

A.Y. 2019-20

Regulations : R14

# LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

B.Tech. (V Semester)(R14) Supplementary Examinations, October 2020

## TIME TABLE

TIME : 10.00 AM to 01.00 PM

DATE	ASE	CE	CSE	ECE	EEE	EIE	IT	ME
20-10-2020 (Tuesday)	S359 - Propulsion-I	S394 - Structural Analysis - II	S181 - Design and Analysis of Algorithms	S187 - Digital Communications	S288 - Linear and Digital IC Applications	S162 - Communication Systems	S181 - Design and Analysis of Algorithms	S267 - IC Engines and Gas Turbines
21-10-2020 (Wednesday)	S117 - Aerodynamics-II	S183 - Design of Reinforced Concrete Structures - I	S401 - Theory of Computation	S195 - Digital Systems Design using VHDL	S341 - Power Electronics	S277 - Integrated Circuits and Applications	S401 - Theory of Computation	S291 - Machine Design - I
22-10-2020 (Thursday)	S122 - Aircraft Structures - II	S255 - Geo Technical Engineering - I	S327 - Operating Systems	S160 - Electronic Measurements and Instrumentation	S219 - Electrical Power Transmission	S352 - Process Control Instrumentation	S323 - Object Oriented Analysis and Design	S203 - Dynamics of Machines
23-10-2020 (Friday)	S123 - Aircraft Systems and Instruments	S265 - Hydrology	S168 - Computer Networks	S313 - Microprocessors and Microcontrollers	S227 - Elements of Signal Processing	S168 - Computer Networks	S168 - Computer Networks	S270 - Industrial Management
27-10-2020 (Tuesday)	S119 - Aircraft Performance	S423 - Water Supply Engineering	S312 - Microprocessors and Interfacing	S398 - Telecommunication Switching Systems and Networks	S406 - Thermal and Hydro Prime Movers	S269 - Industrial Instrumentation	S167 - Computer Graphics	S308 - Metal Cutting and Machine Tools
28-10-2020 (Wednesday)	S226 - Elements of Heat Transfer	S412 - Transportation Engineering - I	S262 - Human Computer Interaction	S411 - Transmission Lines and Wave Guides	S169 - Computer Organization	S192 - Digital Signal Processing	S137 - Artificial Intelligence	S329 - Operations Research

### NOTE:

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

\* for re-admitted students

Date: 06-10-2020

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

CONTROLLER OF EXAMINATIONS

*[Signature]*  
PRINCIPAL

20 OCT 2020

H.T.No

R14

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING  
(AUTONOMOUS)

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

B.Tech. V Semester ~~Regular~~/Supplementary Examinations

**S359-PROPULSION-I**

(AE)

Time : 3 hours

Max.Marks:75

**PART-A**

(Compulsory question)

- 1(a) What is transmission efficiency? [1M]
- (b) Mention the functions of an exhaust nozzle. [1M]
- (c) What is the role of a diffuser in a centrifugal compressor? [1M]
- (d) Explain in short about ignition in a combustor. [1M]
- (e) Define utilization factor. [1M]
- (f) How air breathing engines are classified into? [2M]
- (g) What is thrust vectoring? [2M]
- (h) What is stalling? [2M]
- (i) What are the different losses accounted in combustion chamber? [2M]
- (j) Differentiate between an impulse and reaction turbines. [2M]

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

- 2(a) The exit velocity from a jet unit is 650m/s for an air flow of 40 kg/s [8M]  
through the unit. The aircraft is flying at 250 km/h. Calculate the thrust developed, the thrust power and the propulsion efficiency. Neglect the effect of fuel.
- (b) Explain the principle of bleed burn cycle for thrust augmentation. [7M]
- 3(a) Explain how thrust reversing in an aircraft is done?Also discuss about [8M]  
how the noise generated by the aircraft is controlled.
- (b) With the help of T-S diagrams explain the inlet performance during low [7M]  
thrust for cruise and high thrust for takeoff conditions.
4. Air at a temperature of 290K enters a ten stage axial flow compressor at [15M]  
the rate of 3kg/s. The pressure ratio is 6.5 and the isentropic efficiency is 90%, the compression process being adiabatic. The compressor has symmetrical blades. The axial velocity of 110m/s is uniform across the stage and the mean blade speed of each stage is 180m/s. determine the direction of the air at entry to and exit from the rotor and the stator blades and also the power given to the air. Assume  $C_p = 1.005 \text{ kJ/kgK}$  and  $\gamma = 1.4$

**S359-PROPULSION-I**

- 5(a) What are the various possibilities of combustion chamber [8M]  
arrangements?
- (b) Mention the various practical problems in the operation of a combustion [7M]  
chamber.
6. Explain the following [15M]
- (i) Zero percent reaction stage
  - (ii) Fifty percent reaction stage and
  - (iii) Hundred percent reaction stage.
- 7(a) List all the major design variables for the inlet and nacelle. [8M]
- (b) What is meant by volute? Explain the purpose of volute casing? [7M]
- 8(a) Explain the process of combustion in gas turbine combustion chambers. [8M]
- (b) With a neat sketch explain a single stage velocity triangle and derive an [7M]  
expression for the work output.

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21 OCT 2020

H.T.No

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

B.Tech. V Semester ~~Regular~~/Supplementary Examinations

**S117-AERODYNAMICS-II**

(AE)

Time : 3 hours

Max. Marks : 75

The required Data book is Gas Tables by E. Rathakrishnan

**PART-A**

(Compulsory question)

- 1(a) What is the limiting condition for compressibility? [1M]
- (b) What is the value of critical pressure ratio for air? [1M]
- (c) What is the resulting wave if the supersonic flow turns into itself? [1M]
- (d) What is the effect of friction on stagnation temperature? [1M]
- (e) What is the effect of swept back wing on critical Mach number? [1M]
- (f) Calculate the speed of sound in air at sea level condition? [2M]
- (g) Draw the pressure variation along a convergent nozzle? [2M]
- (h) Define expansion wave? [2M]
- (i) Write the expression for critical pressure ratio for Fanno flow? [2M]
- (j) What are the valid situations for linear velocity potential equation? [2M]

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

- 2(a) During a flight, a fighter aircraft attains its cruise speed of 600 m/s at 10 km altitude after taking off at 150 m/s from sea level. Assuming the speed to have increased linearly with altitude during the climb, compute the variation in Mach number with altitude? [7M]
- (b) Derive the energy equation for one-dimensional steady compressible flow from first principle. Deduce the isentropic relation between stagnation and static conditions for temperature, pressure and density. [8M]
- 3(a) Explain different types of nozzle with neat sketches. [7M]
- (b) Air at a stagnation state of 700 kPa and 180° Celsius expands isentropically through a nozzle. If the pressure at the nozzle exit is 100 kPa, determine the flow velocity at the nozzle exit? Assume the air to be a perfect gas with specific heats ratio  $\gamma = 1.4$  [8M]
- 4(a) Show that it is possible to decelerate the flow from supersonic to subsonic across a normal shock wave only? [7M]
- (b) A normal shock is positioned inside a convergent-divergent nozzle of throat area 5 cm<sup>2</sup>, run by a settling chamber with air at 5 atm and 330 K. If the pressure loss caused by the shock is 12.4% and the temperature at the nozzle exit is 300 K, Determine (a) The Mach number ahead of the shock, (b) the flow speed behind the shock and at the nozzle exit, and (c) the mass flow rate through the nozzle? [8M]



## S117-AERODYNAMICS-II

- 5(a) Argon gas enters an insulated, constant area duct with a Mach number of 0.6, static pressure 90 kPa, and static temperature 300 K. The diameter is 30 cm and length is 1.9 m. If the average friction factor for the duct is 0.02, Determine the Mach number, pressure, and temperature at the duct exit? [7M]
- (b) Hydrogen gas enters an insulated tube of 25 mm diameter with velocity  $V_1 = 200$  m/s and pressure  $P_1 = 250$  kPa and temperature  $T_1 = 303$  K. What is the length of the tube required for this flow to choke? Determine the exit pressure? The average friction factor for this tube is 0.03. [8M]
- 6(a) What is area-rule? Explain briefly the importance of area rule? [7M]
- (b) Derive the linearized velocity potential equation for flow over thin airfoil with small perturbation theory? Consider the nonlinear velocity potential equation as given below. [8M]
- $$\left[1 - \frac{1}{a^2} \left(\frac{\partial \phi}{\partial x}\right)^2\right] \frac{\partial^2 \phi}{\partial x^2} + \left[1 - \frac{1}{a^2} \left(\frac{\partial \phi}{\partial y}\right)^2\right] \frac{\partial^2 \phi}{\partial y^2} - \frac{2}{a^2} \left(\frac{\partial \phi}{\partial x}\right) \left(\frac{\partial \phi}{\partial y}\right) \frac{\partial^2 \phi}{\partial x \partial y} = 0$$
- 7(a) Air at 101 kPa and 20°C Celsius is drawn isentropically through a convergent-divergent nozzle of exit area 0.033 m<sup>2</sup>. If the pressure at the nozzle exit is 91.4 kPa, determine the mass flow rate through the nozzle. What is the pressure at the location with area 0.022 m<sup>2</sup>? [7M]
- (b) Air in a high pressure tank at pressure  $P_0$  is suddenly accelerated through a nozzle to maximum possible velocity. What will be the error in the maximum velocity estimated by assuming this flow as incompressible? [8M]
- 8(a) What is shock polar? Explain its importance in supersonic aerodynamics? [7M]
- (b) Derive the Hugoniot equation and explain the Hugoniot Curve. [8M]

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B.Tech. V Semester Regular/Supplementary Examinations

**S122-AIRCRAFT STRUCTURES-II**

(AE)

Time : 3 hours

Max. Marks : 75

**PART-A**

(Compulsory question)

- 1(a) Define neutral axis. [1M]
- (b) Write formula for shear flow ( $q_s$ ) for an unsymmetrical open section beam. [1M]
- (c) What is the condition for shear flow of wall effective skin of closed section beam? [1M]
- (d) What is anticlastic surface? [1M]
- (e) Write any two assumptions of structural idealization process. [1M]
- (f) What is direct stress ( $\sigma_z$ ) when product second moment of area  $I_{xy}$  is zero of the beam? [2M]
- (g) Locate the shear center for the cross-section shown in Figure. 1(g). And explain how it's located.



Figure. 1(g)

- (h) Write Bredt-Batho formula. Explain. [2M]
- (i) What is tension field beam? [2M]
- (j) What is the effect of idealization on the analysis of open section beams? [2M]

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

- 2(a) Figure. 2(a) shows the section of an angle purlin. A bending moment of 3000 N m is applied to the purlin in a plane at an angle of  $30^\circ$  to the vertical  $y$  axis. If the sense of the bending moment is such that its components  $M_x$  and  $M_y$  both produce tension in the positive  $xy$  quadrant, calculate the direct stress at points F and C in the purlin. Take  $I_{xx} = 3.37 \times 10^6 \text{ mm}^4$ ,  $I_{yy} = 1.93 \times 10^6 \text{ mm}^4$ ,  $I_{xy} = 1.50 \times 10^6 \text{ mm}^4$ .

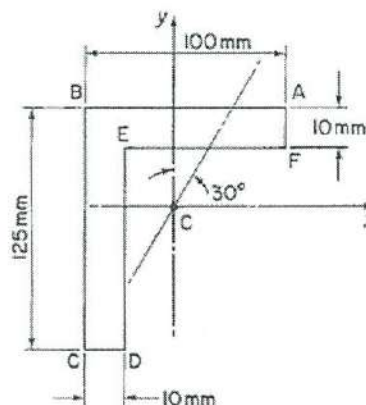


Figure. 2(a)

- (b) A thin-walled, cantilever beam of unsymmetrical cross-section supports shear load at its free end as shown in Figure. 2(b). Calculate the value of direct stress at the extremity of the lower flange (point A) at a section half-way (middle of the beam) along the beam if the position of the shear loads is such that no twisting of the beam occurs. Take  $I_{xx} = 5.67 \times 10^5 \text{ mm}^4$ ,  $I_{yy} = 1.49 \times 10^5 \text{ mm}^4$ ,  $I_{xy} = -0.8 \times 10^5 \text{ mm}^4$ .

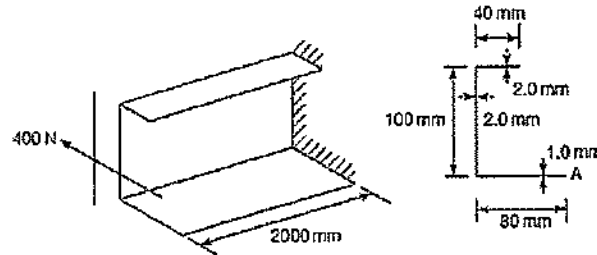


Figure. 2(b)

[8M]

- 3(a) Determine the shear center for the circular section of radius R, thickness t having a narrow slit.
- (b) A thin-walled beam has the cross-section shown in Figure. 3(b). If the beam is subjected to a shear load  $S_y = 100 \text{ N}$  applied through the plane of the web 2-3 calculate the distribution of shear flow in the plane 1-2. Take  $I_{xx} = 10h^3t/3$ ,  $I_{yy} = 5h^3t/12$ ,  $I_{xy} = -3h^3t/4$  when  $h = 200 \text{ mm}$  and  $t = 5 \text{ mm}$ .

