i) Apparent power (ii) Power factor (iii) Real power (iv) Reactive power. | 6M | CO1 | L3 |
| (b) | Obtain the Peak factor for the following waveform.   | 6M | CO1 | L2 |
| | **(OR)** | | | |

| | | | | |
|---|---|---|---|---|
| 4(a) | Explain the terms Active power, Reactive power and Apparent power and write down the expression for them. | 6M | CO1 | L1 |
| (b) | A load absorbed Vrms $=110\angle 85^0$ Volts, Irms $=0.4\angle 15^0$ Amps Determine the real and reactive powers consumed and the power factor offered by load. | 6M | CO1 | L2 |
| | | | | |
| 5(a) | Derive the EMF equation of the Transformer from the fundamentals. | 6M | CO2 | L2 |
| (b) | A single phase 50Hz ,25KVA Transformer ishas 250 turns on the primary and 40 turns on secondary winding. Primary is connected to 1500v.Calculate (i) Primary and secondary currents on full load (ii) Secondary EMF (iii) Maximum flux in the core . | 6M | CO2 | L3 |
| | **(OR)** | | | |
| 6(a) | Summarize the working principle of Induction Motor. | 6M | CO2 | L2 |
| (b) | A three phase Induction motor having 6pole running at speed of 970r.p.m connected to 415v, 50Hz supply. Calculate (i) Synchronous speed (ii) Slip (iii) % of Slip (iv) Rotor currents frequency. | 6M | CO2 | L3 |
| | | | | |
| 7(a) | Recommend your suggestion in selecting conductors by comparing the physical properties of Aluminum and copper conductors. | 6M | CO3 | L2 |
| (b) | Describe Electrical safety measures. | 6M | CO3 | L2 |
| | **(OR)** | | | |
| 8(a) | Differentiate Industrial and Non industrial wiring. | 6M | CO3 | L2 |
| (b) | Illustrate Tee system of wiring connection. | 6M | CO3 | L2 |
| | | | | |
| 9(a) | Outline the "Laws of illumination"with necessary equations. | 6M | CO4 | L2 |
| (b) | Differentiate (i) Direct lighting and Indirect lighting schemes (ii) Semi Direct lighting and Semi Indirect lighting schemes. | 6M | CO4 | L2 |
| | **(OR)** | | | |
| 10(a) | Describe construction and working principles of Fluorescent lamp and explain stroboscopic effect in detail. | 6M | CO4 | L2 |
| (b) | A drawing, with an area of 18 × 12 m, is to be illuminated with an average illumination of about 150 lux. The lamps are to be fitted at 6 m height. Calculate the number and size of incandescent lamps required for an efficiency of 20 lumens/W. UF = 0.6, MF = 0.75. | 6M | CO4 | L3 |

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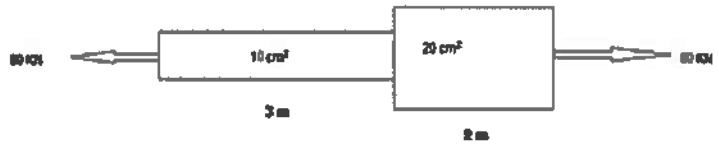
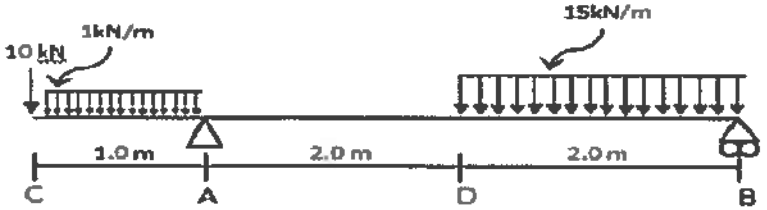
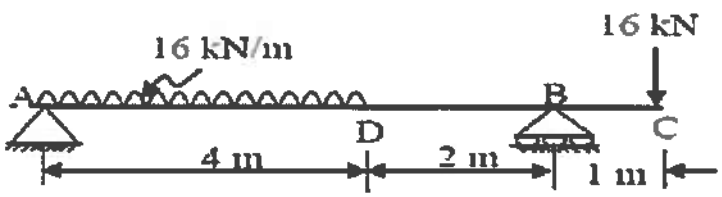
**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING**
**(AUTONOMOUS)**
L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.:: A.P.

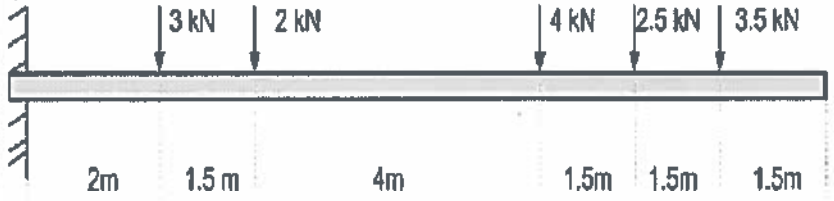
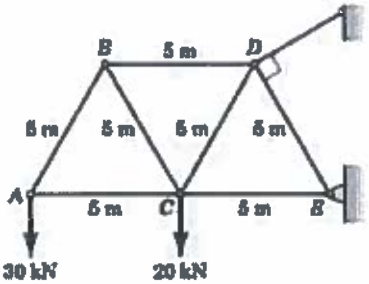
B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

**17CE04-STRENGTH OF MATERIALS-I**
(CE)

Time : 3 hours | Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks

| Q.No | Questions | Marks | CO | BL |
|---|---|---|---|---|
| 1(a) | Define (i) Stress and Strain (ii) Bulk modulus and Modulus of Rigidity (iii) Hooke's Law. | 6M | CO1 | L1 |
| (b) | A rectangular block 350 mm long, 100 mm wide and 80 mm thick is subjected to axial load as follows, 50 KN tensile in direction of length, 100KN compression in the direction of thickness, 60KN tension in direction of breadth. Determine the change in volume of block. Take E=10x10$^5$ N/mm$^2$. Poisson's ratio is 0.25. | 6M | CO1 | L3 |
| | **(OR)** | | | |
| 2(a) | Summarize strain energy, resilience and Proof Resilience. | 6M | CO1 | L2 |
| (b) | A tension bar 5m long is made up of two parts, 3 meter of its length has a cross-sectional area of 10cm$^2$ while the remaining 2 meter has a cross-sectional area of 20 cm$^2$. An axial load of 80 KN is gradually applied. Calculate total strain energy produced in the bar and compare this value with that obtained in a uniform bar of the same length and having the same volume when under the same load. Take E=2x10$^5$ N/mm$^2$.   | 6M | CO1 | L3 |
| | | | | |
| 3(a) | Explain various type of loads, type of supports with reactions and types of Beams. | 6M | CO2 | L2 |
| (b) | Outline Shear Force Diagram and Bending Moment Diagram.   | 6M | CO2 | L4 |
| | **(OR)** | | | |
| 4(a) | Diagram the Shear Force and Bending Moment .   | 6M | CO2 | L3 |

| | | | | |
|---|---|---|---|---|
| (b) | Outline SFD and BMD   | 6M | CO2 | L3 |
| | | | | |
| 5. | The Shear force acting on a beam at an I-Section with unequal flanges is 50 KN. The $I_{N.A}=2.849*10^4$. Calculate shear stress at N.A and also draw the shear stress distribution over the depth of the section. | 12M | CO3 | L3 |
| | **(OR)** | | | |
| 6(a) | Recall the assumptions made in derivation of equation of bending. | 6M | CO3 | L1 |
| (b) | Demonstrate the equation of bending stress distribution across the cross section in a beam subjected to simple bending. | 6M | CO3 | L3 |
| | | | | |
| 7(a) | Predict the maximum torque transmitted by a circular solid shaft. | 6M | CO4 | L3 |
| (b) | Determine the diameter of a solid steel shaft which will transmit 90 KW at 160rpm. Also determine the length of the shaft if the twist must not exceed $1^o$ over the entire length. The maximum shear stress is limited to 60 $N/mm^2$. take $G=8x10^4$ $N/mm^2$. | 6M | CO4 | L3 |
| | **(OR)** | | | |
| 8(a) | Examine the maximum shear stress induced in a close coiled helical spring subjected to an axial load. | 6M | CO4 | L3 |
| (b) | A closely coiled helical spring made of 10 mm diameter steel wire ha 15 coils of 100 mm mean diameter. The spring is subjected to an axial load of 100N. Calculate maximum shear stress induced, deflection and stiffness of the spring. Take $G=8.16x10^4$ $N/mm^2$. | 6M | CO4 | L3 |
| | | | | |
| 9(a) | Illustrate the change in volume of a thin cylindrical shell subjected to internal fluid pressure. | 6M | CO5 | L3 |
| (b) | Determine the maximum and minimum hoop stress across the section of a pipe of 400mm internal diameter and 100mm thick, when the pipe contains a fluid at a pressure of 8 $N/mm^2$. | 6M | CO5 | L3 |
| | **(OR)** | | | |
| 10. | Determine the force in each member of the loaded truss as shown in fig. by method of joints.   | 12M | CO5 | L3 |

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B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

**17CE05-ENGINEERING GEOLOGY**
(CE)

Time : 3 hours Max. Marks : 60

Answer one question from each unit
All questions carry equal marks

| Q.No. | Questions | Marks | CO | BL |
|---|---|---|---|---|
| 1(a) | Interpret the reasons for dividing Seismic Zones in the map of India and demonstrate its application in civil engineering projects. | 6M | CO1 | L2 |
| (b) | Interpret different types of physical / mechanical weathering of rocks with figures. | 6M | CO1 | L2 |
| | **(OR)** | | | |
| 2(a) | Illustrate the role of geology in civil engineering and present a brief account of different branches of geology. | 6M | CO1 | L3 |
| (b) | Earth's interior is layered rather than uniform throughout. Identify different layers with figures. | 6M | CO1 | L1 |
| 3(a) | Illustrate the symmetry elements of Hexagonal crystal system with the help of diagram. | 6M | CO2 | L3 |
| (b) | Interpret the atomic structure of tectosilicates with figures. | 6M | CO2 | L2 |
| | **(OR)** | | | |
| 4(a) | Illustrate importance of the physical property Lustre in identifying minerals. | 6M | CO2 | L3 |
| (b) | Summarize the following with their respective physical properties and uses. (i) Gypsum (ii) Biotite. | 6M | CO2 | L2 |
| 5(a) | Differentiate between concordant and discordant forms of igneous rocks with examples and figures. | 6M | CO3 | L2 |
| (b) | Illustrate the following:<br>(i) Crystallinity in igneous textures (ii) Shale. | 6M | CO3 | L3 |
| | **(OR)** | | | |
| 6(a) | Summarize different textures of metamorphic rocks. | 6M | CO3 | L2 |
| (b) | Identify the following and present an account on their important features: (i) Aa (ii) Diagenesis. | 6M | CO3 | L1 |
| 7(a) | Identify parts of a JOINT with a diagram. | 6M | CO4 | L1 |
| (b) | Illustrate the following with figures:<br>(i) Chevron fold (ii) Nonconformity. | 6M | CO4 | L3 |
| | **(OR)** | | | |
| 8(a) | Differentiate between Normal Fault and Reverse Fault. | 6M | CO4 | L2 |
| (b) | Summarize the following with figures:<br>(i) Symmetric fold (ii) Dip slip fault. | 6M | CO4 | L2 |
| 9(a) | Examine how rock structures influence the selection of a dam site in a faulted terrain with the help of figures and illustration. | 6M | CO5 | L3 |
| (b) | Interpret the following:<br>(i) Underbreak (ii) Concrete fillingin structurally disturbed area. | 6M | CO5 | L2 |
| | **(OR)** | | | |
| 10(a) | Summarize briefly the principle of Radiometric method in civil engineering applications. | 6M | CO5 | L2 |
| (b) | Analyze briefly the conditions when the axis of a tunnel is perpendicular to the beds. | 6M | CO5 | L4 |

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B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