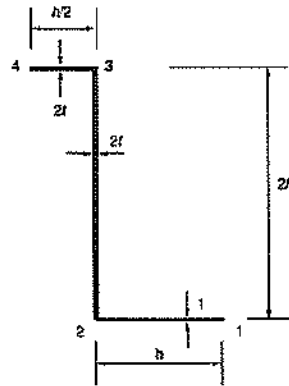


Figure. 3(b)

[8M]

- 4(a) A uniform, thin-walled, cantilever beam of closed rectangular cross-section has the dimensions shown in Figure. 4(a). The shear modulus G of the top and bottom covers of the beam is  $18\,000 \text{ N/mm}^2$  while that of the vertical webs is  $26\,000 \text{ N/mm}^2$ . The beam is subjected to a uniformly distributed torque of  $20 \text{ Nm/mm}$  along its length. Calculate the maximum shear stress according to the Bred-Batho theory of torsion.

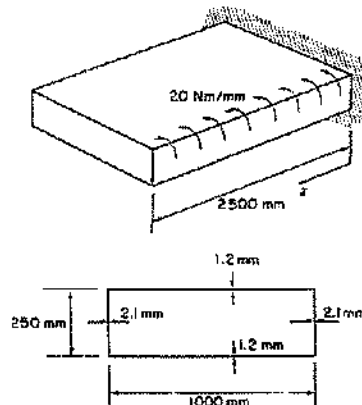


Figure. 4(a)

[7M]



- (b) A thin-walled closed section beam has the singly symmetrical cross-section shown in Figure. 4(b). Each wall of the section is flat and has the same thickness  $t$  and shear modulus  $G$ . Calculate the shear flow of planes 23 and 34. Take  $S_y = 200 \text{ N}$ ,  $I_{xx} = 1152a^3t$ , where  $a = 20 \text{ mm}$  and  $t = 2 \text{ mm}$ .

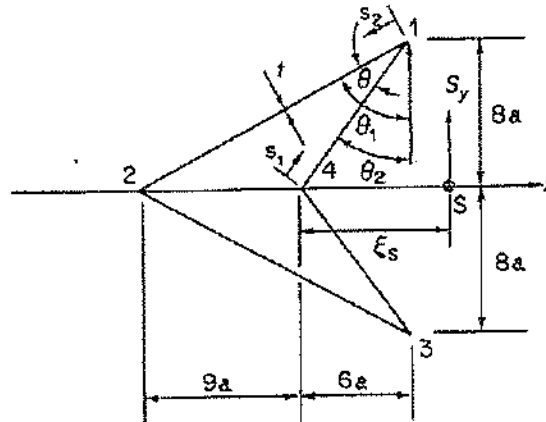


Figure. 4(b)

[8M]

- 5(a) A plate 10 mm thick is subjected to bending moments  $M_x$  equal to 10 N m/mm and  $M_y$  equal to 5 N m/mm, find the maximum twisting moment per unit length in the plate and the direction of the planes on which this occurs.

[7M]

- (b) Part of a compression panel of internal construction is shown in Figure. 5(b). The equivalent pin-centre length of the panel is 500 mm. The material has a Young's modulus of 70 000 N/mm<sup>2</sup> and its elasticity may be taken as falling catastrophically when a compressive stress of 300 N/mm<sup>2</sup> is reached. Taking coefficients of 3.62 for buckling of a plate with simply supported sides and of 0.385 with one side simply supported and one free, determine the load per mm width of panel when initial buckling may be expected.

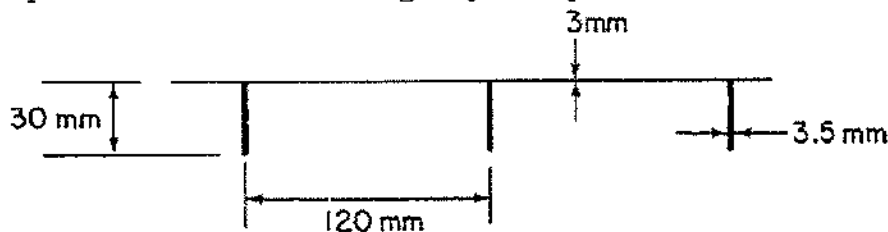


Figure. 5(b)

[8M]

- 6(a) Part of a wing section is in the form of the two-cell box shown in Figure. 6(a) in which the vertical spars are connected to the wing skin through angle sections all having a cross-sectional area of 400 mm<sup>2</sup>. Idealize the section into an arrangement of direct stress carrying booms and shear stress only carrying panels suitable for resisting bending moments in a vertical plane. Position the booms at the spar/skin junctions.

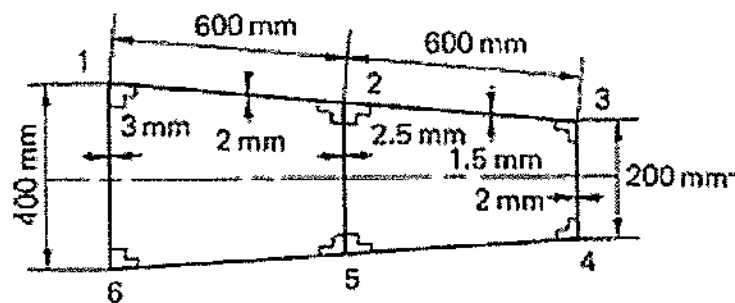


Figure. 6(a)

[7M]

- (b) The fuselage section shown in Figure. 6(b) is subjected to a bending moment of 200 kN-m applied in the vertical plane of symmetry. If the section has been completely idealized into a combination of direct stress carrying booms and shear stress only carrying panels, determine the direct stress in booms 6 to 9 only. Take  $I_{xx} = 1854 \times 10^6 \text{ mm}^4$ .

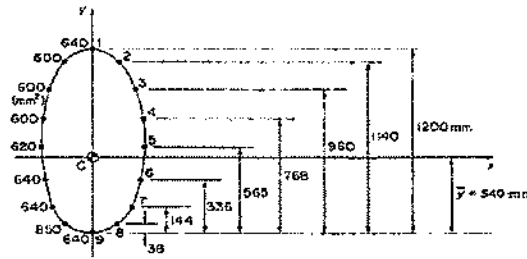


Figure. 6(b)

[8M]

- 7(a) A thin-walled, cantilever beam of unsymmetrical cross-section supports shear load at its free end as shown in Figure. 7(a). Calculate the value of direct stress at the extremity of the lower flange (point A) at a section half-way (middle of the beam) along the beam if the position of the shear loads is such that no twisting of the beam occurs. Take  $I_{xx} = 5.67 \times 10^5 \text{ mm}^4$ ,  $I_{yy} = 1.49 \times 10^5 \text{ mm}^4$ ,  $I_{xy} = -0.8 \times 10^5 \text{ mm}^4$ .

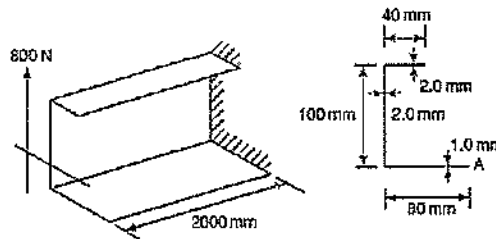


Figure. 7(a)

[7M]

- (b) A plate 10 mm thick is subjected to bending moments  $M_x$  equal to 25 N m/mm and  $M_y$  equal to 15 N m/mm. Calculate the maximum direct stresses in the plate and draw the distribution of it.
- 8(a) Determine the position of the shear flow in a plane 65 and 54 of the cold-formed, thin-walled section is subjected to a shear load  $S_x = 500 \text{ N}$  through shear center of cross-section shown in Figure. 8(a). The thickness  $t = 1 \text{ mm}$  of the section is constant throughout.  $I_{yy} = 6.44 \times 10^5 \text{ mm}^4$ .

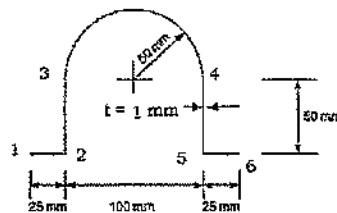


Figure. 8(a)

[7M]

- (b) The singly symmetrical wing section shown in Figure. 8(b) has been idealized into an arrangement of direct stress carrying booms; the boom areas are all 260  $\text{mm}^2$ . Calculate the direct stresses in the booms when the section is subjected to a bending moment of 450 kN m in a horizontal plane.

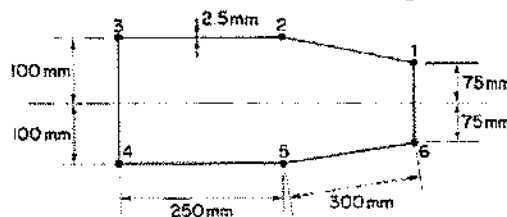


Figure. 8(b)

[8M]

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23 OCT 2020

H.T.No

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B.Tech. V Semester Regular/Supplementary Examinations

**S123-AIRCRAFT SYSTEMS AND INSTRUMENTS**

(AE)

Time : 3 hours

Max. Marks : 75

**PART-A**

(Answer all questions)

- 1(a) What are the components of conventional control system? [1M]
- (b) Where Steering Damper is used? [1M]
- (c) What is Fuel Strainer? [1M]
- (d) List out the smoke detectors? [1M]
- (e) Why mach meter is in an aircraft? [1M]
- (f) Note on digital fly by system? [2M]
- (g) Where the Shimmy Dampers used and explain? [2M]
- (h) What is Fuel Jettisoning System? [2M]
- (i) Explain about Kidde continuous-loop system? [2M]
- (j) Write the difference between aneroid and diaphragm? [2M]

**PART-B**

(Answer any FOUR questions)

- 2(a) Explain the working principles of powered flight control systems? [7M]
- (b) Describe how fully powered flight control systems works. [8M]
- 3(a) Write down the Characteristics of hydraulic fluid? [7M]
- (b) Explain in detail the Brake system of an aircraft? [8M]
- 4(a) What are the components of battery ignition system? Explain? [7M]
- (b) Write about magneto ignition system with sketch? [8M]
- 5(a) What are Requirements for Overheat and Fire Protection Systems? [7M]
- (b) Illustrate in detail about boot-strap air cycle system with the help of neat diagram? [8M]
- 6(a) What are the different types of temperature measuring instruments and explain any one of them? [7M]
- (b) Describe about altimeter with neat diagram? [8M]
- 7(a) Explain the concept of vapour cycle system in an aircraft? [7M]
- (b) Explain the fuel system for A320 with neat diagram? [8M]
- 8(a) Illustrate the importance of lubricating system in an aircraft? Explain? [7M]
- (b) Explain the concept of auto pilot system in an aircraft? [8M]

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28 OCT 2020

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

**S226-ELEMENTS OF HEAT TRANSFER**

(AE)

Time : 3 hours

Max. Marks : 75

**PART-A**

(Compulsory question)

- 1(a) What are the units of heat flux? [1M]
- (b) Enlist the types of fins. [1M]
- (c) For flow through pipes what is the value of critical Reynolds Number. [1M]
- (d) If the incident radiation is 5000W what will be the irradiation. [1M]
- (e) Quote an example for contact type heat exchanger. [1M]
- (f) What is Newton's Law of cooling? [2M]
- (g) For optimization of weight which kinds of fins are used. [2M]
- (h) Differentiate free and forced convection phenomenon. [2M]
- (i) Define Radiosity. [2M]
- (j) Sketch the temperature variation of hot and cold fluids in evaporator. [2M]

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

- 2(a) With the help of examples demonstrate the basic modes of heat transfer [8M]
- (b) A brick wall of  $K = 0.7 \text{ W/mK}$  is 0.3m thick. If the inner and outer surfaces are maintained at  $50^\circ\text{C}$  and  $30^\circ\text{C}$  respectively, calculate the heat lost through  $1 \text{ m}^2$  area. Also find the temperature at 24cm distant from the inner surface. [7M]
3. Derive the temperature distribution equation for a short fin whose one end is insulated. [15M]
- 4(a) Explain the difference between natural and forced convection heat transfer. [7M]
- (b) Assuming that a man can be represented by cylinder of 30cm diameter and 1.7m high with a surface temperature of  $30^\circ\text{C}$ , calculate the heat he would lose while standing in 36km/hr wind at  $10^\circ\text{C}$ . [8M]
- 5(a) State the rules to calculate Shape Factor. [8M]
- (b) It is observed that intensity of radiation is maximum in case of solar radiation at a wave length of 0.49microns. Assuming the sun as a black body, estimate its surface temperature and emissive power. [7M]
- 6(a) Explain in detail the parallel and counter flow heat exchangers. [7M]
- (b) Classify Shell and Tube Heat Exchangers. [8M]
7. Define the terms irradiation,  $G$  and radiosity,  $J$ . Show that for a non-transmitting surface these are related by the expression  $G = [(J - \epsilon E_b) / (1 - \epsilon)]$  [15M]
8. Derive 1D heat conduction equation for a plane slab with internal heat generation at a distance other than the centre of the slab. [15M]

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B.Tech. V Semester ~~Regular~~ / Supplementary Examinations

**S119-AIRCRAFT PERFORMANCE**

(AE)

g.m.w

Time : 3 hours

Max. Marks : 75

**PART-A**

(Answer all questions)

- |      |   |      |
|------|---|------|
| 1(a) | Enlist the parameters required to model the atmosphere.                                   | [1M] |
| (b)  | Draw the curve or drag divergence Mach.   | [1M] |
| (c)  | Write the equation of motion or steady level flight.                                      | [1M] |
| (d)  | On which parameters rate of climb depends?  | [1M] |
| (e)  | What is ultimate limiting load factor?  | [1M] |
| (f)  | Mention different methods to find the variation of the temperature with altitude.         | [2M] |
| (g)  | Mention different types of drag reduction methods?  | [2M] |
| (h)  | How thrust available varying with velocity in case of propeller driven aircrafts and why? | [2M] |
| (i)  | Draw the force and velocity diagram for climbing flight in case of rate of climb?         | [2M] |
| (j)  | How the altitudes effect the ground roll during takeoff?                                  | [2M] |

**PART-B**

(Answer any FOUR questions)

- |      |   |      |
|------|---|------|
| 2(a) | Explain how thrust will produced in a propeller attached reciprocating engine with neat sketch?   | [7M] |
| (b)  | Using Froud's momentum theory show that $T=2\rho SV^2a(1+a)$ .  | [8M] |
| 3(a) | Write a short notes on i) Area-rule method ii) Super-critical airfoil.  | [7M] |
| (b)  | Illustrate the effect of mach number on the drag polar in subsonic and supersonic airplanes.  | [8M] |
| 4(a) | Consider two airplane one is jet propelled another is propeller driven. Explain the producer for deter mining the velocity graphically for these airplanes.   | [7M] |
| (b)  | Explain effect of drag divergence on maximum velocity.  | [8M] |
| 5(a) | Explain time to climb using graphical and analytical approach?  | [7M] |
| (b)  | Using analytical approach calculate the minimum time to climb to 9 KM for the airplane. At altitudes 0, 3.4, 6, 9, 12, 15.4 KM the corresponding maximum rate of climbs are 54.83, 47.73, 40.78, 33.83, 26.18, 17.73 in m/s.        | [8M] |
| 6(a) | Discuss in detail about the V-n diagram with neat sketch?   | [7M] |
| (b)  | What is difference between pull up and pull down maneuver? Derive the expression for radius and turn rate in case of pull-up maneuver for an aircraft.  | [8M] |
| 7(a) | What are different types of propeller co-efficient and derive the expressions for them.   | [7M] |
| (b)  | A propeller is required to produce a thrust of 4KN at flight speed of 120 m/s at sea level. If the diameter of the propeller is 2.5m. Estimate the minimum power that must be supplied on the basis of the Froud's momentum theory. | [8M] |
| 8(a) | Construct the maximum lift to drag ratio on drag polar curve. Explain the minimum drag and drag at zero lift using drag polar.  | [7M] |
| (b)  | Explain the construction of the drag polar using the resultant aerodynamic forces at different angle of attack.   | [8M] |

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20 OCT 2020

H.T.No

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

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

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

**S394-STRUCTURAL ANALYSIS-II**

(CE)

Time : 3 hours

Max.Marks:75

**PART-A**

(Answer all questions)

- 1(a) Is moment at tied arch is zero. [1M]
- (b) State the location of maximum shear force in a simple beam with any kind of loading. [1M]
- (c) What is meant by influence lines? [1M]
- (d) Define Stiffness of joint. [1M]
- (e) Write the element stiffness matrix for a truss element. What is structure/global stiffness matrix? [1M]
- (f) Write the formula to calculate 'R' in a circular arch. [2M]
- (g) Write the expression for maximum negative shear force in S.S beam with udl longer than the span W moving from left to right. [2M]
- (h) A single rolling load of 100 kN moves on a girder of span 20 m. Construct the influence lines for reactions. [2M]
- (i) What are the situations where in sway will occur in portal frame? [2M]
- (j) List the properties of the rotation matrix. [2M]

**PART-B**

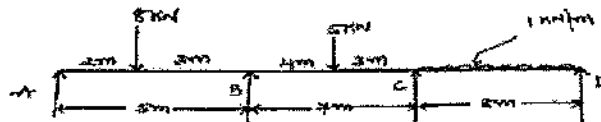
(Answer any FOUR questions. All questions carry equal marks)

- 2(a) A three hinged parabolic arch of span 40 m and rise 8 m carries a concentrated load of 200 kN and 150 kN at the distance of 8m and 16m from the left hand support and UDL of 50 kN/m on the right half of the span. Calculate the reactions at supports and normal thrust & Radial shear at 10 m from left hand support. [8M]
- (b) A parabolic arch hinged at the ends has a span of 60 m and rise of 12 m carries concentrated load of 8 kN at 15 m from left hinge. The second moment area varies as secant of the inclination of the arch axis. Calculate the horizontal thrust and also B.M under the load. [7M]
3. Two wheel loads of 80 kN and 160 kN cross a span of 10 m from left to right. The 80 kN wheel is 2 m ahead of the 160 kN wheel. Find the following force values and their locations.
  - (i) The absolute maximum positive shear.
  - (ii) The absolute maximum negative shear.
  - (iii) The absolute maximum maximum bending moment. [15M]
4. Draw the influence lines for Shear force and bending moment at a section 5 m from one end of simply supported beam, 25 m long. Hence calculate the maximum bending moment and shear. [15M]



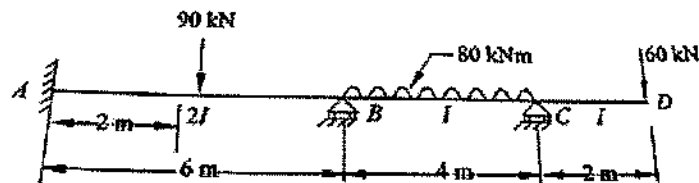
**S394-STRUCTURAL ANALYSIS-II**

5. A continuous beam ABCD, 20 m long is simply supported at its ends and is propped at the same level at B and C as shown. It is loaded as shown in figure - 15. If support B sinks by 10 mm, analyse the beam Kani's method. Take  $E = 2.1 \times 10^5 \text{ N/mm}^2$  and  $I = 85 \times 10^5 \text{ mm}^4$ .



[15M]

6. Analyse the beam shown in figure by stiffness matrix method. Draw the bending moment diagram.



[15M]

- 7(a) A three hinged parabolic arch of span 60 m and central rise 6 m. A simple concentrated load of 30 kN acts downwards at a distance of 40 m from left support. Determine the reactions at the support and result moment under load and Normal thrust and Radial shear. [7M]
- (b) A two hinged parabolic arch of span 40 m and central rise 4 m. A concentrated load of 25 kN at a distance of 16 m from A. The second moment area varies as secant of the inclination of the arch axis. Calculate the horizontal thrust and also B.M at mid span and also draw Bending moment Diagram. [8M]
8. Draw the ILD for shear force and bending moment for a section at 5m from the left hand support of a simply supported beam, 20 m long. Hence, calculate the maximum bending moment and shear force at the section, due to a uniformly distributed rolling load of length 8 m and intensity 10 kN/m run. [15M]

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LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING  
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B.Tech.V Semester ~~Regular~~/Supplementary Examinations

**S183-DESIGN OF REINFORCED CONCRETE STRUCTURES-I**  
(CE)

104

Time : 3 hours

Max.Marks:75

**The codes IS 456-2000 and SP 16 are allowed.**

**Assume any suitable missing data.**

**State your assumptions clearly.**

**PART-A**

(Answer all questions)

- 1(a) Define over reinforced section in working stress method. [1M]
- (b) Identify and locate the position of neutral axis if  $X_u < D_f$  in flanged sections. [1M]
- (c) Compute the development length for M30 grade concrete and Fe415 steel in tension. [1M]
- (d) List out the various types of slabs according to aspect ratio. [1M]
- (e) Mention the value of minimum eccentricity in reinforced concrete columns. [1M]
- (f) What is the transformed area of compression steel in reinforced concrete beams? [2M]
- (g) Why minimum tension reinforcement is provided in reinforced concrete beams? [2M]
- (h) Determine the anchorage value of 10mm diameter stirrups when the bar is bent into an angle of 90 degrees. [2M]
- (i) Calculate interior support moments for a one way continuous slab having  $W_d = 4 \text{ kN/m}^2$  and  $W_s = 7 \text{ kN/m}^2$ . Take  $L = 3.8 \text{ m}$ . [2M]
- (j) Find out the reduction factor for a long column of size 400mm X 600mm. Take  $P_u = 1200 \text{ kN}$ ,  $P_{uz} = 2000 \text{ kN}$  and  $P_b = 500 \text{ kN}$ . [2M]

**PART-B**

(Answer any FOUR questions)

2. Determine the reinforcement required for a doubly reinforced rectangular beam 350mm wide and 500mm deep which is subjected to bending moment of 100 kN-m if the limiting stresses in concrete and steel are 7 N/mm<sup>2</sup> and 140 N/mm<sup>2</sup>. Take effective cover 60mm and  $m = 19$ . (Use working stress method) [15M]
3. Design a singly reinforced concrete beam of clear span 5m to support design working live load of 10 kN/m. Adopt M20 grade concrete and Fe 415 steel. [15M]
4. A rectangular beam of 300mm wide & 600mm effective depth is reinforced with 4 bars 20mm diameter at supports. Design shear reinforcement if it carries a shear force of 80kN at service. Use M15 grade concrete and Fe 415 steel. Check for requirement of bond at support having width of 400mm. [15M]

**S183-DESIGN OF REINFORCED CONCRETE STRUCTURES-I**

5. Design a simply supported R. C slab over a room 4m X 6.0m from inside assuming that the corners are not free to lift. The thickness of four walls is 400mm, the live load on the floor is 4 kN/m<sup>2</sup>. The floor carries a floor finish which weighs 8.5 kN/m<sup>2</sup>. Use M20 mix Fe 500 steel. [15M]
6. Design a short column to carry a working load of 2000kN and uniaxial moment of 200 kN.m. Assume M20 mix Fe 415 steel. [15M]
7. Write short notes on Short term deflection and Long term deflection. [15M]
8. A reinforced concrete beam of rectangular section 350mm wide and 500 mm effective depth having reinforcement of 4 bars of 16mm diameter in compression and 4 bars of 25mm diameter in tension. The beam resist a shear force of 350kN at support. Assume  $F_{ck}=30 \text{ N/mm}^2$  and  $F_y=500 \text{ N/mm}^2$ . Design inclined stirrups. [15M]

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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. (V Semester) ~~Regular~~ / Supplementary Examinations

**S255-GEO TECHNICAL ENGINEERING-I**

(CE)

Time : 3 hours

Max. Marks : 75

**PART-A**

(Compulsory question)

- |      |  |      |
|------|--|------|
| 1(a) | Define void ratio.                                     | [1M] |
| (b)  | State Darcy's law.                                     | [1M] |
| (c)  | Define shear strength of soil.                         | [1M] |
| (d)  | Define zero air void line.                             | [1M] |
| (e)  | Define consolidation.                                  | [1M] |
| (f)  | Define liquid limit.                                   | [2M] |
| (g)  | Define quick sand condition.                           | [2M] |
| (h)  | What are the shear tests based on drainage conditions? | [2M] |
| (i)  | What is pressure bulb?                                 | [2M] |
| (j)  | Define coefficient of compressibility.                 | [2M] |

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

- |      |  |       |
|------|--|-------|
| 2(a) | An undisturbed sample of soil has a volume of 100 cm <sup>3</sup> and mass of 190g on oven drying for 24 hours the mass is reduced to 160g. If the specific gravity of grains is 2.68. Determine the water content, void ratio and degree of saturation of the soil.   | [7M]  |
| (b)  | The mass specific gravity of a fully saturated specimen of clay having a water content of 36% is 1.86. On oven drying, the mass specific gravity drops to 1.72. Calculate the specific gravity of clay and its shrinkage limit.  | [8M]  |
| 3(a) | What are the factors affecting permeability?   | [7M]  |
| (b)  | Calculate the total, effective and pore pressure at a depth of 20m below the bottom of a lake 6m deep. The bottom of lake consists of soft clay with a thickness of more than 20m. The average water content of the clay is 35% and the specific gravity of the soil may be assumed to be 2.65.  | [8M]  |
| 4.   | Explain in detail Direct Shear Test with a neat sketch. What are the advantages and disadvantages of Direct shear test over other test?  | [15M] |
| 5(a) | Find the intensity of the vertical pressure and horizontal shear at a point 4m directly below a 20kN point load acting at a horizontal ground surface. What will be vertical pressure and shear stress at a point 2m horizontally away from the axis of loading but at the same depth of 4m? Use Boussinesq equations.   | [7M]  |
| (b)  | Explain in detail modified proctor test.   | [8M]  |
| 6(a) | Explain the laboratory consolidation test with a neat sketch.  | [7M]  |
| (b)  | A clay layer, whose total settlement under a given loading is expected to be 12 cm settles 3cm at the end of 1 month after the application of load increment. How many months will be required to reach a settlement of 6 cm? How much settlement will occur in 10 months? Assume the layer to have double drainage.   | [8M]  |
| 7.   | Explain in detail IS soil classification system.   | [15M] |
| 8(a) | What are the factors affecting soil compaction.  | [7M]  |
| (b)  | Calculate the coefficient of permeability of a soil sample, 6cm in height and 50 cm <sup>2</sup> in cross sectional area. If quantity of water equal to 430 ml passed down in 10 minutes, under an effective constant head of 40 cm. On oven drying, the test specimen has a mass of 498 g. Taking the specific gravity of soil solids as 2.65. Calculate the seepage velocity of water during the test. | [8M]  |

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23 OCT 2020

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

B.Tech. (V Semester) Supplementary Examinations

**S265-HYDROLOGY**

(CE)

Q.N 2

Time : 3 hours

Max. Marks : 75

**PART-A**

(Compulsory question)