**17CE07-CONCRETE TECHNOLOGY**
(CE)

Time : 3 hours | Max. Marks : 60

Answer one question from each unit
All questions carry equal marks

| Q.No | Questions | Marks | CO | BL |
|---|---|---|---|---|
| 1(a) | Mention various types of cement, indicating briefly the purpose of each type. | 6M | CO1 | L1 |
| (b) | Describe the various tests for determining the quality of aggregate to be used for concreting work. | 6M | CO1 | L2 |
| | **(OR)** | | | |
| 2(a) | Describe the various test for determining the properties of cement. | 6M | CO1 | L2 |
| (b) | Describe the significance of sieve analysis in determining particle size distribution. | 6M | CO1 | L2 |
| | | | | |
| 3(a) | Define workability of concrete, with factors influencing it. | 6M | CO2 | L1 |
| (b) | Explain the procedure of determination of modulus of elasticity of concrete. | 6M | CO2 | L2 |
| | **(OR)** | | | |
| 4(a) | Describe segregation and bleeding of concrete. | 6M | CO2 | L2 |
| (b) | Enumerate different types of shrinkage, with factors influencing it. | 6M | CO2 | L1 |
| | | | | |
| 5(a) | Describe briefly the following method of compaction of concrete.<br>(i) Rodding (ii) Ramming (iii) Tamping. | 6M | CO3 | L2 |
| (b) | Mention the advantages of using silica fumes in manufacturing of cement. | 6M | CO3 | L1 |
| | **(OR)** | | | |
| 6(a) | Discuss various methods of transportation of concrete and their sutability. | 6M | CO3 | L2 |
| (b) | Differentiate between weighing and volumetric batching of concrete. | 6M | CO3 | L3 |
| | | | | |
| 7(a) | Describe Sulphur infiltrated concrete and it's applications. | 6M | CO4 | L1 |
| (b) | Discuss the salient properties of bacterial concrete and its advantages. | 6M | CO4 | L2 |
| | **(OR)** | | | |
| 8(a) | Describe light weight aggregate concrete and it's applications. | 6M | CO4 | L1 |
| (b) | Discuss the following terms (i) Shotcrete (ii) Polymer concrete. | 6M | CO4 | L2 |
| | | | | |
| 9. | Design a concrete mix for reinforced concrete work for the following requirements using IS: 10262-2007<br>Characteristics strength at 28days: 35MPa<br>Exposure condition: Very Severe<br>Degree of workability: 75mm slump<br>Quality control: Very good<br>Cement: OPC (Specific gravity = 2.98)<br>Sand: Zone II (Specific gravity = 2.64)<br>Coarse aggregate: Max size 20mm (angular, Specific gravity = 2.7)<br>Water absorption of coarse aggregate = 0.5%<br>Free surface moisture in sand = 1%<br>Assume any data required. | 12M | CO5 | L6 |
| | **(OR)** | | | |
| 10(a) | Describe the factors considered in mix proportioning. | 6M | CO5 | L1 |
| (b) | Discuss the step by step procedure for mix design of ACI method. | 6M | CO5 | L2 |

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B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

**17FE08-PROBABILITY AND STATISTICS**
(CSE)

Time : 3 hours Max. Marks : 60

Answer one question from each unit
All questions carry equal marks

| Q.No | Questions | Marks | CO | BL |
|---|---|---|---|---|
| 1(a) | State and Prove Baye's Theorem. | 6M | CO1 | L1 |
| (b) | The probability mass function of a random variable $X$ is<br>x: 0, 1, 2, 3, 4, 5, 6<br>P(x): k, 3k, 5k, 7k, 9k, 11k, 13k<br>(i)Find $P(X<4)$, $P(3<X\le 6)$ (ii) What will be the minimum value of k so that $P(X\le 2)>0.3$? | 6M | CO1 | L2 |
| | **(OR)** | | | |
| 2. | An engineering company advertises a job in three papers, *A*, *B* and *C*. It is known that these papers attract undergraduate engineering readerships in the proportions **2:3:1**. The probabilities that an engineering undergraduate sees and replies to the job advertisement in these papers are 0.002, 0.001 and 0.005 respectively. Assume that the undergraduate sees only one job advertisement.<br>(1) If the engineering company receives only one reply to its advertisements, calculate the Probability that the applicant has seen the job advertised in paper.<br>*(i) A (ii) B (iii) C*<br>*(2)* If the company receives two replies, what is the probability that both applicants saw the job advertised in paper *A*? | 12M | CO1 | L2 |
| 3(a) | Derive the mean and variance of a Poisson variate with parameter $\beta$. | 6M | CO2 | L2 |
| (b) | The marks obtained in mathematics by 1000 students are normally distributed with man 78% and standard deviation 11%. Determine (i) What was the highest mark obtained by the lowest 10% of the students? (ii) Within what limits did the middle of 90% of the students lie. | 6M | CO2 | L2 |
| | **(OR)** | | | |
| 4(a) | A hospital switch board receives an average of 4 emergency calls in a 10 minute interval. What is the probability that (i) there are at most 2 emergency calls in a10 minute interval (ii) there are exactly 3 emergency calls in a 10 minutes interval? | 6M | CO2 | L2 |
| (b) | Find the mean and standard deviation of normal distribution in which 7% of items are under 35 and 89% are under 63. | 6M | CO2 | L2 |
| 5. | Samples of 2 are taken from the population 1, 2, 3, 4, 5, 6 with replacement. Find (i) $\mu$ (ii) $\sigma$ (iii) $\mu_{\bar{x}}$ (iv) $\sigma_{\bar{x}}$. | 12M | CO3 | L2 |
| | **(OR)** | | | |

| | | | | |
|---|---|---|---|---|
| 6(a) | The mean height of students in a college is 155 cm and standard deviation is 15. What is the probability that the mean height of 36 students is less than 157cm. | 6M | CO3 | L2 |
| (b) | The mean voltage of a battery is 15 and s.d is 0.2. Find the probability that four such batteries connected in series will have a combined voltage of 60.8 or more volts. | 6M | CO3 | L2 |
| 7(a) | The school nurse thinks the average height of 7th graders has increased. The average height of a 7th grader five yearsago was 145 cm with a standard deviation of 20 cm. She takes a random sample of 200 students and finds that theaverage height of her sample is 147 cm. Are 7th graders now taller than they were before? (Use 0.05 significance level). | 6M | CO4 | L2 |
| (b) | In two large populations, there are 30% and 25% respectively of fair haired people. Is this difference likely to be hidden in samples of 1200 and 900 respectively from the two populations. | 6M | CO4 | L2 |
| | **(OR)** | | | |
| 8(a) | A used car dealer says that the mean price of a 2017 Honda Accord is at least $ 20,500. You suspect this claim is incorrect and find that a random sample of 14 similar vehicle has a mean price of $19,850 and a standard deviation of $1084. Is there enough evidence to reject the dealer's claim at LOS = 0.05. | 6M | CO4 | L2 |
| (b) | A random sample of 10 boys had the following I.Q's: 70,120,110,101,88, 83, 95, 98, 107,100. (i) Do these data support the assumption of a population mean I.Q. of 100. (ii) Find a reasonable range in which most I.Q. values of samples of 10 boys lie. | 6M | CO4 | L2 |
| 9(a) | From the following data calculate the rank correlation coefficient after making adjustment for tied ranks. | 6M | CO5 | L3 |
| (b) | For the following data | 6M | CO5 | L2 |
| 10(a) | In a partially destroyed laboratory record, only the lines of regression of $y$ on $x$ and $x$ on $y$ are available as $4x-5y+33=0$ and $20x-9y-107=0$ respectively. Calculate $\bar{x}$ and $\bar{y}$ and the coefficient of correlation between $x$ and $y$. | 6M | CO5 | L3 |
| (b) | Ten participants in a contest are ranked by two judges as follows: | 6M | CO5 | L3 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| X | 48 | 33 | 40 | 9 | 16 | 65 | 24 | 16 | 57 | 16 |
| Y | 13 | 13 | 24 | 6 | 15 | 20 | 9 | 6 | 19 | 4 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X | 1 | 5 | 3 | 2 | 1 | 1 | 7 | 3 |
| Y | 6 | 1 | 0 | 0 | 1 | 2 | 1 | 5 |

Find the regression line of Y on X and hence predict the value of Y at X=10.

**(OR)**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| x | 1 | 6 | 5 | 10 | 3 | 2 | 4 | 9 | 7 | 8 |
| y | 6 | 4 | 9 | 8 | 1 | 2 | 3 | 10 | 5 | 7 |

Calculate the rank correlation coefficient.

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B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

**17FE03-ENVIRONMENTAL SCIENCE**
(CSE,EIE,IT&ME)

JCY

Time : 3 hours Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks

| Q.No | Questions | Marks | CO | BL |
|---|---|---|---|---|
| 1(a) | Define Environment, explain the scope and importance of environment. | 6M | CO1 | L2 |
| (b) | Population explosion affects the environment seriously, discuss it. | 6M | CO1 | L2 |
| | **(OR)** | | | |
| 2(a) | Explain the effects of AIDS and how do you control it. | 6M | CO1 | L2 |
| (b) | Explain the role of IT in environment and human health. | 6M | CO1 | L2 |
| | | | | |
| 3(a) | Illustrate the various environment ill effects and benefits associated with dams with reference to a case study. | 6M | CO2 | L4 |
| (b) | Discuss the major environmental impacts of mineral extraction. | 6M | CO2 | L2 |
| | **(OR)** | | | |
| 4(a) | Discuss the major uses of forests. How would you justify that ecological uses of forests surpass commercial uses? | 6M | CO2 | L2 |
| (b) | Differentiate between renewable and non-renewable energy resources with appropriate examples. | 6M | CO2 | L2 |
| | | | | |
| 5(a) | Define ecological pyramid. Explain why some of these pyramids are upright while others are inverted in different ecosystems. | 6M | CO3 | L2 |
| (b) | Describe the different types, characteristics features (structure and functions) of forest ecosystem. | 6M | CO3 | L2 |
| | **(OR)** | | | |
| 6(a) | Discuss the major threats faced by Indian biodiversity. | 6M | CO3 | L2 |
| (b) | Compare a wildlife Sanctuary with a National park. Give suitable examples to support your answer. | 6M | CO3 | L5 |
| | | | | |
| 7(a) | Discuss adverse effects and control of water pollution. | 6M | CO4 | L2 |
| (b) | Classify solid waste. What are the sources of urban and industrial solid wastes? | 6M | CO4 | L4 |
| | **(OR)** | | | |
| 8(a) | Explain the effects and control measures of noise pollution. | 6M | CO4 | L2 |
| (b) | Differentiate between Climate change and Global warming. | 6M | CO4 | L2 |
| | | | | |
| 9(a) | Explain the concept of sustainable development | 6M | CO5 | L2 |
| (b) | Discuss the methodology of EIA. | 6M | CO5 | L2 |
| | **(OR)** | | | |
| 10(a) | Explain the concept of Consumerism. | 6M | CO5 | L2 |
| (b) | Discuss the salient features of the Environment (protection) Act, 1986. | 6M | CO5 | L2 |

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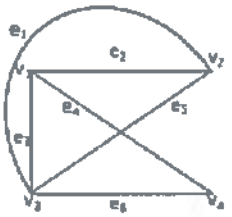
B.Tech. (III Semester) ~~Regular~~ / Supplementary Examinations