Q.No	Questions	Marks
1(a)	Sketch the Ring basin flooding.	1M
(b)	Write the Muskingum equation.	1M
(c)	State two possible disadvantages of Irrigation.	1M
(d)	List any four factors which affect the hydrograph.	1M
(e)	List any two limitations of Darcy's law.	1M
(f)	Write any two demerits of Non- recording type rain gauge.	2M
(g)	Distinguish between depression storage and detention storage.	2M
(h)	Find the delta for a crop if the duty for a base period of 110 days is 1400 hectares/cumec.	2M
(i)	Differentiate between Reservoir routing and channel routing.	2M
(j)	Draw a neat sketch to indicate the different types of aquifers.	2M

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

2(a)	Derive an expression for the steady state discharge of well fully penetrating into a confined aquifer.	7M
(b)	An unconfined aquifer has an areal extent of 15 km <sup>2</sup> . When 9.5 million m <sup>3</sup> of water was pumped out, the water table was observed to go down by 2.4 m. Find the specific yield of the aquifer. If the water table of the same aquifer rises by 12.5 m during a monsoon season, find the volume of recharge.	8M
3(a)	Discuss the factors affecting evaporation.	7M
(b)	A small watershed near Nagpur is 250 ha in size and has group C soil. The land cover can be classified as 30 % open forest (CN=60) and 70 % poor quality pasture (CN=86). Assuming AMC at average condition and the soil to be black soil, estimate the direct runoff volume due to a rainfall of 75 mm in one day. Use SCS-CN equation applicable to Indian Conditions.	8M
4(a)	Write the necessity of Irrigation and Describe in brief few of the important irrigation projects undertaken or completed after Independence of our country.	7M
(b)	A water course has a culturable commanded area of 1200 hectares. The intensity of irrigation for crop A is 40 % and for B is 35 %, both the crops being Rabi crops. Crop A has a kor period of 20 days and crop B has kor period of 15 days. Calculate the discharge of the water course if the kor depth for crop A is 10 cm and for B it is 16 cm.	8M

5(a)	Describe the method of estimating a $T_r$ - year flood using Log-Pearson type III distribution.											7M	
(b)	The ordinates of a 6-h unit hydrograph are as given below. If two storms, each of 2 cm rainfall excess and 6-h duration occur in succession, calculate the resulting hydrograph of flow. Assume base flow to be uniform at $10 \text{ m}^3/\text{s}$ .											8M	
	Time (h)	0	6	12	18	24	30	36	42	48	54		60
	Ordinates of 6-h UH ( $\text{m}^3/\text{s}$ )	0	20	60	120	90	70	50	30	20	10		0
6(a)	Derive an expression for the steady state discharge of well fully penetrating into a unconfined aquifer.											7M	
(b)	A 20 cm dia meter well penetrate fully a confined aquifer of thickness 25 m. When the well is pumped at a rate of 200 litres/ minute the steady state drawdown in the two observations wells located at 10 m and 100 m distance from the pumping well are found to be 3.5 m and 0.05 m respectively. (i) Calculate the transmissivity and the permeability of the aquifer. (ii) Determine the radius of influence and the drawdown in the well.											8M	
7(a)	Naighbouring raingauge stations A, B, C, D, E and F have normal annual rainfalls of 610, 554, 468, 606, 563 and 382 mm respectively. During a storm, stations B, C, D, E and F have reported rainfalls of 22, 29, 35, 13 and 25 mm respectively and station A did not report as it was inoperative. Estimate the missing storm rainfall at A by the arithmetic average method and the normal-ratio method.											7M	
(b)	Describe the three methods of separating the baseflow from the total runoff.											8M	
8(a)	Two storms each of 6-h duration and having rainfall excess values of 3.0 and 2.0 cm respectively occur successively. The 2 cm ER rain follows the 3 cm rain. The 6 h unit hydrograph for the catchment is given below. Calculate the resulting DRH.											7M	
	Time (h)	0	6	12	18	24	30	36	42	48	54		60
	Ordinates of 6-h UH ( $\text{m}^3/\text{s}$ )	0	50	125	185	160	110	60	36	25	16		0
(b)	Distinguish between (i) Aquifer and Aquifuge (ii) Confined aquifer and water table aquifer (iii) Ground water and Perched ground water.											8M	

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28 OCT 2020

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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. (V Semester) ~~Regular~~/Supplementary Examinations

**S412-TRANSPORTATION ENGINEERING-I**

(CE)

Time : 3 hours

Max.Marks:75

**PART-A**

(Answer all questions)

- |      |  |      |
|------|--|------|
| 1(a) | What are arterial roads?                                 | [1M] |
| (b)  | Define ruling gradient.                                  | [1M] |
| (c)  | Define warning sign in traffic signs.                    | [1M] |
| (d)  | Define viscosity of bitumen.                             | [1M] |
| (e)  | Why shrinkage cracks are formed in roads?                | [1M] |
| (f)  | Write a short note on Bombay road plan.                  | [2M] |
| (g)  | What is the total reaction time of the driver?           | [2M] |
| (h)  | What are the various objectives of the accident studies? | [2M] |
| (i)  | How the bitumen content is estimated in pavement mixer?  | [2M] |
| (j)  | What are the components of rigid pavement?               | [2M] |

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

- |      |  |       |
|------|--|-------|
| 2(a) | Briefly discuss about the scope of highway engineering.  | [7M]  |
| (b)  | What are the various planning surveys required for highway development?  | [8M]  |
| 3(a) | A national highway located in rolling terrain has a radius of 250m. Determine the length of the transition curve making suitable assumptions.  | [7M]  |
| (b)  | What are the general controls to be kept in mind in designing the vertical profile of a road?  | [8M]  |
| 4(a) | What is road marking? Explain the need for road markings.  | [7M]  |
| (b)  | What are the various types of traffic marking commonly used? What are the uses of each?  | [8M]  |
| 5.   | Mention the method of construction and quality control for a granular sub-base layer.  | [15M] |
| 6(a) | The initial traffic after completion of construction of a four-lane divided highway is estimated to be 5600 cv per day, average growth rate =6% per year. Design the flexible pavement for a life of 15 years using the following data given below: design CBR value =10%, growth rate of cv= 6.5% p a, Average VDF value for CV=4.0.Assume any data if necessary. | [8M]  |
| (b)  | What is the effect of using superior pavement materials in flexible pavement?  | [7M]  |
| 7(a) | Explain briefly about the horizontal alignment in highway design. Mention factors which control the alignment.   | [7M]  |
| (b)  | Explain briefly about the vertical alignment in highway design. Mention factors which control the alignment.   | [8M]  |
| 8.   | Explain briefly about the following terms (i) Speed (ii) Volume (iii) Capacity (iv) Traffic sign (v) Road marking.   | [15M] |

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

B.Tech. (V Semester) Supplementary Examinations  
**S423-WATER SUPPLY ENGINEERING**  
(CE)

Time : 3 hours

Max. Marks : 75

**PART-A**  
(Compulsory question)

Q.No	Questions	Marks
1(a)	How the demand curve is prepared?	1M
(b)	What will happen to the turbidity of water in a river during floods?	1M
(c)	Why slow mixing is provided in coagulation process?	1M
(d)	How the equivalent value of effective particle size in filtration estimated?	1M
(e)	What type of head loss is associated with pipe bends or pipe exits?	1M
(f)	The average annual water demand is 150 lpcd. Calculate the maximum daily consumption.	2M
(g)	What are the advantages of plastic pipe used for water supply?	2M
(h)	For what type of particles, Stokes' law is valid in the design of sedimentation tank.	2M
(i)	What are chloramines?	2M
(j)	Two pipes (1 & 2) are connected in series. What will be the resultant discharge in the pipes?	2M

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

2(a)	Describe about infiltration galleries using neat sketches.	7M
(b)	The following data shows the variation in population of a city from 1920-1970. Estimate the population of the city in year 2000 using arithmetical and geometrical increase methods. The population in the years 1920, 1930, 1940, 1950, 1960 and 1970 are 72,000, 85,000, 110,500, 144,000, 184,000 and 221,000 respectively.	8M
3(a)	Explain how the intake works for the earth and gravity dams differ using neat sketches.	7M
(b)	What is the purpose and possible locations of using pumps in water supply systems? Explain the different components and their purposes of a centrifugal pump using neat sketch.	8M
4(a)	Explain the following with respect to water treatment plants: (i) Baffles (ii) weir loading (iii) sludge hoppers (iv) Scrapers.	8M
(b)	Explain the mechanism and factors affecting coagulation process.	7M
5(a)	Why chlorination is given to water? Explain the different forms of chlorination (i) Prechlorination (ii) Post chlorination (iii) Plain chlorination (iv) Double chlorination.	7M
(b)	A filter unit is of size 5m x 10 m. After filtering 10,000 m <sup>3</sup> of water in 24 hour period, the filter is backwashed @10 L/m <sup>2</sup> /s for 10 minutes. Calculate (i) filtration rate (ii) backwash rate and (iii) % backwash water.	8M
6(a)	What do you understand by equivalent pipe method? How do you determine its length when the pipes are (i) in series and (ii) in parallel.	7M
(b)	Explain Radial method of distribution system.	8M
7(a)	Explain the working and operation of slow sand gravity filter using neat sketch.	7M
(b)	For disinfecting water supply, it is required to treat 2,00,000 L of water using 1.5 mg/L of bleaching powder. If the bleaching powder contains 30% of available chlorine, calculate amount of chlorine and bleaching powder required per day.	8M
8.	Explain (i) Gravity system of distribution (ii) Intermittent system (iii) Grid-iron system (iv) Equivalent pipe method (v) Dead End System.	15M



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

B.Tech.V Semester ~~Regular~~/Supplementary Examinations

**S181 - DESIGN AND ANALYSIS OF ALGORITHMS**  
(CSE&IT)

Time : 3 hours

Max.Marks:75

**PART-A**

(Answer all questions)

- 1(a) Define Big-Oh Notation. [1M]
- (b) Define Adjacency Matrix. [1M]
- (c) What is meant by bottom up dynamic programming? [1M]
- (d) Define live node. [1M]
- (e) Define Binomial heap. [1M]
- (f) What are different algorithm design techniques? [2M]
- (g) State single source shortest path algorithm? [2M]
- (h) List out the applications of dynamic programming paradigm. [2M]
- (i) Give the categories of the problem in backtracking. [2M]
- (j) Differentiate between NP Complete and NP-Hard. [2M]

**PART-B**

(Answer any FOUR questions)

- 2(a) Design an algorithm for merge sort and instantiate with an example. [8M]
  - (b) Analyze the time complexity of merge sort. [7M]
  - 3(a) Design an algorithm for optimal storage on tapes and find all feasible solutions for  $n=3$  and  $(l_1, l_2, l_3) = (5, 10, 3)$  and calculate optimal retrieval time. [7M]
  - (b) Construct optimal merge pattern for the files 2,9,7,5,3,13 and show the corresponding steps diagrammatically. [8M]
  4. Describe the procedure of Reliability design. Design a three stage system with device types  $d_1, d_2, d_3$ . The costs are 30/-, 15/-, 20/- and the cost of entire system is 105/- and the reliabilities are 0.9, 0.8, 0.5. [15M]
  5. State Travelling salesperson problem. Apply Branch and Bound algorithm to solve the TSP instantiated by the following cost matrix. [15M]
- |          |          |          |          |          |
|----------|----------|----------|----------|----------|
| $\infty$ | 20       | 30       | 10       | 11       |
| 15       | $\infty$ | 16       | 4        | 2        |
| 3        | 5        | $\infty$ | 2        | 4        |
| 19       | 6        | 18       | $\infty$ | 3        |
| 16       | 4        | 7        | 16       | $\infty$ |
6. Define Splay trees. List out the rotations in Splay tree and illustrate each rotation with an example. [15M]
  - 7(a) Define Space complexity. How to calculate space complexity for an algorithm by considering examples. [7M]
  - (b) Define Time complexity. What are the different ways to calculate time complexity of an algorithm and illustrate with an example. [8M]
  8. State and elaborate 0/1 Knapsack problem solution by dynamic programming method. Find knapsack instance of  $m=21$ ,  $n=4$  and  $P_i = (2, 5, 8, 1)$  and  $W_i = (10, 15, 6, 9)$  by using Dynamic Programming. [15M]

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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. (V Semester) ~~Regular~~/Supplementary Examinations

**S401-THEORY OF COMPUTATION**  
(CSE & IT)

Time : 3 hours

Max. Marks : 75

**PART-A**

(Compulsory question)

- 1(a) Construct a Deterministic Finite Automaton for the Language L over the alphabet {a,b} that accepts strings having at most two a's. [1M]
- (b) State Pumping lemma for the regular language. [1M]
- (c) Define Inherently Ambiguous Language. [1M]
- (d) Mention any two operations of DCFL that are not closed. [1M]
- (e) Give formal Notation of Turing Machine. [1M]
- (f) Construct a Deterministic Finite Automaton (DFA) for the Language L over the alphabet {0,1} that accepts all strings such that the number of 0's is divisible by five, and the number of 1's is divisible by three. [2M]
- (g) Write a regular expression for the Language L over the alphabet {a,b} that accepts all strings having at least two a's and at most two b's. [2M]
- (h) Consider the grammar G:  $S \rightarrow SS \mid a$ . Find the number of parse trees for the string "aaaa". [2M]
- (i) Construct Pushdown Automaton(PDA) for the following grammar  
 $S \rightarrow aA \mid bB$   
 $A \rightarrow a$   
 $B \rightarrow b$  [2M]
- (j) Mention any 4 closure properties of recursive languages. [2M]

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

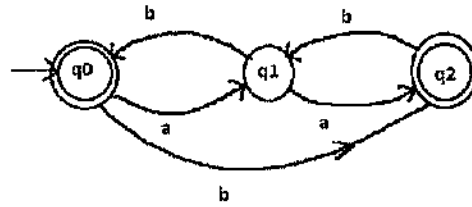
- 2(a) Convert the following NFA into its equivalent DFA

State/Input	0	1
$\rightarrow A$	{A,B}	A
B	C	B
C	D	D
D(final state)	-	C

- (b) Design a Moore machine to generate 1's complement of given binary number. [8M]



- 3(a) Find the Regular Expression for the language accepted by the following Finite Automaton. [7M]



- (b) Show that the language  $L = \{a^n b^m; n \neq m\}$  is not regular. [8M]
- 4(a) Construct a left-linear grammar for the regular expression  $0^*1(0+1)^*$ . [7M]
- (b) Find an equivalent Chomsky Normal Form(CNF) for the following grammar  
 $G = (\{S\}, \{ \sim, \supset, [, ], p, q \}, \{ S \rightarrow \sim S \mid [S \supset S] \mid p \mid q \}, \{S\})$ . [8M]
- 5(a) Construct a Push down Automaton(PDA) to accept the language  
 $L = \{w \mid w \in (a+b)^* \text{ and } n_a(w) = n_b(w)\}$  ( $n_a(w)$  indicates no of  $a$ 's in a string  $w$ ). [7M]
- (b) Construct a Deterministic Push down Automaton (DPDA) for the language  
 $L = \{w \# w^R \mid w \in (a+b)^* \text{ and } w^R \text{ is the reverse of } w \text{ and } \# \text{ is a symbol}\}$ . [8M]
- 6(a) Explain different techniques for construction of Turing machines. [7M]
- (b) Construct a Turing machine  $M$  to compute the function  $f(a,b) = a * b$  where  $a$  and  $b$  are integers represented in unary. [8M]
- 7(a) Construct a Deterministic Finite Automaton (DFA) that accepts all strings over the alphabet  $\{0, 1\}$  such that strings does not contain the substring **001**. [7M]
- (b) Use pumping lemma to show that the language  $L = \{a^n b^n c^n d^n \mid n \geq 1\}$  is not CFL. [8M]
8. Convert the following Context-free Grammar(CFG) into its equivalent Greibach Normal Form  
 $A_1 \rightarrow A_2 A_3$   
 $A_2 \rightarrow A_3 A_1 \mid b$   
 $A_3 \rightarrow A_1 A_2 \mid a$  [15M]

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LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING  
(AUTONOMOUS)

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

B.Tech. V Semester ~~Regular~~ / Supplementary Examinations

**S327-OPERATING SYSTEMS**  
(CSE)

Time : 3 hours

Max. Marks : 75

**PART-A**

(Answer all questions)

- 1(a) Write the responsibility of the Device controller. [1M]
- (b) State the rule if both the processes have same priority in priority Scheduling. [1M]
- (c) Define Circular wait. [1M]
- (d) State the main purpose of Hierarchical paging. [1M]
- (e) State the disadvantages associated with contiguous allocation. [1M]
- (f) List the responsibilities of the operating system in connection with disk management. [2M]
- (g) What is context switch time? [2M]
- (h) List the preventive measures of Deadlock. [2M]
- (i) Discuss roll out and roll in operations [2M]
- (j) Give an example for Absolute path name [2M]

**PART-B**

(Answer any FOUR questions)

2. Discuss in detail about Storage Management. [15M]
3. Consider the following data with burst time given in milliseconds:  
The process has arrived in the order p1, p2, p3, p4, p5 all at time 0.  
A) Sketch Gantt charts for the execution of these processes using FCFS and SJF scheduling.  
B) Find out the turnaround time and waiting time of each process for each of the above scheduling algorithm.
 

Process	Burst time
P1	10
P2	1
P3	2
P4	1
P5	5

 [15M]
4. Illustrate Banker's algorithm for deadlock avoidance with suitable example. [15M]
5. How would you explain memory mapping with Relocation and limit registers? [15M]
6. Demonstrate the contiguous and linked file allocation methods and discuss the advantages and Disadvantages in these methods. [15M]
- 7(a) Explain the layered file system. [7M]
- (b) What is a semaphore? Explain the usage of semaphores. [8M]
- 8(a) What are the main differences between operating systems for mainframe computers and personal computers? [7M]
- (b) Differentiate pre-emptive scheduling and non-pre-emptive scheduling. [8M]

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B.Tech. V Semester Regular / Supplementary Examinations

**S168-COMPUTER NETWORKS**

(ESE, IT & EIE)

Time : 3 hours

Max.Marks : 75

**PART-A**

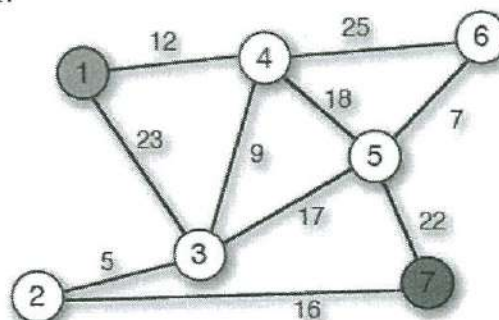
(Compulsory question)

- |      |  |      |
|------|--|------|
| 1(a) | State Shannon theorem for noisy channel.                             | [1M] |
| (b)  | Define bit stuffing.   | [1M] |
| (c)  | Give the principle difference between broadcasting and multicasting. | [1M] |
| (d)  | Why does UDP exist?  | [1M] |
| (e)  | List various methods of HTTP.  | [1M] |
| (f)  | Draw the original ARPANET design.                                    | [2M] |
| (g)  | What is the purpose of hamming code?                                 | [2M] |
| (h)  | Differentiate Virtual subnet and datagram subnet.                    | [2M] |
| (i)  | Give two differences between UDP and TCP.                            | [2M] |
| (j)  | State network security.  | [2M] |

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

- |      |  |       |
|------|--|-------|
| 2.   | Analyze different Guided media used in computer networks.  | [15M] |
| 3(a) | How error detection codes are differ from error correction codes? Give an example for each.                          | [8M]  |
| (b)  | Discuss the role of CSMA/CD protocol in Ethernet.  | [7M]  |
| 4.   | Why congestion occurs in the network? Discuss various congestion control mechanisms associated with traffic shaping. | [15M] |
| 5.   | Draw TCP header format and explain each field in the header.   | [15M] |
| 6.   | Describe how RSA Algorithm is used to generate keys for Public-key Cryptography with an example?                     | [15M] |
| 7(a) | Classify different Gateway Routing protocols.  | [7M]  |
| (b)  | Outline Open Shortest Path First (OSPF) protocol with a neat sketch.   | [8M]  |
| 8(a) | Examine the steps involved in Dijkstra's algorithm to find out shortest path.  | [7M]  |
| (b)  | Derive shortest path from node '1' to node '7' for the below graph using Dijkstra's Algorithm.                       | [8M]  |



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B.Tech. (V Semester) Supplementary Examinations

**S312-MICROPROCESSORS AND INTERFACING  
(CSE)**

Time : 3 hours

Max. Marks : 75

**PART-A**

(Compulsory question)

Q.No	Questions	Marks
1(a)	How many control flags are there in 8086?	1M
(b)	What is the length of instruction queue in 8086?	1M
(c)	Why should we need DMA in the computer system?	1M
(d)	What is IO mode in 8255?	1M
(e)	How many number of interrupts are supported by 8086?	1M
(f)	List the addressing modes of 8086.	2M
(g)	Write an ALP to add two ASCII numbers.	2M
(h)	Explain the use of DMA address register.	2M
(i)	What is meant by key debounce?	2M
(j)	What do you mean by Special Fully Nested Mode (SFNM)?	2M

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

2(a)	Show the functions of the segment registers of 8086 with examples.	7M
(b)	Briefly Explain the following instructions of 8086 with an example. (i) AND (ii) XOR (iii) TEST (iv) NOT	8M
3(a)	Generate an ALP in 8086 to find smallest number in an array of 10 bytes.	7M
(b)	What is the use of the following assembler directives? (i) DW (ii) ORG (iii) OFFSET (iv) END	8M
4(a)	Differentiate between minimum mode and maximum mode operations of 8086.	7M
(b)	Describe the function of the following pins of 8257. (i) $\overline{CS}$ (ii) $\overline{MEMR}$ (iii) $\overline{MEMW}$ (iv) AEN	8M
5(a)	Design an interface an 8-bit ADC to 8255 and write a Program in 8086 to read an input channel-05.	7M
(b)	Interface 8255 to 8086 for the address A0-A3H.	8M
6(a)	Draw and explain the synchronous mode transmit and receive data formats of 8251.	7M
(b)	Create a program to initialize 8251 in synchronous mode with even parity, single SYNC character, 7-bit data character. Then receive FFH bytes of data from a remote terminal and store it in the memory at address 5000H:2000H.	8M
7(a)	Discuss various techniques of passing parameters to procedures.	7M
(b)	Develop an ALP to find total no-of 1's in given byte.	8M
8(a)	Show the selection process of the ports and control word registers with the help of address and control lines of 8255.	7M
(b)	Initialize the Port-A as output port in mode-1. Explain the data transfer scheme used through Port-A with the help of handshaking signals. Draw the timing diagram.	8M

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

**S187-DIGITAL COMMUNICATIONS**

(ECE)

Time : 3 hours

Max. Marks : 75

**PART-A**

(Compulsory question)

- |      |  |      |
|------|--|------|
| 1(a) | Define SNR.  | [1M] |
| (b)  | Classify Digital Modulation Techniques.                            | [1M] |
| (c)  | Define Probability of Error.                                       | [1M] |
| (d)  | What is Entropy?   | [1M] |
| (e)  | Write the difference between error detection and error correction. | [1M] |
| (f)  | Derive SNR in Delta Modulation.                                    | [2M] |
| (g)  | Explain Amplitude Shift Keying.                                    | [2M] |
| (h)  | Compare Digital Modulation Schemes.                                | [2M] |
| (i)  | Define Channel Capacity.   | [2M] |
| (j)  | Describe the Linear Block Codes in Matrix notation.                | [2M] |

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

- |      |  |      |
|------|--|------|
| 2(a) | A PCM system uses a uniform quantizer followed by a 7-bit binary encoder. The bit rate of the system is equal to 50Mbps.<br>(i) What is the maximum message bandwidth for which the system operates satisfactorily?<br>(ii) Determine the output signal to quantization noise ratio. | [7M] |
| (b)  | What is slope overload distortion and granular noise in Delta Modulation? How is it removed?   | [8M] |
| 3(a) | The bit stream 11011100101 is to be transmitted using DPSK. Determine the encoded sequence and the transmitted phase sequence. Also find demodulated signal.   | [7M] |
| (b)  | Explain the generation and detection of QPSK signal with a neat block diagram. Also draw the phasor diagram of QPSK.   | [8M] |
| 4(a) | Derive an expression for the error probability of the QPSK system.   | [7M] |
| (b)  | What is an optimum filter? Derive the expression for the transfer function of an optimum filter.   | [8M] |
| 5(a) | One of five possible messages Q1 to Q5 having probabilities 1/2, 1/4, 1/8, 1/16, 1/16, respectively, is transmitted. Calculate the average information.  | [7M] |
| (b)  | Explain the concept of Mutual Information and its properties.  | [8M] |
| 6(a) | Draw Code Tree, trellis diagram and State diagram for rate $\frac{1}{2}$ convolutional encoder with constraint length 3 and generator sequences $g_1=(1, 1, 1)$ and $g_2=(1, 0, 1)$ .  | [7M] |
| (b)  | Explain about block codes in which each block of k message bits encoded into block of n>k bits with an example.  | [8M] |
| 7(a) | Compare PCM and DM.  | [7M] |
| (b)  | A discrete memory less source has an alphabet of seven symbols with probabilities 0.25, 0.25, 0.125, 0.125, 0.125, 0.0625 and 0.0625. Compute the Huffman code by moving a combined symbol as high as possible. Explain why the code has 100% efficiency.                            | [8M] |
| 8(a) | What is non-uniform quantization? Explain companding in PCM system.  | [7M] |
| (b)  | Derive an expression for probability of error of FSK.  | [8M] |

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B.Tech. V Semester ~~Regular~~/Supplementary Examinations

**S195-DIGITAL SYSTEM DESIGN USING VHDL**  
(ECE)

Time : 3 hours

Max. Marks : 75

**PART-A**

(Compulsory question)

- 1(a) Define Open-drain outputs. [1M]
- (b) Where the Generic constants are declared in VHDL program? [1M]
- (c) Analyze the functionality of Three state devices. [1M]
- (d) What is the difference between a latch and flip-flop. [1M]
- (e) Define the term address valid to end write for SRAM. [1M]
- (f) Summarize the characteristics of ECL family. [2M]
- (g) Mention the component instantiation syntax for A and B as inputs and Y output of a structural design. [2M]
- (h) Name the enable signals of 3X8 MSI device and what is the logic that should be applied on these input signals to get the functional output. [2M]
- (i) What is the drawback of asynchronous counters and mention the reason involved in it. [2M]
- (j) Define memory bandwidth. [2M]

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

- 2(a) Construct three input NOR gate using CMOS logic and analyze the circuit with the help of functional table. [7M]
- (b) Analyze the circuit of transmission gate and explain how a transmission gate can be used to create a two i/p multiplexer. [8M]
- 3(a) Illustrate the design flow model of VHDL program with the help of front-end and back-end steps. [8M]
- (b) Describe the Package in VHDL program. Outline the syntax and explain the terms in it. [7M]
- 4(a) Describe Three-State Driver circuit, illustrate various types in it and construct VHDL module for each type of device. [8M]
- (b) Construct the circuit 4-to-16 decoder using 74X138. [7M]