**17C103-DISCRETE MATHEMATICAL STRUCTURES**
(CSE)

Time : 3 hours | Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks

| Q.No. | Questions | Marks | CO | BL |
|---|---|---|---|---|
| 1(a) | Construct the truth table for $[(P \vee Q) \wedge \sim R] \leftrightarrow Q$. | 6M | CO1 | L3 |
| (b) | Show that r → s can be derived from the premises p→(q→s), ¬ r V p and q. | 6M | CO1 | L1 |
| | **(OR)** | | | |
| 2(a) | Infer the validity of the following argument $\neg(p \wedge \neg q),\ \neg q \vee r,\ \neg r \Rightarrow \neg p$ | 6M | CO1 | L2 |
| (b) | Let p(x) denote "x is a professional athlete", q(x) denote "x plays soccer". The domain is the set of all people. Interpret each of the following propositions in English. Also build the negation of each of the following expressions (i) $\forall x(p(x) \rightarrow q(x))$ (ii) $\exists x(p(x) \wedge q(x))$ (iii) $\forall x(p(x) \vee q(x))$ | 6M | CO1 | L2 |
| | | | | |
| 3(a) | A Relation R defined over the set of integers Z as a Rb = a – b is a multiple of n. Show that R is an Equivalence relation. | 6M | CO2 | L1 |
| (b) | If A = {1,2,3,4} and R is a relation on A defined by R={(1,2), (1,3),(2,4),(3,2),(3,3),(3,4)}, then find $R^2$ and $R^3$. Also construct their digraphs. | 6M | CO2 | L2 |
| | **(OR)** | | | |
| 4(a) | Let A = {1, 2, 3, 6, 12} and R = {(a, b) /a, b∈A and "a divides b" }, Show that the relation R is a partial order relation and also construct its Hasse diagram. | 6M | CO2 | L2 |
| (b) | Find the inverse of the following functions (i) $f(x) = \frac{x+1}{x}$ ; (ii) $f(x) = x^3 + 2$ & (iii) $f(x) = \frac{2x+3}{5}$ | 6M | CO2 | L1 |
| | | | | |
| 5(a) | Explain (i) subgraph (ii) spanning subgraph and (iii) induced subgraph with suitable examples each. | 6M | CO3 | L2 |

| | | | | |
|---|---|---|---|---|
| (b) | Show whether the following graphs are isomorphic or not.<br>  <br><br>$G_1$ $G_2$ | 6M | CO3 | L1 |
| | **(OR)** | | | |
| 6(a) | Select the Euler trail from the following graph<br>  | 6M | CO3 | L3 |
| (b) | Define chromatic number of a graph. Identify the chromatic numbers of (i) Cycle graph $C_n$, (ii) Complete graph $K_n$ and (iii) Path graph ($P_n$) | 6M | CO3 | L2 |
| | | | | |
| 7(a) | Show that the set G = { 1 , -1 , i ,-i } is a group under multiplication. | 6M | CO5 | L2 |
| (b) | Find the middle term of the expansion $\left(2x-\frac{1}{3x}\right)^{10}$. | 6M | CO5 | L1 |
| | **(OR)** | | | |
| 8(a) | Show that the set of all positive rational numbers forms an abelian group under the composition defined by $a*b=\frac{ab}{4}$. | 6M | CO5 | L2 |
| (b) | State pigeon hole principle. Show that if eight people are in a room, at least two of them have birthdays that occur on the same day of the week. | 6M | CO5 | L1 |
| | | | | |
| 9(a) | Find the coefficient of $x^{10}$ in<br>(i) $(1 + x + x^2 + \ldots)^2$. (ii) $\frac{1}{(1-x)^3}$. | 6M | CO5 | L1 |
| (b) | Solve the recurrence relation $a_n - a_{n-1} - 6a_{n-2} = -30$ with $a_0 = 20$, $a_1 = -5$. | 6M | CO5 | L3 |
| | **(OR)** | | | |
| 10(a) | Solve the recurrence relation $a_n = a_{n-1} + \frac{1}{n(n+1)}$, where $a_0 = 1$ by substitution method. | 6M | CO5 | L3 |
| (b) | Solve the recurrence relation $a_n - 5a_{n-1} + 6a_{n-2} = 2^n$. | 6M | CO5 | L3 |

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L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.:: A.P.
B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

**17CI04-PYTHON PROGRAMMING**
(CSE)

JCK

Time : 3 hours Max. Marks : 60

Answer one question from each unit
All questions carry equal marks

| Q.No | Questions | Marks | CO | BL |
|---|---|---|---|---|
| 1(a) | Evaluate the following arithmetic expressions using the rules of operator precedence in python.<br>(i) 5*4+7/2 (ii) 6//7*2-5 (iii) 20//4//2<br>(iv) 5-6+2**3 (v) 24//6*2 (vi) 4*(2**3)-5/2. | 6M | CO1 | L3 |
| (b) | Write a python script to calculate number of seconds in a day. | 6M | CO1 | L2 |
| | **(OR)** | | | |
| 2(a) | Write a python script to calculate a student's result based on results of 2 examinations, 1 sports event and 3 activities conducted.<br>The weightage of activities = 30 % ,<br>Sports = 20% and Examination = 50%. | 6M | CO1 | L3 |
| (b) | Write a python script to calculate the distance between two points. | 6M | CO1 | L2 |
| 3(a) | Demonstrate the usage of break and continue with syntax and examples. | 6M | CO2 | L2 |
| (b) | Write a python script to print prime numbers between 100 and 200. | 6M | CO2 | L3 |
| | **(OR)** | | | |
| 4(a) | Summarize various mathematical functions and constants available in python WITH EXAMPLE. | 6M | CO2 | L2 |
| (b) | Write a python script that accepts a list of both positive and negative integers and Create a new list with only positive numbers. | 6M | CO2 | L3 |
| 5(a) | With the help of an example,how we can create string variables in python and develop a python program to find the length of given string. | 6M | CO3 | L3 |
| (b) | Write a python script to check given string is palindrome or not. | 6M | CO3 | L3 |
| | **(OR)** | | | |
| 6(a) | Construct a function that generate Fibonacci sequence using recursion. | 6M | CO3 | L3 |
| (b) | Write a python script which makes use of function to display all such numbers which are divisible by 7 but are not a multiple of 5, between 1000 and 2000. | 6M | CO3 | L3 |
| 7(a) | Define Tuple. Give syntax for creating a tuple and accessing elements in tuple with suitable examples. | 6M | CO4 | L2 |
| (b) | Write a python script that creates one set with Squares and other set with Cubes in range 1-10. | 6M | CO4 | L3 |
| | **(OR)** | | | |
| 8(a) | Write a python script to open file using "WITH" keyword and display the content of the file. | 6M | CO4 | L3 |
| (b) | Construct a function that has argument as variable length and pass a tuple in function call. | 6M | CO4 | L3 |
| 9(a) | Demonstrate the procedure of Bubble sort with example. | 6M | CO5 | L2 |
| (b) | Construct a function that takes list as argument and perform Selection sorting. | 6M | CO5 | L3 |
| | **(OR)** | | | |
| 10. | Demonstrate how to handle multiple exceptions in program. | 12M | CO5 | L2 |

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B.Tech. (II Semester) ~~Regular~~/Supplementary Examinations

**17CI06-COMPUTER ARCHITECTURE**

Time : 3 hours (CSE) Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks

| Q.No | Questions | Marks | CO | BL |
|---|---|---|---|---|
| 1(a) | What is the final value of R=10011001? After applying logical shift-right, followed by circular shift-left, followed by a logical shift-right and a circular shift-left. | 6M | CO1 | L3 |
| (b) | Distinguish between direct address and indirect address. | 6M | CO1 | L2 |
| | **(OR)** | | | |
| 2(a) | Define Interrupt. What is the need of it? Explain about Input/output interrupts. | 6M | CO1 | L2 |
| (b) | Design a bus system for 4 registers each of size 4 bits. | 6M | CO1 | L3 |
| 3(a) | Draw a flowchart for adding/subtracting of two fixed point binary numbers, represented in signed magnitude form. | 6M | CO2 | L4 |
| (b) | Apply addition/subtraction algorithm for adding 2 fixed point binary numbers like 14 & -15. | 6M | CO2 | L3 |
| | **(OR)** | | | |
| 4(a) | Evaluate the arithmetic expression Y=(P/Q) using Three address, Two address, One address and Zero address instructions. | 6M | CO2 | L3 |
| (b) | Draw the block diagram of a BCD adder. | 6M | CO2 | L2 |
| 5(a) | Classify different ways of Designing Control Unit. | 6M | CO3 | L2 |
| (b) | How would you illustrate the role Micro Program Counter, Control Address Register and Control Data Register in executing Micro Instructions? | 6M | CO3 | L2 |
| | **(OR)** | | | |
| 6(a) | How would you explain basic components of the Control Unit? | 6M | CO3 | L2 |
| (b) | Classify Micro programmed controls. | 6M | CO3 | L2 |
| 7(a) | Design the block diagram and function table of a Typical RAM Chip and Analyze it. | 6M | CO4 | L4 |
| (b) | Let us consider an example in which computer needs 512 bytes of RAM and ROM as well and we have to use the chips of size 128 bytes for RAM and 512 bytes for ROM. Explain Memory Connection to the CPU. | 6M | CO4 | L3 |
| | **(OR)** | | | |
| 8(a) | What is the role played by Key Register in Associative Memory? Explain it with an example. | 6M | CO4 | L3 |
| (b) | Analyze the role played by the Cache Memory in executing programs. | 6M | CO4 | L4 |
| 9(a) | Classify various types of Peripheral Devices and explain them. | 6M | CO5 | L2 |
| (b) | List out different modes of transfer. Explain them. | 6M | CO5 | L2 |
| | **(OR)** | | | |
| 10(a) | How would you classify Data Transmission Types? Explain Synchronous data transfer. | 6M | CO5 | L2 |
| (b) | How would you analyze the role of handshaking mechanism in data transmission? | 6M | CO5 | L4 |

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B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

**17CI01-COMPUTER PROGRAMMING**
(ECE)

JC4

Time : 3 hours Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks

| Q.No | Questions | Marks | CO | BL |
|---|---|---|---|---|
| 1(a) | Discuss arithmetic, logical and bitwise operators with examples. | 6M | CO1 | L2 |
| (b) | What is Algorithm? Write an algorithm for the biggest number among three numbers. | 6M | CO1 | L3 |
| | **(OR)** | | | |
| 2(a) | Differentiate between break and continue statements. Analyze its importance by tracing with example. | 6M | CO1 | L4 |
| (b) | Develop a C program to generate and print the numbers between 100 and 200, which are divisible by 3 but not divisible by 4. | 6M | CO1 | L3 |
| | | | | |
| 3(a) | Define an array. Explain the declaration and initialization of one and two-dimensional arrays. Illustrate with examples. | 6M | CO2 | L2 |
| (b) | Implement a C program to check whether the given matrix in symmetric matrix or not. Illustrate with example. | 6M | CO2 | L3 |
| | **(OR)** | | | |
| 4(a) | Define String. Explain about declaration and Initialization of string in C. Illustrate with examples. | 6M | CO2 | L2 |
| (b) | Develop a C program to concatenate two strings without using strcat() function. | 6M | CO2 | L3 |
| | | | | |
| 5(a) | Compare different storage classes supported in C language with respect to scope, default initial value and lifetime. | 6M | CO3 | L4 |
| (b) | Implement a C program using functions to compute the function $\cos(x) = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} - - - -$ upto 5 terms. Tabulate the values from $0^\circ$ to $180^\circ$ in steps of $30^\circ$ in the main program. | 6M | CO3 | L4 |
| | **(OR)** | | | |
| 6(a) | What is Pointer? Explain the importance of pointers. Discuss how to declare and initialize pointers variables using examples. | 6M | CO3 | L2 |
| (b) | Demonstrate passing array as an argument to the functions by implementing it for addition of two matrix program using C. | 6M | CO3 | L3 |
| | | | | |
| 7(a) | Compare structure and union with respect to allocation of memory by the compiler. Give an example of each. | 6M | CO4 | L4 |

| | | | | |
|---|---|---|---|---|
| (b) | Discuss the process to pass structure as parameter to the function with example. | 6M | CO4 | L2 |
| | **(OR)** | | | |
| 8(a) | Explain the following with examples: (i) Nested Structures (ii) Self-Referential Structures (iii) Typedef. | 6M | CO4 | L2 |
| (b) | Write a C program that defines a structure-student with members students name, average marks, address where address is inner structure that contains dno, street, city as members, read the student details and display the output - student name and his city as follows:<br>Student name \| City<br>XX \| Vijayawada<br>YY \| Vizag | 6M | CO4 | L3 |
| | | | | |
| 9(a) | Distinguish between text mode and binary mode operations of files. | 6M | CO5 | L2 |
| (b) | Develop a program to open a pre-existing file and add information at the end of File. Display the contents of file before and after appending. | 6M | CO5 | L3 |
| | **(OR)** | | | |
| 10(a) | Discuss different types of operating modes to open the files? Illustrate with an example. | 6M | CO5 | L2 |
| (b) | Develop a C program to count the number of characters and number of lines in a file. | 6M | CO5 | L3 |