**S195-DIGITAL SYSTEM DESIGN USING VHDL**

- 5(a) Model the MSI device IC 74X163 in free running mode. Analyze with the help of functional table develop VHDL program for a 74x163-like 4-bit binary counter. [10M]
- (b) Differentiate the synchronous counters with asynchronous counters. [5M]
6. Explain the Static-RAM timing parameters for Read and Write operation with help of timing diagram. [15M]
- 7(a) Analyze the three input NAND gate circuit using CMOS logic and with the help of functional table. [8M]
- (b) Draw the circuit of buffer using CMOS logic and analyze the circuit with its functional table. [7M]
8. Construct the 16-bit barrel shifter that performs the left circular shift operation using MSI devices IC 74X151. Demonstrate the circuit using VHDL program. [15M]

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B.Tech. V Semester Regular/Supplementary Examinations

**S160-ELECTRONIC MEASUREMENTS AND INSTRUMENTATION**

(ECE)

54

Time : 3 hours

Max. Marks : 75

**PART-A**

(Answer all questions)

- 1(a) What must be sensitivity of voltmeter to avoid loading effect? [1M]
- (b) Which quantity is measured using Anderson's bridge? [1M]
- (c) What must be the crystal oscillator frequency in order to perform the internal calibration in a modern signal generator? [1M]
- (d) Mention the need of trigger pulses in CRO. [1M]
- (e) Define transducer. [1M]
- (f) List out the static characteristics and define any two. [2M]
- (g) Define dissipation factor of a series RC network in Schering bridge & give its expression. [2M]
- (h) Give reasons for using buffers in modern signal generator. [2M]
- (i) During which duration the sync and blanking pulses are added in CRO. [2M]
- (j) Define piezo electric property and give two examples of materials which exhibit that property. [2M]

**PART-B**

(Answer any FOUR questions)

- 2(a) Mention the type of instruments that are used for the measurement of dc and ac voltages. Write a short notes on D'Arsonval principle. [7M]
- (b) Describe with a diagram the operation of a staircase ramp type DVM. State the advantages of it. [8M]
- 3(a) Under unbalanced conditions of wheatstone bridge derive an expression for current through galvanometer,  $I_g$ . [7M]
- (b) An unbalance wheatstone bridge with  $R_1=1K\Omega$ ,  $R_2=3.5k\Omega$ ,  $R_3=2.5k\Omega$  and  $R_4=10k\Omega$  is shown in fig-1. Calculate the current through the galvanometer when the applied voltage is 6V.

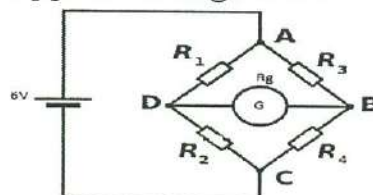


Fig-1

[8M]

- 4(a) What is signal generator? How does it differ from an ordinary oscillator? What is need of inserting isolation between signal generator output and oscillator in a signal generator? Explain how it is accomplished with the help of neat sketch. [7M]

**S160-ELECTRONIC MEASUREMENTS AND INSTRUMENTATION**

- (b) Explain the following terms in connection with pulse i)rise time ii)fall time iii)overshoot iv)ringing v)sag or droop. [8M]
- 5(a) Draw the basic CRO block diagram and state the functions of each block. [7M]  
(b) How are intensity control and focus rods employed in CRT tubes. [8M]
- 6(a) Write a short notes on resistive transducers. [7M]  
(b) State the differences between photo emissive,photo conductive and photo voltaic transducers. [8M]
- 7(a) Enumerate the type of errors that are likely to occur in a measurement and show how such errors can be minimized and evaluated. [7M]  
(b) Distinguish between accuracy and precision. [8M]
8. Draw basic Q meter circuit. Describe series connection & parallel connection in Q meter and obtain the expression for resistance, reactance and Q-factor. [15M]

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B.Tech. (V Semester) Supplementary Examinations

**S313-MICROPROCESSORS AND MICROCONTROLLERS**

(ECE)

Time : 3 hours

Max. Marks : 75

**PART-A**

(Compulsory question)

Q.No	Questions	Marks
1(a)	What is the purpose of Direction Flag?	1M
(b)	Define Memory.	1M
(c)	Draw the winding arrangement of 4-pole 200teeth stepper motor.	1M
(d)	What is the use of receive buffer?	1M
(e)	Priority of interrupts can be changed by which SFR.	1M
(f)	List out the conditional flags	2M
(g)	What is the use of mode set register in 8257?	2M
(h)	What is the use of the STB signal in 8255?	2M
(i)	What is the purpose of IMR in 8259?	2M
(j)	What are the functions of register B in 8051?	2M

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

2(a)	Create an ALP in 8086 to find largest number in an array of 8 bytes.	7M
(b)	What is the purpose of the following assembler directives? (i) EQU      (ii) DB      (iii) PTR      (iv) ENDS	8M
3(a)	What is the need for DMA? Discuss in detail about DMA data transfer method.	7M
(b)	Interface 512KB RAM to 8086 in even and odd banks from the address 80000H.	8M
4(a)	List out the Salient features of 8255 in different modes.	7M
(b)	Interface a 4-pole, Stepper Motor to 8255 and write a Program for 5 rotations in anticlockwise direction.	8M
5(a)	Draw and explain Command and Mode word formats of 8251.	7M
(b)	Develop an initialization sequence to operate 8251 in asynchronous mode with 5-bit character size, baud rate factor 16, one and half stop bits and odd parity enable. The 8251 is interfaced with 8086 at address 0C0H.	8M
6(a)	Discuss the stack organization of 8051 microcontroller.	7M
(b)	Demonstrate various operation modes of Timers.	8M
7(a)	Interface the stepper motor with 8255 and write an ALP to rotate the stepper motor continuously in clockwise direction.	7M
(b)	Write an assembly language program to rotate a 200 teeth, 4 phase stepper motor as specified below: Ten rotations clockwise and eight rotations anti-clockwise.	8M
8(a)	What is the purpose of operational command words of 8259? Explain their format and the use.	7M
(b)	Briefly describe the condition(s) which cause the 8086 to perform each of the following types of interrupts: Type-0, Type-1, Type-2, Type-3 and Type-4.	8M

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B.Tech. V Semester ~~Regular~~/Supplementary Examinations

**S411-TRANSMISSION LINES AND WAVE GUIDES**  
(ECE)

Time: 3 hours

Max.Marks: 75

**PART-A**

(Compulsory question)

- 1(a) Define characteristic impedance. [1M]
- (b) What is impedance matching? [1M]
- (c) Why TEM mode is not possible in a rectangular waveguide? [1M]
- (d) What are the possible modes for TE waves in a circular waveguide? [1M]
- (e) What is the dominant mode for circular cavity resonator? [1M]
- (f) List the applications of a transmission lines. [2M]
- (g) List the applications of Smith chart. [2M]
- (h) Define cut-off frequency and give the expression for cut-off frequency of a rectangular waveguide. [2M]
- (i) Why circular waveguides are not preferred over rectangular waveguides? [2M]
- (j) What are the advantages of Microstrip lines over Strip lines? [2M]

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

- 2(a) A lossy cable which has  $R = 2.25 \Omega/m$ ,  $L = 1.0 \mu H/m$ ,  $C = 1 pF/m$  and  $G = 0$  operates at  $f = 0.5 GHz$ . Find out the attenuation constant of the line. [7M]
- (b) What is a distortion less transmission line and derive conditions for it? [8M]
- 3(a) Derive the expression for input impedance of a transmission line terminated with any load impedance,  $Z_L$ . [7M]
- (b) Explain the significance and utility of  $\lambda/8$ ,  $\lambda/4$  and  $\lambda/2$  lines. [8M]
- 4(a) Explain about attenuation in parallel plate waveguides. [7M]
- (b) Derive the field expressions for TM waves in a rectangular waveguide. [8M]
- 5(a) Derive the field expressions for TE waves in a circular waveguide. [8M]
- (b) Find the resonant frequencies of first five lowest modes of an air-filled rectangular cavity of dimensions  $5 cm \times 4 cm \times 2.5 cm$ . [7M]
- 6(a) Derive the expression for resonant frequency of a circular cavity resonator. [8M]
- (b) Derive the expression for characteristic impedance of Microstrip line. [7M]
- 7(a) For a parallel plane wave guide of  $3cm$  separation, determine all the propagation characteristics for a signal at  $10 GHz$  for  $TE_{10}$  waves. [8M]
- (b) Derive the expression for cut-frequency, cut-off wave length and velocity of propagation in a rectangular wave guide. [7M]
- 8(a) Explain about the construction of Smith chart. [7M]
- (b) A load of  $(50 - j100) \Omega$  is connected across a  $50 \Omega$  line. Design a short circuited stub in order to provide impedance matching between the two at a signal frequency of  $30 MHz$ . [8M]

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

B.Tech. V Semester ~~Regular~~/Supplementary Examinations

**S398-TELECOMMUNICATION SWITCHING SYSTEMS AND NETWORKS**  
(ECE)

Time : 3 hours

Max. Marks : 75

**PART-A**

(Compulsory question)

- 1(a) Draw the equivalent circuit of time division time switch. [1M]
- (b) Define Busy hour. [1M]
- (c) Identify which OSI layers are network support layers. [1M]
- (d) Define functional grouping. [1M]
- (e) What is DSL technology? [1M]
- (f) What are the different switching network configurations available? [2M]
- (g) Write any two differences between in-channel and common channel signaling. [2M]
- (h) What are the responsibilities of Data link layer? [2M]
- (i) Identify the use of R reference point. [2M]
- (j) Identify the relation between STS and STM signal. [2M]

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

- 2(a) Differentiate multistage networks and single stage networks. [7M]
- (b) Comprehend the enhanced services used in telecommunication. [8M]
3. Analyze the underlying concepts of charging plan used in telecommunication. [15M]
- 4(a) Precise the functionalities of data link layer and network layer. [7M]
- (b) Analyze the looping problem in Transparent bridge. [8M]
- 5(a) Describe the ISDN channel interfaces and data rates. [7M]
- (b) Memorize principles of ISDN [8M]
- 6(a) Specify the concepts STS multiplexing and Byte Interleaving. [7M]
- (b) Specify the types of virtual tributaries and calculate data rates. [8M]
- 7(a) Comprehend the cable hierarchy for subscriber loops with the help of functional diagram. [8M]
- (b) Identify the methods used to meet d.c resistance constraint in subscriber loop. [7M]
- 8(a) Specify the devices used in SONET network with neat sketch of simple network. [7M]
- (b) Specify the available SONET and SDH signals and data rates. [8M]

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

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

B.Tech. (V Semester) Supplementary Examinations

**S288-LINEAR AND DIGITAL IC APPLICATIONS**

(EEE)

Time : 3 hours

Max. Marks : 75

**PART-A**

(Compulsory question)

Q.No	Questions	Marks
1(a)	Define input offset current.	1M
(b)	What is the gain value of RC phase shift and wien bridge oscillators?	1M
(c)	What is the main drawback of a dual-slop ADC?	1M
(d)	Compare different logic family according to noise margin.	1M
(e)	How many types of RAMS are there?	1M
(f)	Sketch subtractor circuit using op-amp.	2M
(g)	Sketch the frequency and gain characteristics of high pass and low pass filters.	2M
(h)	Sketch the internal block diagram of IC 555 timer.	2M
(i)	Implement the AND gate by using diodes.	2M
(j)	What are the main components used in RAM architecture?	2M

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

2(a)	Analyse the practical non inverting amplifier. What do you mean by the term "virtual ground"?	8M
(b)	Analyse the practical inverting amplifier.	7M
3(a)	Classify the filters and explain the characteristics of each one of them.	8M
(b)	What are the advantages of active filters over passive filters?	7M
4(a)	Analyse the operation of pulse width modulation.	8M
(b)	Analyse the operation of FSK generator.	7M
5(a)	Analyse open collector gate configuration.	8M
(b)	Analyse the tristate TTL logic gate.	7M
6(a)	Differentiate synchronous and asynchronous DRAMS.	7M
(b)	Sketch the timing diagram of DRAM.	8M
7(a)	Distinguish between ideal and practical op-amp.	8M
(b)	list out the AC and DC characteristic of an op-amp.	7M
8(a)	Sketch the block diagram of ADC and DAC converter explain each block.	8M
(b)	list out different types of ADC and DAC Techniques.	7M

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

**S341-POWER ELECTRONICS  
(EEE)**

Time : 3 hours

Max.Marks : 75

**PART-A**  
(Compulsory question)

Q.No	Questions	Marks
1(a)	What type of triggering method is used in HVDC System?	1M
(b)	What is commutation angle or overlap angle?	1M
(c)	Why thyristors are not preferred for inverters?	1M
(d)	What is meant by cyclo-converter?	1M
(e)	Name the power semiconductor switches used in chopper.	1M
(f)	Classify various power semiconductor switches based on their gate signal requirements and characteristics and control.	2M
(g)	Draw the circuit and output voltage wave form of single phase half -wave rectifier with RL load.	2M
(h)	What is the frequency of voltage input to CSI if the frequency of output voltage is f Hz?	2M
(i)	What is integral cycle control?	2M
(j)	What are the advantages of PWM control?	2M