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B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

**17EC05-SIGNALS AND SYSTEMS**
(ECE)

Time : 3 hours Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks
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**UNIT-I**

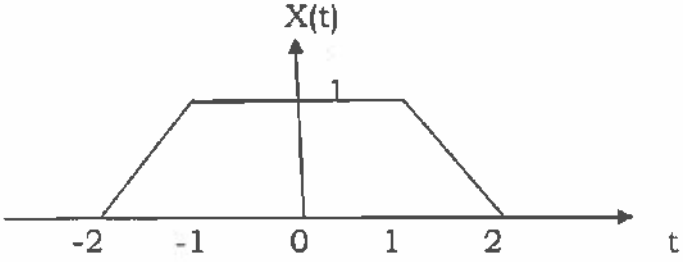
1(a) Draw the graphical representation of continuous time signals
(i) Impulse signal (ii) Unit step signal
(iii) Signum signal (iv) Sampling signal. [6M]

(b) Calculate the average power of a signal $y(t) = \int_{-\infty}^{t} x(\tau)d\tau$,
given that x(t) = Sin(t) u(t). [6M]

**(OR)**

2(a) Compare decaying, raising and double exponential signals with suitable examples. [6M]

(b) Apply operations on given signal x(t) and draw the graphical representation of signal y(t) = 2 x(-3t+4).




[6M]

**UNIT-II**

3(a) Discuss about the approximation of a signal x(t) by using another signal y(t) and obtain the expression for mean square error. [6M]

(b) Analyze the approximation process and discuss about the Gibb's Phenomena, when a rectangular signal x(t) is approximated by a set of sinusoid signals Sin(t), Sin(2t), Sin(3t).... over the intervals (0,2π).

$$x(t) = \begin{cases} 1, & 0 < t < \pi \\ -1, & \pi < t < 2\pi \end{cases}.$$

[6M]

**(OR)**

4(a) Compare line spectrum and power spectrum. [6M]

(b) Evaluate the signal x(t) such that
(i) x(t) is real and odd
(ii) x(t) is periodic with a fundamental period of T=2
(iii) Fourier series coefficient Cn=0 for |n|>1
(iv) $\frac{1}{2}\int_{0}^{2}|x(t)|^2 dt = 1$.

[6M]

## UNIT-III

5(a) Discuss any four properties of Fourier Transform. [6M]

(b) Apply the Fourier Transform on the signal $x(t) = x_1(t) * x_2(t)$ and obtain its frequency domain, where * denotes convolution, $x_1(t) = e^{-3t}\,u(t)$ and $x_2(t) = t\,e^{-3t}\,u(t)$. [6M]

**(OR)**

6(a) Explain the time and frequency domain analysis of sampling theorem. [6M]

(b) Evaluate the output signal of a low pass filter, when the input message signal $m(t)=\cos(2\pi f_m t)$ with $f_m=50Hz$ is sampled at sampling frequency $f_s=40Hz$ is transmitted through low pass filter with cutoff frequency $f_c=40Hz$. [6M]

## UNIT-IV

7(a) Explain about Additivity, Homogenity and Time Invariance of a continuous time system. [6M]

(b) Evaluate the Autocorrelation Function and Energy Spectral Density of an exponential signal $x(t)=e^{-2t}\,u(t)$. [6M]

**(OR)**

8(a) Compare Static, Causal, Non-causal and Dynamic Systems. [6M]

(b) Examine the systems (i) $y(t)=\cos[x(t)]$ (ii) $y(t)=x(t-3)$ for Invertibility. If the system is invertable, then obtain the inverse system. [6M]

## UNIT-V

9(a) Explain about bilateral and unilateral Laplace Transforms. [6M]

(b) Evaluate the Laplace Transform and associated Region of Convergence of a signal $x(t)=2e^{-3t}u(t)+ 3e^{-2t}u(t)$. [6M]

**(OR)**

10(a) Discuss initial and final value theorems. [6M]

(b) Calculate initial value and final value of a signal x(t) from $X(s) = \frac{s+3}{s(s+2)}$. [6M]

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B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

**17EC06-RANDOM VARIABLES AND STOCHASTIC PROCESSES**
(ECE)

Time : 3 hours Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks
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**UNIT-I**

1(a) Infer with necessary examples about the classification of Random variables. [6M]

(b) A random variable has a probability density

$$f_X(x)=\begin{cases}\frac{5}{4}\left(1-x^4\right), & 0<x\le 1\\ 0, & \textit{elsewhere}\end{cases}$$

Inspect the values of (i) E[X] (ii) E[4X+2] (iii) E[$X^2$]. [6M]

**(OR)**

2(a) Examine the properties of Probability distribution function with relevant proofs. [6M]

(b) A random variable X has the density

$$f_X(x)=\begin{cases}\frac{3}{32}\left(-x^2+8x-12\right), & 2\le x\le 6\\ 0, & \textit{elsewhere}\end{cases}$$

Compute the following moments (i) $m_1$ (ii) $m_2$ (iii) $\mu_2$ [6M]

**UNIT-II**

3(a) Contrast the properties of joint probability density function. [6M]

(b) The density function

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

Applies to two random variables X and Y.
Categorize whether
(i) X and Y are uncorrelated or not.
(ii) X and Y are statistically independent or not. [6M]

**(OR)**

4(a) Distinguish between various joint central moments. [6M]

(b) Two statistically independent random variables X and Y with $\overline{X}=2$, $\overline{X^2}=8$, $\overline{Y}=4$, $\overline{Y^2}=25$. For a random variable W = 3X-Y, then calculate i) mean ii) second moment iii) variance . [6M]

**UNIT-III**

5(a) Explain numerous categories of random processes with examples. [6M]

(b) A random process is described by X(t) = A, where A is a continuous random variable and is uniformly distributed on (0,1). Justify that X(t) is wide sense stationary. [6M]

**(OR)**

6(a) Choose relevant expressions to verify the properties cross correlation function. [6M]

(b) A Random Process Y(t) = X(t) – X(t+τ) is defined in terms X(t) that is at least wide sense stationary

(i) Deduce the mean value of Y(t) if E[X(t)] ≠ 0.

(ii) Justify that the variance $\sigma_X^2 = 2[R_{XX}(0) - R_{XX}(\tau)]$.

(iii) If Y(t) = X(t) + X(t+τ), estimate E[Y(t)] and $\sigma_Y^2$. [6M]

**UNIT-IV**

7(a) Judge the statement that cross power spectral density and cross correlation function of random processes X(t) & Y(t) form a Fourier transform pair. [6M]

(b) The cross power spectral density is given

$$S_{XY}(\omega) = a + \frac{jb\omega}{W}, \quad -W \le \omega \le W$$

$$= 0 \quad , \quad Otherwise$$

where a, b are real constants, then estimate cross correlation function. [6M]

**(OR)**

8(a) Interpret the Wiener-Khintchine relation for auto power spectral density and autocorrelation of a random process. [6M]

(b) Calculate the rms bandwidth of a random process whose power spectral density is given as

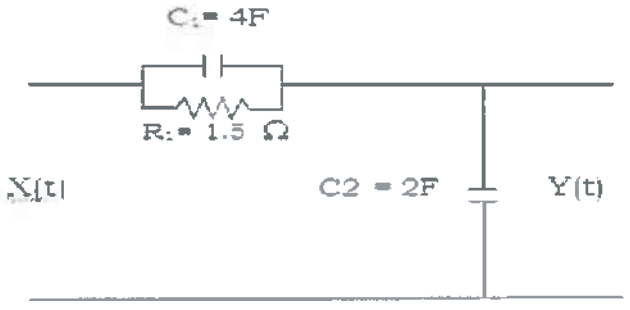
$$s_{XX}(\omega) = P\,\omega \; for \quad |\omega| \le W$$
$$= 0 \qquad\qquad |\omega| > W.$$ [6M]

**UNIT-V**

9(a) Solve for the cross correlation function of system response. [6M]

(b) A stationary random process X(t) having autocorrelation function $R_{XX}(\tau) = 2\exp(-4|\tau|)$ is applied to the network shown in figure.

Compute (i) $S_{XX}(\omega)$ (ii) $|H(\omega)|^2$ (iii) $S_{YY}(\omega)$




[6M]

**(OR)**

10(a) Develop the relationship between cross power spectral density of system response. [6M]

(b) Power spectrum of noise process N(t) is given by

$$S_{NN}(\omega) = \frac{P\pi}{W}, \quad -W \le \omega \le W$$

$$= 0 \quad , \quad Otherwise$$ , where P and W are constants

Use the concept of Wiener – Khintchine relation to obtain auto correlation function. [6M]

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B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

**17EC08-ANALOG INTEGRATED CIRCUITS**
(ECE)

Time : 3 hours | Max. Marks : 60

Answer one question from each unit
All questions carry equal marks

| Q.No | Questions | Marks | CO | BL |
|---|---|---|---|---|
| 1(a) | List and compare the different configurations of differential amplifier. | 6M | CO1 | L1 |
| (b) | Explain the AC Analysis of Dual input and balanced output Differential amplifier in detail with a neat circuit diagram. | 6M | CO1 | L2 |
| | **(OR)** | | | |
| 2(a) | Sketch basic current mirror circuit and explain its operation. | 6M | CO1 | L3 |
| (b) | Differentiate Analog IC and Digital IC. | 6M | CO1 | L2 |
| | | | | |
| 3(a) | Explain the IC741 op-amp block diagram and its features in detail. | 6M | CO2 | L2 |
| (b) | Define input offset voltage, total output offset voltage and also present the methods of compensation. | 6M | CO2 | L1 |
| | **(OR)** | | | |
| 4(a) | Explain the operation of I-V converter using relevant diagrams and expressions. | 6M | CO2 | L2 |
| (b) | Design an inverting amplifier with an input resistance of 5 K Ω and the gain of -4. | 6M | CO2 | L6 |
| | | | | |
| 5(a) | Calculate the gain and frequency of Oscillations of Wein Bridge oscillator. | 6M | CO3 | L3 |
| (b) | Sketch the diagram of low pass filter and obtain the expression for transfer function, write the expression for cut-off frequency. | 6M | CO3 | L3 |
| | **(OR)** | | | |
| 6(a) | Explain the operation of Schmitt trigger with suitable waveforms. | 6M | CO3 | L2 |
| (b) | Design a wide band-pass filter with $f_L$=200Hz,$f_H$=1KHz and a pass band gain=4 and also calculate the Q for the filter. | 6M | CO3 | L6 |
| | | | | |
| 7(a) | Design a monostable multivibrator having an output pulse width of 100msec using 555 Timer. | 6M | CO4 | L6 |
| (b) | Explain the Closed loop analysis of PLL and applications of PLL. | 6M | CO4 | L2 |
| | **(OR)** | | | |
| 8(a) | Outline the features of IC 566 with suitable explanation. | 6M | CO4 | L4 |
| (b) | Illustrate the working of Fixed voltage regulator with relevant IC. | 6M | CO4 | L3 |
| | | | | |
| 9(a) | List the specifications of ADC and DAC Circuits. | 6M | CO5 | L1 |
| (b) | Evaluate the conversion time of a 8 bit successive approximation ADC if its input clock is 5MHz. | 6M | CO5 | L5 |
| | **(OR)** | | | |
| 10(a) | Explain the operation of weighted resistor DAC with the help of relevant diagrams and sketches. | 6M | CO5 | L2 |
| (b) | Compare and contrast Flash, dual slope, SAR type of ADCs . | 6M | CO5 | L4 |

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**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING**
**(AUTONOMOUS)**
L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.::A.P.