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

2(a)	Analyze the static anode-cathode characteristics of SCR.	8M
(b)	Discuss the principle of operation of SCR.	7M
3(a)	Analyze the operation of class E commutation with neat circuit and waveforms.	8M
(b)	Analyze the operation of class F commutation with neat circuit and waveforms.	7M
4(a)	Discuss principle of operation of single phase half – bridge inverter with neat circuit diagram and wave forms.	8M
(b)	What are the draw backs of half bridge inverter?	7M
5(a)	Describe the basic principle operation of chopper circuit with help of output voltage and current waveforms.	8M
(b)	A step up chopper has input voltage of 220 V and output voltage of 660 V. If the non conducting time of thyristor chopper is 100 $\mu$ s, compute the pulse width of output voltage. In case pulse width is halved for constant frequency operation, find the new output voltage.	7M
6(a)	Discuss the operation of on-off control of AC voltage controller.	8M
(b)	An ac voltage controller as a resistive load of $R=10\ \Omega$ and the rms input voltage is $V_S=120V$ , 60Hz. The thyristor switch is on for $n=25$ cycles and is off for $m=75$ cycles. Determine (i) the rms output voltage (ii) the input power factor.	7M
7(a)	Analyze the single – pulse modulation with help of diagrams and waveforms.	8M
(b)	Analyze the multiple – pulse modulation with help of waveforms and derive necessary equations.	7M
8.	Describe the basic principle of working of a single phase to single phase step down cyclo converter with R load for both continuous and discontinuous conductions for a bridge type cyclo converter. Mark the condition of various thyristors also.	15M



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B.Tech. (V Semester) Supplementary Examinations

**S219-ELECTRICAL POWER TRANSMISSION  
(EEE)**

Time : 3 hours

Max. Marks : 75

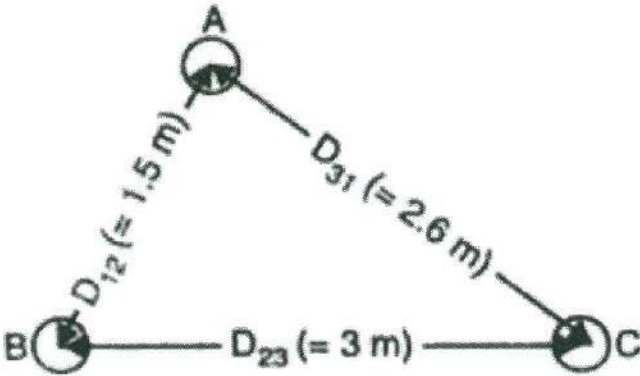
**PART-A**

(Compulsory question)

Q.No	Questions	Marks
1(a)	What is solid conductor?	1M
(b)	What is Refracted wave?	1M
(c)	Write the equation of insulation resistance of single core cable.	1M
(d)	What is the voltage across the disc of insulator string near the conductor?	1M
(e)	What is the velocity of propagation of wave?	1M
(f)	List the properties of ACSR conductor.	2M
(g)	Draw the circuit diagrams of nominal-T and nominal- $\pi$ methods.	2M
(h)	What is the difference between single core and three core cables .	2M
(i)	What are the effects obtained due to the interference with nearby communication lines?	2M
(j)	What are the most commonly used methods of neutral grounding?	2M

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

2(a)	Illustrate the effect of earth on capacitance of three phase Transmission line.	8M
(b)	<p>A single 3-phase line operated at 50Hz is arranged as shown in the fig. The conductor diameter is 8 mm and the line is regularly transposed. Determine the inductance and capacitance per Km.</p> 	7M
3(a)	Derive the performance equations of long transmission lines using (i) Equivalent T-Network (ii) Equivalent $\pi$ -Network.	7M
(b)	<p>A 3-<math>\Phi</math> transmission line 200 km long has the following constants :</p> <p>Resistance/phase/km = <math>0.16 \Omega</math></p> <p>Reactance/phase/km = <math>0.25 \Omega</math></p> <p>Shunt admittance/phase/km = <math>1.5 \times 10^{-6} \text{ S}</math></p> <p>Calculate by rigorous method the sending end voltage and current when the line is delivering a load of 20 MW at 0.8 p.f. lagging. The receiving end voltage is kept constant at 110 kV.</p>	8M



## S219-ELECTRICAL POWER TRANSMISSION

4(a)	Derive the equation for insulation resistance of single core cable.	7M
(b)	Calculate the capacitance and charging current of a single core cable used on a 3-phase, 66 kV system. The cable is 1 km long having a core diameter of 10 cm and an impregnated paper insulation of thickness 7cm. The relative permittivity of the insulation may be taken as 4 and the supply at 50 Hz.	8M
5(a)	Define corona. Explain the formation of corona in power systems	8M
(b)	List the Advantages and Disadvantages of Corona.	7M
6.	Analyze the transient analysis for DC circuit has the following elements (i) Inductance only                      (ii) Capacitance only (iii) RL circuit                              (iv) RC circuit.	15M
7(a)	Illustrate the intersheath grading process of underground cables.	7M
(b)	A single core cable for use on 11 kV, 50 Hz system has conductor area of $0.645 \text{ cm}^2$ and internal diameter of sheath is $2.18 \text{ cm}$ . The permittivity of the dielectric used in the cable is $3.5$ . Find (i) the maximum electrostatic stress in the cable (ii) minimum electrostatic stress in the cable (iii) capacitance of the cable per km length (iv) charging current.	8M
8(a)	A surge of 10KV magnitude travels along a cable towards its junction with an overhead line. The inductance & capacitance of the cable and overhead line are respectively $0.3 \text{ mH}$ , $0.4 \mu\text{F}$ & $1.5 \text{ mH}$ , $0.012 \mu\text{F}$ . Find the voltage rise at the junction due to surge.	7M
(b)	Two overhead transmission lines A and B having surge impedance of $400 \Omega$ & $420 \Omega$ respectively are connected by a short cable C of surge impedance $50 \Omega$ . A rectangular surge of magnitude 100KV and of infinite length travels along A towards cable C. Find the surge voltage which is transmitted to the cable at the junction A and C when the first reflected wave from the junction of C and B reaches former junction.	8M

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B.Tech. (V Semester) Supplementary Examinations

**S227-ELEMENTS OF SIGNAL PROCESSING  
(EEE)**

Time : 3 hours

Max. Marks : 75

**PART-A**

(Compulsory question)

Q.No	Questions	Marks
1(a)	What are the steps involved in calculating convolution sum?	1M
(b)	What is the disadvantage of direct computation of DFT?	1M
(c)	Write the multiplication property of z transform.	1M
(d)	What are the significance of chebyshev filter?	1M
(e)	Write the characteristic features of rectangular window.	1M
(f)	What is a Shift invariant (or) Time-invariant system?	2M
(g)	State any two DFT properties.	2M
(h)	What are the factors that influence the choice of structure for realization of an LTI system.	2M
(i)	Differentiate IIR filters and FIR filters.	2M
(j)	Why FIR filters are called as all zero filter?	2M

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

2(a)	Describe the different types of discrete time signal representation.	8M
(b)	Define energy and power signals. Determine whether a discrete time unit step signal $x(n) = u(n)$ is an energy signal or a power signal.	7M
3(a)	Explain the following properties of DFT (i) Linearity (ii) Complex conjugate property (iii) Circular Convolution (iii) Time Reversal.	8M
(b)	Perform the linear convolution of the sequence $x(n) = \{1, -1, 1, -1\}$ and $h(n) = \{1, 2, 3, 4\}$ using DFT method.	7M
4.	Explain the different types of structures for realizing FIR system with necessary diagram and expressions.	15M
5(a)	Explain the procedure for designing analog filters using the butter worth approximation.	8M
(b)	For the analog transfer function $H(s) = 2 / (s+1)(s+3)$ . Determine $H(z)$ using bilinear transformation. With $T=0.1$ sec.	7M
6(a)	Discuss the design procedure of FIR filter using frequency sampling method.	8M
(b)	Explain briefly how the zeros in FIR filter is located.	7M
7(a)	Explain the design of IIR filter using impule invariant transformation.	8M
(b)	Apply impule invariant transformation to $H(s) = 2/(S+1)(S+2)$ with $T=1$ sec and find $H(z)$ .	7M
8(a)	Write the expressions for the Hamming, Hanning, Bartlett and Kaiser windows.	7M
(b)	Explain the design of FIR filters using windows.	8M

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B.Tech. (V Semester) Supplementary Examinations

**S169-COMPUTER ORGANIZATION**

Time : 3 hours

(EEE)

Max. Marks : 75

**PART-A**

(Compulsory question)

Q.No	Questions	Marks
1(a)	What is a "Micro-operation"?	1M
(b)	What is a microinstruction?	1M
(c)	What is delayed load method that deals with pipeline conflicts?	1M
(d)	What is Hit ratio?	1M
(e)	What is a handshaking method?	1M
(f)	What is the difference between MASK and Selective- Clear operations?	2M
(g)	Name the most common fields usually found in instruction formats.	2M
(h)	Define Pipelining.	2M
(i)	What is a page frame?	2M
(j)	What is burst transfer mode of DMA operation?	2M

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

2(a)	How are interrupts handled by the basic computer? Explain the interrupt cycle with a flowchart.	7M
(b)	Describe the connections of registers and memory of the basic computer to a common bus system.	8M
3.	Evaluate the arithmetic expression $X = (A+B)*(C+D)$ using three address, two address, one address and zero address instructions.	15M
4(a)	Explain the features of Booth's algorithm for multiplication of signed 2's complement numbers.	7M
(b)	Show the block diagram of the hardware for implementing the Booth's multiplication algorithm.	8M
5(a)	What are the advantages of semi-conductor memories? Differentiate between RAM and ROM. Show block diagrams of RAM and ROM chips.	7M
(b)	List out different types of ROMs along with their application.	8M
6(a)	How asynchronous communication and synchronous communication differ?	7M
(b)	With suitable diagrams explain strobe control method of asynchronous data transfer.	8M
7(a)	What is the basic operation of Cache?	7M
(b)	What are the different mapping techniques used in cache memories and give their relative merits and demerits?	8M
8(a)	Write short notes on the following (i) Magnetic disk (ii) Magnetic tapes	7M
(b)	Distinguish between static RAM and dynamic RAM.	8M



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

**S406-THERMAL AND HYDRO PRIME MOVERS  
(EEE)**

g.w ✓

Time : 3 hours

Max. Marks : 75

**PART-A**

(Compulsory question)

- |      |  |      |
|------|--|------|
| 1(a) | State Zeroth law of thermodynamics.                            | [1M] |
| (b)  | Define compression ratio.                                      | [1M] |
| (c)  | Differentiate between impulse turbine and reaction turbine.    | [1M] |
| (d)  | Define specific weight.  | [1M] |
| (e)  | Give the layout of a hydroelectric power plant.                | [1M] |
| (f)  | What is meant by irreversible process?                         | [2M] |
| (g)  | Give the difference between open and closed cycle gas turbine. | [2M] |
| (h)  | How the steam turbines are classified?                         | [2M] |
| (i)  | Define continuity and Bernoulli's equation.                    | [2M] |
| (j)  | Differentiate impulse turbine & reaction turbine.              | [2M] |

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

- |      |   |      |
|------|---|------|
| 2(a) | Define thermodynamic definition of work and derive the expression for displacement work.  | [7M] |
| (b)  | With a neat sketch describe the working of Carnot cycle.  | [8M] |
| 3(a) | Explain the working principle of four stroke CI engine with the help of simplified sketches.  | [7M] |
| (b)  | The simple gas turbine plant operates on Joule cycle and has the pressure ratio 6 and the maximum and minimum temperatures of the cycle are 1000 K and 288 K respectively. Assume an ideal cycle, calculate the efficiency and specific work output of the plant.   | [8M] |
| 4(a) | Explain the working of simple impulse turbine and derive an expression for the power developed by an impulse turbine.   | [8M] |
| (b)  | Classify the steam turbines and also mention the applications of a steam turbines.  | [7M] |
| 5(a) | What do you mean by single column manometers? How are they used for the measurement of pressure?  | [7M] |
| (b)  | Explain the principle of venturimeter with a neat sketch. Discuss the relative merits and demerits of venturimeter with respect to orifice-meter.   | [8M] |
| 6(a) | Explain Kaplan turbine with a neat sketch.  | [7M] |
| (b)  | Describe briefly the function of various main components of Pelton turbine with neat sketches.  | [8M] |
| 7(a) | With a neat sketch explain the theoretical and actual valve timing diagrams of four stroke Diesel engine.   | [7M] |
| (b)  | What are the assumptions made in analysis of Brayton cycle? Derive efficiency of constant pressure closed cycle gas turbine.  | [8M] |
| 8(a) | Briefly explain about thermodynamic equilibrium and quasi-static process with the help of simplified sketch.  | [7M] |
| (b)  | Air is contained in a cylinder fitted with a frictionless piston. Initially the cylinder contains 0.5 m <sup>3</sup> of air at 1.5 bar, 20°C. The air is then compressed reversibly according to the law $p v^n = \text{constant}$ until the final pressure is 6 bar, at which point the temperature is 120°C. Determine (i) the polytropic index $n$ , (ii) the final volume of air, (iii) the work done on the air and the heat transfer, and (iv) the change in internal energy. | [8M] |

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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. (V Semester) ~~Regular~~/Supplementary Examinations

**S162-COMMUNICATION SYSTEMS  
(EIE)**

Time : 3 hours

Max. Marks : 75

**PART-A**

(Compulsory question)