B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

**17EE02-ELECTRIC AND MAGNETIC FIELDS**
(EEE)

Time : 3 hours | Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks

| Q.No | Questions | Marks | CO | BL |
|---|---|---|---|---|
| 1(a) | Determine the electric field intensity $\bar{E}$ due to an infinite line charge having uniform charge density of row $\rho_L$ c/m at any point p. | 6M | CO1 | L1 |
| (b) | Find the electric field intensity $\bar{E}$ at P (1, 5, 2) m due to a point charge of 5nC at Q (0, 0, 1) m, the points are located in free space. | 6M | CO1 | L3 |
| | **(OR)** | | | |
| 2(a) | Determine the electric flux density $\bar{D}$ due to finite line charge having uniform line charge density $\rho_L$c/m at any point p. | 6M | CO1 | L2 |
| (b) | The flux density $\bar{D}=\frac{r}{3}\bar{a}_r$ C/m² is in the free space<br>(i) Find $\bar{E}$ at r=0.2m. (ii) Find the total electric flux leaving the sphere of r=0.3m. (iii) Find the total charge within the sphere or r=0.6m. | 6M | CO1 | L3 |
| 3(a) | Briefly explain about electric dipole and dipolemoment and also write the necessary equations. | 6M | CO2 | L1 |
| (b) | Derive the expressions for the energy stored and energy density in a capacitor. | 6M | CO2 | L2 |
| | **(OR)** | | | |
| 4(a) | Derive the boundary conditions of the normal and tangential components of electric field at the interface of two media with free space and conductor. | 6M | CO2 | L2 |
| (b) | Discuss the behavior of conductors in an electric field. | 6M | CO2 | L1 |
| 5(a) | Derive the expression for magnetic field $\bar{H}$ due to an infinitely long straight filament carrying a direct current I. | 6M | CO3 | L2 |
| (b) | Derive the proof of Ampere's circuital law in point form. | 6M | CO3 | L2 |
| | **(OR)** | | | |
| 6(a) | State and Prove the Biot-Savart law. | 6M | CO3 | L2 |
| (b) | Derive the expression for due to square loop carrying current I at the center. | 6M | CO3 | L2 |
| 7(a) | Briefly explain the concepts of magnetic dipole and dipole moment. | 6M | CO4 | L2 |
| (b) | Derive an expression for the inductance of solenoid. | 6M | CO4 | L3 |
| | **(OR)** | | | |
| 8(a) | Derive the expression for Torque on a current loop placed in a magnetic field. | 6M | CO4 | L2 |
| (b) | State and prove Lorentz force equation. | 6M | CO4 | L2 |
| 9(a) | List out the differences between static induced EMF and dynamic induced EMF. | 6M | CO5 | L1 |
| (b) | State and explain the Faraday's laws of electromagnetic induction. | 6M | CO5 | L2 |
| | **(OR)** | | | |
| 10. | Derive the Maxwell's equations in Differential and integral form. | 12M | CO5 | L2 |

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# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
## (AUTONOMOUS)

L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.::A.P.

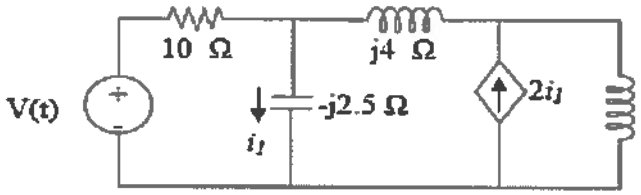
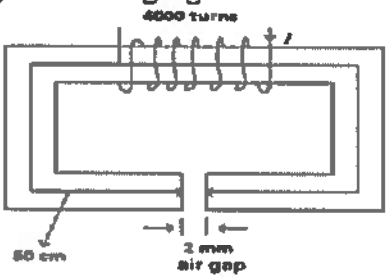
B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

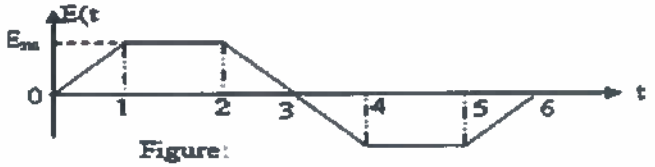
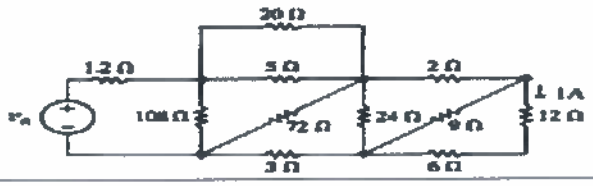
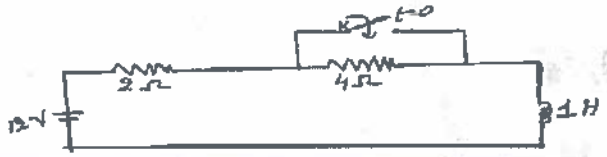
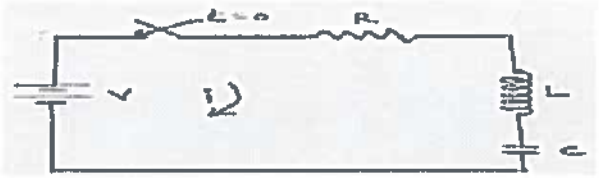
## 17EE03-NETWORK THEORY-I

(EEE)

Time : 3 hours | Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks

| Q.No | Questions | Marks | CO | BL |
|---|---|---|---|---|
| 1(a) | Explain Linear and Non-linear elements and Active and passive elements with examples. | 6M | CO1 | L1 |
| (b) | Derive the Star-Delta Transformations. | 6M | CO2 | L4 |
| | **(OR)** | | | |
| 2(a) | State and explain Kirchhoff's voltage and current law with an example. | 6M | CO1 | L1 |
| (b) | Find $i_1$ in circuit shown in figure: using nodal analysis. Assume the supply voltage V(t)=20 cos(4t) volts.   Figure. | 6M | CO2 | L4 |
| 3(a) | Explain in detail about Faraday's law of electromagnetic induction. | 6M | CO1 | L2 |
| (b) | In a series circuit of L=10mH and C=0.01μF and R=50Ω. Calculate the resonant frequency and also the impedance at the resonant frequency. | 6M | CO2 | L3 |
| | **(OR)** | | | |
| 4(a) | Explain self-inductance and mutual inductance. And Derive an expression for coefficient of coupling. | 6M | CO2 | L5 |
| (b) | For the magnetic current shown in figure, find the current 'I' in the coil needed to produce a flux of 5.5 mWb in the air gap. The magnetic circuit has a uniform cross sectional area of 5 $cm^2$. Assume the relative permeability of the magnetic material as 3523, neglect leakage and fringing effect.   Figure: | 6M | CO1 | L4 |
| 5(a) | Define and explain the following with an example: (i) Oriented Graph (ii) Tree of a Graph (iii) Tie set and a basic Tie set (iv) Cut set and a basic Cut set. | 6M | CO1 | L2 |
| (b) | Draw the circuit diagram for T and π sections of composite filter. | 6M | CO2 | L4 |
| | **(OR)** | | | |
| 6. | Explain low pass filters. Discuss the design considerations of K type-low pass filters. | 12M | CO1 | L4 |

| | | | | |
|---|---|---|---|---|
| 7(a) | Define average value, RMS value, form factor and peak factor and calculate the same for the following periodic waveform shown in figure:<br>  <br><br>Figure: | 6M | CO2 | L2 |
| (b) | A capacitor of 100 μF is connected across 200 V, 50 Hz, Single phase supply. Calculate: i) The reactance of the capacitor ii) RMS value of the current iii) The maximum value of the current. | 6M | CO1 | L3 |
| | **(OR)** | | | |
| 8(a) | A current of 5 A flows through a non-inductive resistance in series with a chocking coil when supplied at 250 V, 50 Hz. If the voltage across the non-inductive resistance is 125V and that across the coil 200V, calculate Impedance, Reactance and Resistance of the coil, and power absorbed by the coil. Also draw the phasor diagram. | 6M | CO2 | L2 |
| (b) | If the current in the 12 Ω resistor in the following given circuit is 1 A, as shown find (i) source voltage $v_a$and, (ii) power absorbed by 20 Ω resistor.<br>  <br> | 6M | CO2 | L3 |
| 9(a) | List the basic properties of Laplace transform. | 6M | CO1 | L1 |
| (b) | For the figure shown, the dc voltage is applied to the circuit keeping the switch K open so that the steady state is reached. Determine the complete response for the circuit after closing the switch K.<br>  <br> | 6M | CO2 | L3 |
| | **(OR)** | | | |
| 10(a) | In the circuit shown below, V = 10 V, R = 10 Ω, L = 1H and C = 10 The capacitor is initially uncharged. The switch is closed at t = 0. Determine formulae.<br>  <br> | 6M | CO2 | L4 |
| (b) | In the circuit shown below, L= 1H, R = 6 Ω and C = 0.2F. The capacitor is initially charged to 24 V and the switch is closed at t = 0. Determine the expression for i(t) and the value of current at one second after the switch is closed. And also derive the formulae used.<br>  <br> | 6M | CO1 | L4 |

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**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING**
**(AUTONOMOUS)**
L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.:: A.P.

B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

**17EE04-DIGITAL LOGIC CIRCUIT DESIGN**
(EEE)

Time : 3 hours Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks
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**UNIT-I**

1(a) Discuss the classification of the number systems. [6M]

(b) Perform the decimal additions in 8421 BCD code
(i) 24+18 (ii) 48+58. [6M]

**(OR)**

2(a) Perform the following operations using 2's complement method.
i) 48 – 23 ii) 23 – 48
Use 8-bit representation of numbers. [6M]

(b) Convert the following decimal numbers into equivalent binary numbers
(i) $(13)_{10}$ (ii) $(0.65625)_{10}$ (iii) $(25.5)_{10}$ [6M]

**UNIT-II**

3(a) Describe the following forms
i) Sum of the Products ii) Product of the sum
iii) Standard SOP iv) Standard POS. [6M]

(b) Realize the following Boolean functions using AOI logic
i) f = PQ + QR ii) F = ABC + ABC' + A'BC' [6M]

**(OR)**

4(a) Find the reduced SOP form using K-map technique for the following function
$f(A,B,C,D) = \Sigma m(1,3,7,11,15) + \Sigma d(0,2,4)$ [6M]

(b) Describe the function of NAND & NOR Gates with their truth tables. [6M]

**UNIT-III**

5(a) Design the combinational circuit of half subtractor. [6M]

(b) Convert the 4-bit binary code into Gray code and design the logic circuit. [6M]

**(OR)**

6(a) Develop the logic expressions and design the combinational circuit of 8×3 Encoder. [6M]

(b) Implement the logic circuit of BCD adder using 4-bit parallel adders. [6M]

## UNIT-IV

7(a) Distinguish between the combinational and sequential logic circuits. [6M]

(b) Elaborate the operation of clocked D Flip-flop and develop its characteristic equation. [6M]

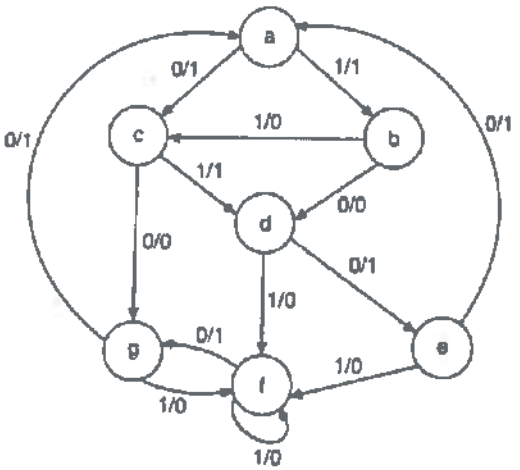
**(OR)**

8(a) Discuss the types of triggering methods of flip-flops. [6M]

(b) Describe the working of buffer and controlled buffer registers. [6M]

## UNIT-V

9(a) Obtain reduced state table and reduced state diagram for the sequential machine whose state diagram is shown in figure.




[6M]

(b) Draw the block diagram of FSM and discuss the capabilities and limitations of FSM. [6M]

**(OR)**

10(a) Draw the state diagram, state table and ASM chart for a D flip flop. [6M]

(b) Obtain the ASM chart for the following state transitions

i) If x=0, control goes from state $T_1$ to state $T_2$.

If x=1, generate the conditional operation and go from $T_1$ to $T_2$.

ii) If x=1, control goes from $T_1$ to $T_2$ and then to $T_3$.

If x=0, control goes from $T_1$ to $T_3$. [6M]

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# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
## (AUTONOMOUS)

L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.:: A.P.

B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

**17EE05-POWER GENERATION AND UTILIZATION**

(EEE)

Time : 3 hours | Max. Marks : 60

Answer one question from each unit.

All questions carry equal marks

| Q.No | Questions | Marks | CO | BL |
|---|---|---|---|---|
| 1(a) | Illustrate the growth of electrical power generation in India. | 6M | CO1 | L1 |
| (b) | Discuss the selection of site for hydel power plant. | 6M | CO1 | L2 |
| | **(OR)** | | | |
| 2(a) | Describe the line diagram of thermal power station. | 6M | CO1 | L2 |
| (b) | A steam power station of 100 MW capacity uses coal of calorific value 6400 Kcal/Kg. The thermal efficiency of the station is 30% and alternator is 92%. Determine the coal required per hour when the plant is working at full load. | 6M | CO1 | L3 |
| 3(a) | Discuss the types of nuclear reactors. | 6M | CO1 | L2 |
| (b) | Describe the process of nuclear fission & chain reaction. | 6M | CO3 | L1 |
| | **(OR)** | | | |
| 4(a) | Illustrate the components of gas power station. | 6M | CO1 | L2 |
| (b) | How the wind energy can be converted into electrical energy? | 6M | CO3 | L2 |
| 5(a) | Explain the following factors (i) Load factor (ii) Diversity factor (iii) Contribution factor (iv) Loss factor. | 6M | CO2 | L1 |
| (b) | A generating station has a connected load of 40 MW and a maximum demand of 20 MW; the units generated being 60 x $10^6$ KWhr. Calculate (i) Demand factor (ii) Load factor. | 6M | CO2 | L3 |
| | **(OR)** | | | |
| 6(a) | Enumerate the items that constitute the fixed and running charges of generation of electrical energy. | 6M | CO2 | L2 |
| (b) | A generating station has a maximum demand of 50 MW. Calculate (i) the fixed cost (ii) the running cost (iii) number of units consumed per year and (d) the cost per Kwhr, from the following data: Capital cost=Rs $150\times10^6$, Annual cost of fuel oil=Rs.$9\times10^6$, Taxes, wages & salaries=Rs.$6\times10^6$, Interest and depreciation=10%, Annual load factor=50%. | 6M | CO2 | L3 |
| 7(a) | What is a polar curve? How is it useful to an illumination engineer? | 6M | CO4 | L2 |
| (b) | Define the terms: (i) Candle Power (ii) Luminous efficiency (iii) Maintenance factor (iv) Reduction factor. | 6M | CO4 | L1 |
| | **(OR)** | | | |
| 8(a) | Describe the principle of operation of a sodium vapour lamp. | 6M | CO4 | L1 |
| (b) | The illumination at a point on a working plane directly below the lamp is to be 100 lumens/$m^2$. The lamp gives 250 CP, uniformly below the horizontal plane. Determine the height at which the lamp is suspended. Also find illumination at a point on the working table 1.2m away from the vertical axis of the lamp. | 6M | CO4 | L3 |
| 9(a) | State the desirable properties of a heating element. | 6M | CO4 | L2 |
| (b) | Discuss advantages of electric heating as compared to other heating methods. | 6M | CO4 | L2 |
| | **(OR)** | | | |
| 10(a) | Illustrate the types of resistance welding. | 6M | CO4 | L2 |
| (b) | Distinguish between AC & DC welding. | 6M | CO4 | L2 |

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# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
## (AUTONOMOUS)

L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.:: A.P.

B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

## 17EE53 - ELECTRICAL TECHNOLOGY
(EIE)

Time : 3 hours | Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks

| Q.No | Questions | Marks | CO | BL |
|---|---|---|---|---|
| 1(a) | Derive the emf equation of a DC generator. | 6M | CO1 | L4 |
| (b) | The Armature of an 8-pole DC generator has 960 conductors and runs at 400 rpm. The flux per pole is 40 mWb. Calculate the induced EMF, if the armature is: (i) Lap-wound (ii) Wave wound. | 6M | CO2 | L3 |
| | **(OR)** | | | |
| 2(a) | Explain the magnetization characteristics of a DC generator. | 6 M | CO2 | L2 |
| (b) | A 4-pole, lap-wound, DC shunt generator has a useful flux per pole of 0.07 Wb. The armature winding consists of 220 turns each of 0.004 Ω resistance. Calculate the terminal voltage when running at 900 r.p.m. if the armature current is 50 A. | 6 M | CO2 | L3 |
| 3(a) | Explain different speed control methods of DC motor. | 6M | CO2 | L2 |
| (b) | The back emf of shunt motor is 230 V, the field resistance is 165 Ω and field current is 1.52 A. If the line current is 37 A, find the armature resistance. Also find the armature current when the motor is stationary. | 6M | CO2 | L3 |
| | **(OR)** | | | |
| 4(a) | Describe how Swinburne's test is conducted on DC machine. State its advantages and disadvantages. | 6M | CO2 | L2 |
| (b) | Explain the principle of operation of 3-point starter with neat diagram. | 6M | CO2 | L2 |
| 5(a) | Explain the constructional details and principle of operation of a single phase transformer. | 6M | CO3 | L2 |
| (b) | Evaluate the approximate equivalent circuit parameters of a given 200/2000 V single phase 30 KVA transformer having the following test results: OC Test: 200 V,6.2 A,360 W on LV side<br>SC Test : 75 V,18A,600 W on HV side | 6M | CO4 | L4 |
| | **(OR)** | | | |
| 6(a) | Derive the condition for the maximum efficiency of a single phase transformer. | 6M | CO4 | L3 |
| (b) | In a 20 kVA, 2000/200 V, single-phase transformer, the iron and full-load copper losses are 350 and 400 W respectively. Calculate the efficiency at unity power factor on full load. | 6M | CO4 | L3 |
| 7. | Explain the construction, working principle and operation of 3-phase Induction motor. | 12M | CO3 | L1 |
| | **(OR)** | | | |
| 8(a) | Deduce the condition for maximum starting torque of an induction motor. | 6M | CO4 | L4 |
| (b) | A three phase induction motor has 2 poles and is connected to 400 V, 50 Hz supply. Calculate the actual rotor speed and rotor frequency when the slip is 4%. | 6M | CO4 | L3 |
| 9(a) | Explain and compare the salient pole and non-salient pole synchronous machines. | 6M | CO3 | L5 |
| (b) | Derive the emf equation of an Alternator. | 6M | CO3 | L3 |
| | **(OR)** | | | |
| 10. | Illustrate synchronous impedance method for finding voltage regulation of an Alternator. | 12M | CO4 | L3 |

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# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
## (AUTONOMOUS)

L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.::A.P.

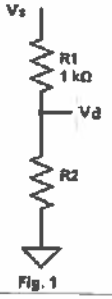
B.Tech. (III Semester) Regular/Supplementary Examinations

## 17EI02-TRANSDUCERS

(EIE)

Time : 3 hours | Max.Marks : 60

Answer one question from each unit.
All questions carry equal marks

| Q.No | Questions | Marks |
|---|---|---|
| 1(a) | Classify sensors and describe the process of functions and dataflow in a measurement and control system. | 6M |
| (b) | Describe random errors. | 6M |
| | **(OR)** | |
| 2(a) | Interpret the use of transducers, sensors and actuators to signal conditioning and displays. | 6M |
| (b) | What are the steps necessary for measurement systems in the contrast of input-output classification? | 6M |
| 3(a) | Explain different types of potentiometers in terms of their resolution and sensitivity. | 6M |
| (b) | Derive the gauge factor of strain gauge. | 6M |
| | **(OR)** | |
| 4(a) | **The divider of fig.1 has R1= 10KΩ and Vs = 5V supply . R2 is a sensor whose resistance varies from 4 to 12 KΩ as some dynamic variable varies over a range. To find (i) min voltage Vd (ii) The range of output voltage iii) range of power dissipated by R2.**   Fig. 1 | 6M |
| (b) | Define the following with examples<br>(i) Calibration (ii) span (iii) signal conditioning element | 6M |
| 5(a) | Explain the working of LVDT with neat sketch? | 6M |
| (b) | Elaborate faraday's law interprets to sensors. | 6M |
| | **(OR)** | |
| 6(a) | Explain hall effect sensors. | 6M |
| (b) | Describe electromagnetic sensors. | 6M |
| 7(a) | Distinguish between analog and digital signal conditioning. | 6M |
| (b) | Describe AC bridges, explain ac amplifiers and power supply decoupling. | 6M |
| | **(OR)** | |
| 8(a) | Elaborate fundamentals and structure of carrier amplifiers. | 6M |
| (b) | Describe capacitive sensors. | 6M |
| 9(a) | What is pyroelectric effect and describe its materials? | 6M |
| (b) | Summarize Radiation Laws: Planck, Wien and Stefan Boltzmann. | 6M |
| | **(OR)** | |
| 10. | **Explain the following (i) Offset and drift in Opamps (ii) Charge amplifier (iii) Noise in amplifiers.** | 12M |

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# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
## (AUTONOMOUS)

L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.:: A.P.

B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

## 17EC04-DIGITAL ELECTRONIC CIRCUITS

(EIE)

Time : 3 hours | Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks

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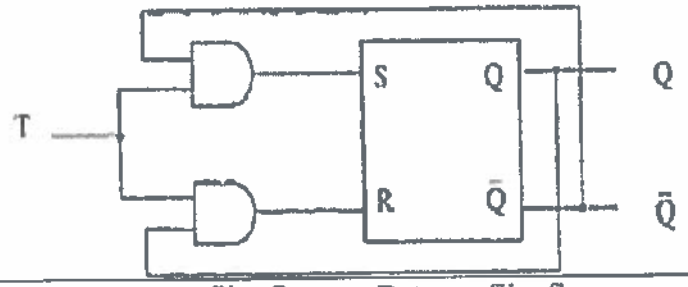
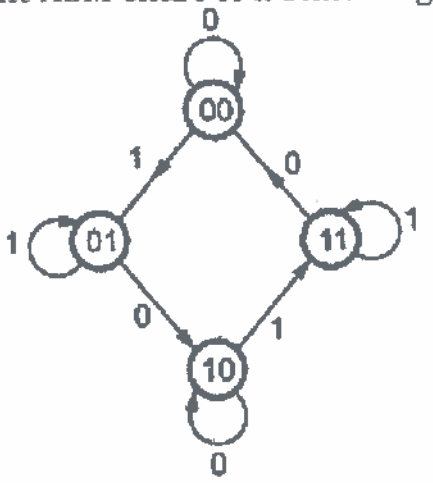
| Q.No | Questions | Marks |
|---|---|---|
| 1(a) | Using the polynomial method of number conversion, determine the equivalent decimal number for each of the following: (i)$101101.1_{(2)}$ (ii)$2110_{(3)}$ (iii).$362_{(8)}$ (iv).$2c3_{(16)}$ (v)$1475.2_{(8)}$ (vi) AD.$E_{(16)}$ | 6M |
| (b) | Write the Hamming code groups for each of the following 8 bits of information. (i) 11100011 (ii) 01011000. | 6M |
| | **(OR)** | |
| 2(a) | Express the following functions in a sum of minterms and a product of maxterms. (i) F(A,B,C,D)=D(A'+B)+B'D (ii) F(w,x,y,z)=y'z+wxy'+wxz'+w'x'z | 6M |
| (b) | Simplify the following Boolean function by using four variable K-map and implement that by using NAND gates. F(A,B,C,D)=∑(4,6,7,15). | 6M |
| | | |
| 3. | Implement the following functions using the don't care conditions. Assume that both the normal and complement inputs are available. (i) F=A'B'C'+AB'D+A'B'CD' with no more than two NOR gates. D= abc+ab'd' (ii) F=(A+D)(A'+B)(A'+C') with no more than three NAND gates. (iii) F= B'D+B'C+ABCD with NAND gates. d= A'BD+AB'C'D' | 12M |
| | **(OR)** | |
| 4. | Given the Boolean function F=xy+xy'+y'z (i) Implement it with AND. OR, and NOT gates. (ii) Implement it with only OR and NOT gates. (iii) Implement it with only AND and NOT gates. | 12M |
| | | |
| 5(a) | Design a combinational circuit with four input lines that represent a decimal digit in BCD and four output lines that generate the 9's complement. | 6M |
| (b) | Design Half-adder. | 6M |
| | **(OR)** | |
| 6(a) | Design a 4-line to 2-line priority encoder. Include an output E to indicate that at least one input is a 1. | 6M |

| | | |
|---|---|---|
| (b) | Implement the following Boolean function using PAL<br>(i) F1 (x,y,z )=∑m ( 0,1,3,6,7 )<br>(ii) F2( x y z) = ∑m ( 0,2,3,5 ) | 6M |

| | | |
|---|---|---|
| 7(a) | Design a sequential circuit with two D flip-flops A and B, and one input x. When x=0, the state of the circuit remains the same. When x=1, the circuit goes through the state transitions from 00 to 01 to 11 to 10 back to 00, and repeats. | 6M |
| (b) | Explain synchronous ripple counters. Compare their merits and demerits. | 6M |

**(OR)**

| | | |
|---|---|---|
| 8(a) | Determine how the circuit shown in Fig. 1 functions as a T-type flip-flop. What problem would there be when T= 1 and how could it be resolved?<br>  | 6M |
| (b) | Convert a SR flip-flop to D type flip flop. | 6M |

| | | |
|---|---|---|
| 9(a) | Explain in brief ASM chart. | 6M |
| (b) | Draw an equivalent ASM chart of a state diagram shown in fig.<br>  | 6M |

**(OR)**

| | | |
|---|---|---|
| 10(a) | How do you convert the state diagram to ASM chart. | 6M |
| (b) | Design an FSM to output a 1 after it has seen the sequence aab in the input sequence and output a 0 at all other times. Give an informal argument your machine is correct. | 6M |

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**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING**
**(AUTONOMOUS)**

L.B.Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.::A.P.

B.Tech. III Semester Regular/Supplementary Examinations

**17CI07-OOPS THROUGH JAVA**
**(IT)**

Time : 3 hours Max.Marks : 60

Answer one question from each unit.
All questions carry equal marks

| Q.No | Questions | Marks | CO | BL |
|---|---|---|---|---|
| 1(a) | What is a constructor? Explain various types of constructors with an example. | 6M | CO1 | L2 |
| (b) | Write a Java program using StringBuffer class methods. | 6M | CO1 | L2 |
| | (OR) | | | |
| 2(a) | Write a Java program to illustrate the usage of looping control statements. | 6M | CO1 | L2 |
| (b) | Discuss declaration, allocation and accessing array elements in Java with an example. | 6M | CO1 | L2 |
| 3. | Define polymorphism. Explain different types of polymorphism with suitable examples. | 12M | CO2 | L2 |
| | (OR) | | | |
| 4(a) | Can we achieve multiple inheritance in Java? If so, Justify it with an example program. | 6M | CO2 | L2 |
| (b) | Compare & contrast classes with interfaces. | 6M | CO2 | L2 |
| 5(a) | Explain the following exceptions.<br>i)ArithmaticException ii)ArrayIndexOutOfBoundsException<br>iii) NullPointerException iv) NumberFormatException | 6M | CO3 | L2 |
| (b) | Identify the error in the following program and rewrite it with exception handling mechanism.<br>class Sample{<br>public static void main(String args[]){<br>int a=10,b=0;<br>System.out.println("a+b: "+a+b);<br>System.out.println("a-b: "+a-b);<br>System.out.println("a/b: "+a/b);<br>System.out.println("a*b: "+a*b);<br>}} | 6M | CO3 | L2 |
| | (OR) | | | |
| 6(a) | Explain thread synchronization with an example. | 6M | CO3 | L2 |
| (b) | Write a Java program to create multiple threads using Runnable interface. | 6M | CO3 | L2 |
| 7(a) | Explain the applet architecture with neat diagram. | 6M | CO4 | L2 |
| (b) | Write an applet program to demonstrate Graphics class methods. | 6M | CO4 | L3 |
| | (OR) | | | |
| 8(a) | Elaborate the following terms.<br>a) Events b) Event sources<br>c) Event Listeners interfaces d) Event classes | 6M | CO4 | L2 |
| (b) | Write a Java program to handle mouse events. | 6M | CO4 | L3 |
| 9(a) | Describe the following components with an example.<br>i) CheckBox ii) CheckBoxGroup | 6M | CO5 | L2 |
| (b) | Design calculator application with event handling. | 6M | CO5 | L3 |
| | (OR) | | | |
| 10(a) | Write a Java program using JApplet. | 6M | CO5 | L3 |
| (b) | Describe the following components with an example.<br>i) JRadioButton ii) JComboBox | 6M | CO5 | L2 |

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# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
## (AUTONOMOUS)

L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.::A.P.

B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

## 17IT01-OPERATING SYSTEM PRINCIPLES

## (IT)

Time : 3 hours | Max. Marks : 60

Answer one question from each unit

All questions carry equal marks

| Q.No | Questions | Marks | CO | BL |
|---|---|---|---|---|
| 1(a) | Summarize the features of Linux Operating System. | 6M | CO1 | L2 |
| (b) | Describe the operating system interface. | 6M | CO1 | L2 |
| | **(OR)** | | | |
| 2(a) | Illustrate the architecture of Linux Operating system | 6M | CO1 | L3 |
| (b) | Discuss about the system programs in an operating system. | 6M | CO1 | L2 |
| 3. | Consider the following set of processes, with the length of the CPU burst given in milliseconds:<br>Process / Burst Time / Priority<br>P1 / 10 / 3<br>P2 / 1 / 1<br>P3 / 2 / 3<br>P4 / 1 / 4<br>P5 / 5 / 2<br>The processes are assumed to have arrived in the order p1, p2, p3, p4, p5, all at time 0.Draw four Gantt charts that illustrates the execution of these processes using the following scheduling algorithms: FCFS, SJF, non-preemptive , priority (a smaller priority number implies a higher priority), and RR (quantum=1). Calculate turnaround time, waiting time of each process and average waiting time for each of these scheduling algorithms. | 12M | CO2 | L3 |
| | **(OR)** | | | |
| 4(a) | Demonstrate Inter Process Communication using Message Passing Systems with a neat diagram. | 6M | CO2 | L3 |
| (b) | What is a process? How is it different from a program? Illustrate various stages of process life cycle. | 6M | CO2 | L1 |
| 5(a) | Solve dining philosopher problem using monitors. | 6M | CO3 | L3 |
| (b) | Identify the main idea behind hardware support for synchronization. | 6M | CO3 | L1 |
| | **(OR)** | | | |
| 6(a) | Demonstrate the Producer Consumer problem in detail. | 6M | CO3 | L3 |
| (b) | Illustrate the Peterson solution for critical section problem. | 6M | CO3 | L4 |
| 7(a) | Consider the following page reference strings:<br>1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6.<br>Calculate the page faults that occur for the following replacement algorithms. Assume three frames of allocation.<br>(i) LRU replacement (ii) Optimal replacement. | 6M | CO4 | L3 |
| (b) | Discuss Swapping in detail. | 6M | CO4 | L2 |
| | **(OR)** | | | |
| 8(a) | Illustrate the techniques for structuring a page table. | 6M | CO4 | L4 |
| (b) | Differentiate Internal fragmentation and external fragmentation. | 6M | CO4 | L2 |
| 9(a) | What are different file attributes? Describe the system calls related to a file structure. | 6M | CO5 | L1 |
| (b) | Describe File Access methods. | 6M | CO5 | L2 |
| | **(OR)** | | | |
| 10(a) | Explain the virtual file system with the help of next sketch. | 6M | CO5 | L2 |
| (b) | Discuss about Tree structured directory and Acyclic graph directory. | 6M | CO5 | L2 |

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**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING**
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L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.:: A.P.

B.Tech. III Semester) Regular/Supplementary Examinations

**17CI09-DATA BASE MANAGEMENT SYSTEMS**

(IT)

Time : 3 hours Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks

| Q.No | Questions | Marks | CO | BL |
|---|---|---|---|---|
| 1(a) | What is the difference between logical data independence and physical data independence? Which one is harder to achieve? | 6M | CO1 | L1 |
| (b) | What is an attribute inheritance? Why it is important? | 6M | CO1 | L1 |
| | **(OR)** | | | |
| 2(a) | Consider the foreign key constraint from the dept_name attribute of an instructor relation to the department relation. Give examples of inserts and deletes to these relations, which can cause a violation of the foreign key constraint. | 6M | CO1 | L3 |
| (b) | How to convert a weak entity set into a strong entity set? Outline what sort of redundancy will result if we convert weak entity set into strong entity set. | 6M | CO1 | L3 |
| | | | | |
| 3(a) | Describe the relations that would be produced by the following relational Algebra operations:<br>i) $\Pi_{Hotelname}$ (Hot⋈ $_{Hotel.hotelNo=Room.hotelNp}(\sigma_{price > 50}(Room))$)<br>ii) Gues⋈ $(\sigma_{datTo \geq '1\text{-}Jan\text{-}2019'}(Room\_Booking))$<br>iii) $\sigma_{Hotel.hotelNo=Room.hotelNo}$(Hotel X Room) | 6M | CO2 | L4 |
| (b) | Express the following operations in terms of fundamental relational algebra operations: (i) Theta join (ii) Intersection (iii) Division. | 6M | CO2 | L6 |
| | **(OR)** | | | |
| 4. | Suppliers(*sid:* integer, *sname:* string, *address:* string)Parts(*pid:* integer, *pname:* string, *color:* string)Catalog(*sid:* integer, *pid:* integer, *cost:* real)Write the following queries in relational algebra and Calculus.<br>i) Find the *pids* of parts supplied by every supplier at less than $200.<br>ii) Find the *pids* of the most expensive parts supplied by suppliers named '*SUP111*'.<br>iii) Find pairs of *sids* such that the supplier with the first *sid* charges more for somepart than the supplier with the second *sid*.<br>iv) Find the *names* of suppliers who supply some red part.<br>v) Find the *sids* of suppliers who supply some red part or are located at '*Packer Street*'.<br>vi) Find the *sids* of suppliers who supply every red part or supply every green part. | 12M | CO2 | L2 |

| | | | | |
|---|---|---|---|---|
| 5(a) | Consider a relation schema $R = ABCDE$, functional dependencies $FD=\{B\rightarrow E,\ E\rightarrow A,\ A\rightarrow D$ and $D\rightarrow E\}$ and a decomposition $D = \{AB, BCD, ADE\}$ of $R$.Prove or disprove that $D$ is a lossless join decomposition of $R$ with respect the given set of FDs. | 6M | CO3 | L3 |
| (b) | Design an algorithm to find aclosure of attributes in a given relation. Illustrate with an example. | 6M | CO3 | L6 |
| | **(OR)** | | | |
| 6. | Consider the following relational schema $R(A,B,C,D,E,F)$ with the following functional dependencies $FD=\{ AC\rightarrow F,\ B\rightarrow D,\ AB\rightarrow CEF,\ ACE\rightarrow B$, and $AEF\rightarrow BC\}$. Do the following: (i)Give all the candidate keys for relation schema $R$.(ii) Is relation $R$ in $BCNF$? If not, show which FD violates the BCNF condition and explain why and convert R into BCNF. | 12M | CO3 | L3 |
| | | | | |
| 7(a) | During it execution, a transaction passes through several states, until it finally commits or aborts. Construct a state diagram with all possible sequences of states through which a transaction may pass. Explain why each state transition may occur. | 6M | CO4 | L6 |
| (b) | What is locking protocol? Describe the strict two-phase locking protocol. | 6M | CO4 | L2 |
| | **(OR)** | | | |
| 8(a) | What is the difference between a system crash and a media failure? Explain. | 6M | CO4 | L1 |
| (b) | Evaluate the performance of the recovery technique based on immediate update. | 6M | CO4 | L5 |
| | | | | |
| 9(a) | Define multilevel indexing? How does multilevel indexing improve the efficiency of searching an index file? | 6M | CO5 | L4 |
| (b) | Write a pseudo code for the insertion and deletion operations on the multilevel indexing. | 6M | CO5 | L2 |
| | **(OR)** | | | |
| 10(a) | Compare the *B-tree* indexing with $B^+$-*tree* indexing in terms of insertion and deletion operations. | 6M | CO5 | L4 |
| (b) | Why hash structure is not the best choice for a search key on which range queries are likely? | 6M | CO5 | L4 |

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# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
## (AUTONOMOUS)

L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.:: A.P.

B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

## 17EC50-BASIC ELECTRONICS ENGINEERING
(ME)

Time : 3 hours | Max. Marks : 60

Answer one question from each unit.
All questions carry equal marks

| Q.No | Questions | Marks | CO | BL |
|---|---|---|---|---|
| 1(a) | List out various types of materials using Energy band diagrams. | 6M | CO1 | L1 |
| (b) | A bar of intrinsic silicon has a cross-sectional area of 2.5 X $10^{-4}$ $m^2$. The electron density is 1.5X$10^{16}$ / $m^3$. Determine the length of the bar be in order that the current in the bar will be 1.2mA when 9V battery is applied across it. (Assume the mobility of electrons is $\mu_n$ = 0.14 $m^2$ /v-sec and the mobility of holes $\mu_p$ = 0.05 $m^2$ /v-sec). | 6M | CO1 | L3 |
| | **(OR)** | | | |
| 2(a) | Describe the mass action law for semiconductors and mention the applications. | 6M | CO1 | L1 |
| (b) | Show that the Fermi energy level lies in middle of the energy band gap in case of intrinsic type semiconductor material. | 6M | CO1 | L3 |
| | | | | |
| 3(a) | Summarize the following parameters of half wave rectifier circuit when applied with sinusoidal a.c. input. (i)Average d.c Current (ii) R.M.S value of Current (iii) Efficiency (iv) Ripple factor (v) Percentage of regulation. | 6M | CO2 | L2 |
| (b) | For an N-P-N transistor collector current $I_C$ = 10m A, base current $I_B$ = 100μA, determine the emitter current, large signal current gain, transport factor and emitter efficiency of the transistor. | 6M | CO2 | L3 |
| | **(OR)** | | | |
| 4(a) | Sketch the bridge rectifier circuit, analyze its operation when applied with a.c. input and mention the expressions for various parameters. | 6M | CO2 | L4 |
| (b) | Evaluate the expression for ripple factor for a full wave rectifier using capacitor filter. | 6M | CO2 | L5 |
| | | | | |
| 5(a) | Summarize the stability factors 'S', 'S$^I$' and 'S$^{II}$' for fixed bias, collector to base bias and voltage divider bias circuits. | 6M | CO3 | L2 |
| (b) | Calculate base and collector resistance for a collector to base bias circuit with $V_{CC}$ = 15V, $V_{CE}$ = 5V, $I_C$ = 5mA, $V_{BE}$ = 0.7V and β = 100. | 6M | CO3 | L3 |
| | **(OR)** | | | |

| | | | | |
|---|---|---|---|---|
| 6. | Design a voltage divider biased transistor amplifier with $\beta = 40$, $V_{CC}=12V$, $V_{CE} = 6V$, $V_{BE} = 0.7V$, $I_C = 3mA$, $V_E = 10\%$ of $V_{CC}$ and stability factor $S \leq 5$. | 12M | CO3 | L6 |
| | | | | |
| 7(a) | (i).Convert $(10111110.11)_2$ to decimal, octal and then to hexadecimal<br>(ii).Find the 1's and 2's complements of the binary number $(10101000)_2$<br>(iii).Simplify the function $F(A,B,C) = \sum(0, 2, 4, 6)$ using K-map. | 6M | CO4 | L2 |
| (b) | Simply the following functions in to minimum literals<br>(i). $(B+B\overline{C})(B+\overline{B}C)(B+D)$<br>(ii). $\overline{AB}(A+B)$<br>(iii). $A\overline{B}C+B+B\overline{D}+AB\overline{D}+\overline{A}C$ | 6M | CO4 | L3 |
| | **(OR)** | | | |
| 8(a) | Convert the following numbers into binary and to its equivalent Gray code numbers<br>(i) $(96)_{10}$ (ii) $(45)_{16}$ (iii) $(235)_8$ | 6M | CO4 | L2 |
| (b) | Simplify the following functions using k-map:<br>(i) $F(A,B,C,D) = \sum(2, 3, 6, 7, 8, 9, 11, 12, 13) + d(0, 1, 14)$<br>(ii) $F(A,B,C,D) = \sum(0, 1, 2, 4, 5, 6, 8, 9, 10, 12, 13, 14)$ | 6M | CO4 | L3 |
| | | | | |
| 9(a) | Develop a circuit that used to convert given four bit binary code into gray code. | 6M | CO5 | L3 |
| (b) | Describe inverting summing amplifier circuit using IC-741 Op-amp. | 6M | CO5 | L1 |
| | **(OR)** | | | |
| 10(a) | Develop full adder circuit using basic gates and using two half adders. | 6M | CO5 | L3 |
| (b) | List out the function of each pin of IC-741 Op-Amp. | 6M | CO5 | L1 |

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**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING**
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B.Tech. (III Semester) ~~Regular~~/Supplementary Examinations

**17ME03-THERMODYNAMICS**
(ME)

Time : 3 hours Max. Marks : 60

Answer one question from each unit
All questions carry equal marks

| Q.No | Questions | Marks | CO | BL |
|---|---|---|---|---|
| 1(a) | Describe the free expansion and throttling process with the help of a neat diagram and show that work transfer is zero. | 6M | CO1 | L2 |
| (b) | Define a new temperature scale say $^0$M. At ice point and steam point temperatures are 80$^0$M and 300$^0$M respectively. Correlate this with centigrade scale. The $^0$N reading on this scale is a certain number of degrees on a corresponding absolute temperature scale. Find this absolute temperature at $^0$N. | 6M | CO1 | L3 |
| | **(OR)** | | | |
| 2(a) | Paraphrase the thermodynamic system and control volume. | 6M | CO1 | L2 |
| (b) | What is the zeroth law of thermodynamics? How does constant volume and constant pressure gas thermometers differ? | 6M | CO1 | L1 |
| | | | | |
| 3(a) | Differentiate between $W=\int pdv$ and $W=-\int vdp$ | 6M | CO2 | L2 |
| (b) | A stationary mass of gas is compressed without friction from an initial state of 0.3 m$^3$ and 0.105 MPa to a final state of 0.15 m$^3$ and 0.105 MPa, the pressure remaining constant during the process. There is a transfer of 37.6 kJ of heat from the gas during the process. How much does the internal energy of the gas? | 6M | CO2 | L3 |
| | **(OR)** | | | |
| 4(a) | Develop the steady flow energy equation (SFEE) for one stream entering and leaving the device with certain assumptions. Apply the SFEE to the given systems (i) Hydraulic Turbine (ii) Nozzle and Diffuser. | 6M | CO2 | L3 |
| (b) | Air enters a compressor operating at steady state at a pressure of 1 bar, a temperature of 290 K, and a velocity of 6 m/s through an inlet with an area of 0.1 m$^2$. At exit, the pressure is 7 bar, the temperature is 450 K and the velocity is 2 m/s. Heat transfer from the compressor to the surroundings occurs at the rate of 180 kJ/min. By employing the ideal gas model, estimate the power input to the compressor. Take $C_p$=1.005 kJ/kg-K. | 6M | CO2 | L3 |
| | | | | |
| 5(a) | Prove that $(COP)_{HP}=1+(COP)_R$ and also draw a block diagram showing the four energy interactions of a cyclic heat engine. | 6M | CO3 | L3 |

| | | | | |
|---|---|---|---|---|
| (b) | Distinguish the concepts on PMM1 and PMM2. It is impossible to construct PMM1 and PMM2. Justify. | 6M | CO3 | L2 |
| | **(OR)** | | | |
| 6(a) | How is entropy related to molecular disorder in a system? Enlist the salient characteristics and uses of entropy | 6M | CO3 | L1 |
| (b) | Calculate the entropy change of the universe as a result of the following process:<br>(i) A copper block of 600g mass and with $C_P$ of 150J/K at 100°C is placed in a lake at 8°C. (ii) The same block at 8°C is dropped from a height of 100m into the lake (iii) Two such blocks at 100 and 0°C are joined together. | 6M | CO3 | L4 |
| | | | | |
| 7(a) | What is an equation of state? Distinguish the Dalton's law of partial pressures and Amagat's law of partial volumes of gas mixtures. | 6M | CO4 | L2 |
| (b) | A mixture of ideal gases consists of 3 kg of Nitrogen and 5 kg of Carbon dioxide at a pressure of 300 kPa and a temperature of 20 $^0$C. Find (i) mole fraction of each constituent (ii) equivalent molecular weight of the mixture (iii) equivalent gas constant of the mixture. (iv) The partial pressures and partial volumes. | 6M | CO4 | L3 |
| | **(OR)** | | | |
| 8(a) | Draw the phase equilibrium diagram for pure substance on P-T and T-V coordinates. Why does the fusion curve for water have negative slope? | 6M | CO4 | L2 |
| (b) | Find the internal energy of 1 kg of superheated steam at a pressure of 12 bar and temperature of 250 $^0$C. If the steam is expanded to 1.2 bar and dryness fraction 0.9, Find the change in internal energy.<br>Analyze the internal energy change for 25 bar and temperature of 350$^0$C, keeping the remaining parameters above are same. | 6M | CO4 | L4 |
| | | | | |
| 9(a) | Why the Rankine cycle efficiency is less than Carnot cycle? Justify your answer with sketches | 6M | CO5 | L1 |
| (b) | Formulate the expression for efficiency of Otto Cycle with neat diagram and represent on p-v and t-s planes. Compare the final expression with Diesel Cycle. | 6M | CO5 | L4 |
| | **(OR)** | | | |
| 10(a) | In which of the following states of steam at the inlet of the turbine the efficiency of Rankine cycle is maximum.<br>(i) Wet condition of steam (ii) Dry saturated steam (iii) Superheated steam.<br>Justify your view with help of T-S diagram. | 6M | CO5 | L4 |
| (b) | The stroke and cylinder diameter of a CI engine are 250 mm and 150 mm respectively. If the clearance volume is 0.0004 $m^3$ and fuel injection takes place at constant pressure for 5 % of the stroke. Determine the efficiency of the engine.<br>Analyze the efficiency change when fuel injection takes place at constant pressure for 15 % of the stroke. | 6M | CO5 | L4 |

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