- 1(a) List Application of SSB. [1M]
- (b) What is wideband FM and Narrowband FM? [1M]
- (c) Define the term Time division multiplexing(TDM). [1M]
- (d) Compare ASK and DPSK. [1M]
- (e) What is meant by Quantization? [1M]
- (f) Outline the need of modulation in communication system. [2M]
- (g) Write down the expressions for WBFM, NBFM and PM. [2M]
- (h) Discuss the types of pulse Modulation. [2M]
- (i) Illustrate the non-coherent detection of binary FSK signal. [2M]
- (j) What are the drawbacks of Delta modulation? [2M]

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

- 2(a) Draw the Envelope detector and illustrate the process of detection of AM wave. [7M]
- (b) An amplitude modulated signal represented in time domain as  $4\cos(1800t) + 10\cos(2000t) + 4\cos(2200t)$ . Sketch the spectrum and calculate the band width and total power. [8M]
- 3(a) What is the difference between direct and indirect methods of FM generation? Explain the working of a balanced frequency discriminator with the help of circuit diagram. [7M]
- (b) For an FM modulator with a modulating signal  $m(t) = V_m \sin 300\omega t$ , the carrier Signal  $V_c(t) = 8 \sin(6.5 \times 10^6 t)$  and the modulator index  $\beta = 2$ . Find out the significant side frequencies and their amplitudes. [8M]
- 4(a) What are the elements of PAM? Explain PAM in detail? [8M]
- (b) Obtain the expression for signal to quantization noise power ratio in the case of PAM. [7M]
- 5(a) Explain the working of DPSK. [8M]
- (b) A bit stream 1011111011 is to be transmitted using ASK, FSK, and PSK techniques. Draw the waveforms for the above mentioned digital modulation techniques. [7M]
- 6(a) What are the elements of PCM? Explain PCM in detail? [7M]
- (b) Obtain the expression for signal to quantization noise power ratio in the case of PCM. [8M]
- 7(a) What is FM threshold effect? How to achieve threshold reduction in FM system? [8M]
- (b) Discuss the noise performance of AM system using envelop detection. [7M]
- 8(a) Prove that the balanced modulator produces an output consisting of sidebands only with the carrier removed. [8M]
- (b) Write the comparisons among PAM, PWM and PPM. [7M]

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

**S277-INTEGRATED CIRCUITS AND APPLICATIONS**

(EIE)

Time : 3 hours

Max. Marks : 75

**PART-A**

(Compulsory question)

- |      |   |      |
|------|---|------|
| 1(a) | Draw the block diagram of op-amp.                                 | [1M] |
| (b)  | Define cut-off frequency.   | [1M] |
| (c)  | Explain the term resolution of DAC.                               | [1M] |
| (d)  | Define the terms fan-in and fan-out.                              | [1M] |
| (e)  | Distinguish between SRAM and DRAM.                                | [1M] |
| (f)  | List out the ideal op-amp characteristics.                        | [2M] |
| (g)  | What is the relation between $Q, f_c$ and bandwidth?              | [2M] |
| (h)  | List out the drawbacks of weighted resistor DAC.                  | [2M] |
| (i)  | Give the logic levels and noise margins of CMOS and TTL families. | [2M] |
| (j)  | What are the applications of ROM?                                 | [2M] |

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

- |      |   |      |
|------|---|------|
| 2(a) | Derive the expression for the output voltage of an instrumentation amplifier with a neat circuit diagram.                 | [7M] |
| (b)  | Design a Monostable multivibrator using 555 timer to produce a pulse width of 100 m sec.                                  | [8M] |
| 3(a) | Design a low pass filter having a cut-off frequency of 15.9KHz with a pass band gain of 1.5.                              | [7M] |
| (b)  | Derive the expression for frequency of oscillations of RC phase shift oscillator using op-amp.                            | [8M] |
| 4(a) | With a neat diagram explain the operation of comparator type ADC.   | [7M] |
| (b)  | Compare different types of DACs. Also list out the specifications of IC 1408 DAC.   | [8M] |
| 5(a) | Draw the CMOS circuit diagram of tri-state buffer. Explain the circuit with the help of logic diagram and function table. | [7M] |
| (b)  | What is interfacing? Explain interfacing between low voltage TTL and low voltage CMOS logic.                              | [8M] |
| 6(a) | Explain the internal structure of 64 x 1 DRAM.  | [7M] |
| (b)  | With the help of timing waveforms, explain read and write operations of SRAM.   | [8M] |
| 7(a) | Draw the functional diagram of 555 timer and explain its operation.   | [7M] |
| (b)  | Prove that the gain of all pass filter equal to 1.  | [8M] |
| 8(a) | Draw the sample and hold circuit and explain its operation in detail with neat sketches.                                  | [7M] |
| (b)  | Explain the operation of PLL with the help of different frequency ranges.   | [8M] |

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

B.Tech. V Semester ~~Regular~~ / Supplementary Examinations

**S352-PROCESS CONTROL INSTRUMENTATION**  
(EIE)

Time : 3 hours

Max. Marks : 75

**PART-A**

(Compulsory question)

- |      |  |      |
|------|--|------|
| 1(a) | What is set point?   | [1M] |
| (b)  | Name the control mode that is also called as anticipatory control.                         | [1M] |
| (c)  | Define critical gain with reference to continuous cycling method of tuning a controller.   | [1M] |
| (d)  | List the three types of control valve characteristics.                                     | [1M] |
| (e)  | How many controllers are present in cascade control?                                       | [1M] |
| (f)  | Explain dead time with reference to a process.   | [2M] |
| (g)  | Determine the proportional band (PB) when proportional sensitivity $K_p$ is selected as 2. | [2M] |
| (h)  | What is quarter amplitude response criterion?  | [2M] |
| (i)  | Define rangeability(R) and turndown(T) of a control valve.                                 | [2M] |
| (j)  | Compare split range control to feedback control.   | [2M] |

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

- |  |  |      |
|--|--|------|
| 2(a)   | Determine the transfer function (input-output equation) for first order liquid process. Assume relevant data.  | [7M] |
| (b)  | Differentiate between continuous process and batch process.  | [8M] |
| 3(a)   | Explain ON-OFF control scheme with an example.   | [8M] |
| (b)  | How pneumatic P controller works?  | [7M] |
| 4(a)   | Elaborate on damped oscillation method of tuning a controller.   | [7M] |
| (b)  | A transient disturbance test is run on a process loop. The results of 9% controlling variable give a process reaction curve. The measurements made are $K = 3.9\%$ , $L = 2.4$ min., $T = 4.8$ min. Find optimum controller settings for PID Controller. | [8M] |
| 5(a)   | How butterfly valve works? Explain with neat sketch.   | [7M] |
| (b)  | Describe working of a control valve with a neat diagram.   | [8M] |
| 6(a)   | How P to I converter works?  | [7M] |
| (b)  | What is I to P converter? Describe its working with neat Sketch.   | [8M] |
| 7(a)   | Define the following with reference to proportional control.   |      |
| (i)  | Proportional gain (ii) Proportional band (iii) Offset  | [7M] |
| (b)  | Describe the following   |      |
| i) 1/4 Decay Ratio ii) IAE iii) ISE iv) ITAE |  | [8M] |
| 8(a)   | Explain pneumatic spring actuator with a neat diagram.   | [7M] |
| (b)  | Describe working of feed forward control scheme with neat block diagram.   | [8M] |

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28 OCT 2020

H.T.No

R14

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING  
(AUTONOMOUS)

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

B.Tech. V Semester Regular/Supplementary Examinations

**S192-DIGITAL SIGNAL PROCESSING**

Time : 3 hours

(EIE)  
**PART-A**

Max. Marks : 75

(Answer all questions)

- 1(a) What is DTFT of impulse sequence  $\delta(n)$ ? [1M]
- (b) What is the ROC of  $ZT[u(n)]$ ? [1M]
- (c) What is the percentage saving due to additions in the computation of 64 point radix-2 FFT? [1M]
- (d) Write the mathematical form of squared magnitude frequency response of a Butterworth approximation. [1M]
- (e) What is the maximum amplitude of any window? [1M]
- (f) What is the period of  $x(n) = x_1(n) + x_2(n)$ ? Assume  $x_1(n)$ ,  $x_2(n)$  are periodic with periods 8, 12 samples. [2M]
- (g) Find the initial value of a sequence  $x(n)$  from  $X(z) = \frac{z(z+1)}{(3z-1)(2z-1)}$  [2M]
- (h) List any four properties of twiddle factor. [2M]
- (i) How the order (N) of the filter can be computed in Chebyshev approximation procedure. [2M]
- (j) Let us assume the hanning window  $w(n)$  is defined over the range  $[0,10]$ , then find the value of  $w(0)+w(10)$ . [2M]

**PART-B**

(Answer any FOUR questions)

2. Evaluate the convoluted sequence  $x(n) = x_1(n) \otimes x_2(n)$  through graphical method, given that  $x_1(n) = \{1, 2, 3, 4\}$  and  $x_2(n) = \{4, 5, 6, 7, 8\}$ . [15M]
3. Determine the causal sequence  $x(n)$  from the z-domain
  - (i)  $X(z) = \frac{z(z+1)}{(z-1/2)(z-1/4)}$  (ii)  $X(z) = \frac{z^2+z+1}{2z^3+3z^2+z+4}$  (iii)  $X(z) = \frac{z(z-2)}{(z-1/4)^3}$  [15M]
4. Evaluate 4-point DFT of a sequence  $x(n) = \{1, 2, 3, 4\}$ . Hence convert  $X(k)$  into  $x(n)$  through IDFT. [15M]
5. Design a digital IIR low pass filter for the following specifications by using Butterworth approximation and impulse invariant method.
 
$$0.8 \leq |H(jw)| \leq 1.0; 0 \leq w \leq 0.2\pi,$$

$$|H(jw)| \leq 0.2; 0.32\pi \leq w \leq \pi,$$
 [15M]
6. Design a digital FIR low pass filter with a cutoff frequency of 1.2 rad/sec by taking 9 samples of rectangular window. [15M]
- 7(a) Define digital signal. How it is different from discrete time signal? Explain with an example. [7M]
- (b) Compute the circular convolution of sequences  $x_1(n) = \{1, 2, 3, 4\}$  and  $x_2(n) = \{5, 6, 7, 8\}$ . [8M]
- 8(a) How DTFT and z-transforms are related? Explain. [7M]
- (b) What is frequency warping effect? Where and how it occurs? Explain. [8M]

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

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

B.Tech. (V Semester) ~~Regular~~/Supplementary Examinations**S323-OBJECT ORIENTED ANALYSIS AND DESIGN  
(IT)**

Time : 3 hours

Max. Marks : 75

**PART-A**

(Compulsory question)

- 1(a) Define modeling. [1M]
- (b) What is the notation of a package? Give an example. [1M]
- (c) Define classes and objects. [1M]
- (d) List out various interaction diagrams. [1M]
- (e) Define event and signal. [1M]
- (f) What are various principles of modeling? [2M]
- (g) List out various relationships of UML. [2M]
- (h) Distinguish between method and message in object. [2M]
- (i) Define Actor and draw the notation of an Actor. [2M]
- (j) Compare note and node in UML. [2M]

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

- 2(a) Describe Object Oriented Modeling. [7M]
- (b) Explain Software Development Life Cycle. [8M]
- 3(a) Explain various relationships used in UML. [7M]
- (b) Explain interfaces and package notations in UML with an example. [8M]
- 4(a) Explain various relationships used in a class diagram. [7M]
- (b) Draw a class diagram for ATM Banking. [8M]
- 5(a) Explain interaction modeling. [7M]
- (b) Draw a use case diagram for irctc online booking railway system. [8M]
- 6(a) Explain state chart modeling. [7M]
- (b) Draw the component and deployment diagram for amazon.in [8M]
- 7(a) Compare sequence and collaboration diagrams. [7M]
- (b) Draw an activity diagram for order management system. [8M]
- 8(a) Explain various relationships in use case diagram. [7M]
- (b) Draw an use case diagram illustrating all the relationships in use case. [8M]

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LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

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

B.Tech V Semester Regular/Supplementary Examinations

**S137-ARTIFICIAL INTELLIGENCE**

Time : 3 hours

(IT)

304

Max. Marks : 75

**PART-A**

(Compulsory question)

- |      |  |      |
|------|--|------|
| 1(a) | What are different heuristic techniques? | [1M] |
| (b)  | What do you mean by resolution?          | [1M] |
| (c)  | Define uncertainty.                      | [1M] |
| (d)  | Define agent planning.                   | [1M] |
| (e)  | Define alpha beta pruning.               | [1M] |
| (f)  | List out uninformed search strategies.   | [2M] |
| (g)  | Define knowledge acquisition.            | [2M] |
| (h)  | List out planning techniques.            | [2M] |
| (i)  | What is robotic hardware?                | [2M] |
| (j)  | Give an example of expert system.        | [2M] |

**PART-B**

(Answer any FOUR questions all question carry equal marks)

- |      |  |      |
|------|--|------|
| 2(a) | Compare and contrast A* and AO* algorithms.  | [7M] |
| (b)  | List out various informed searching strategies, compare and contrast importance of each method.          | [8M] |
| 3(a) | How well you explain about approaches to knowledge representation?                                       | [7M] |
| (b)  | In what way you can analyze about scripts.   | [8M] |
| 4(a) | How can you differentiate classical logic with fuzzy logic?  | [7M] |
| (b)  | Summarize about rule based systems.  | [8M] |
| 5(a) | Define learning and illustrate different types of learning.  | [7M] |
| (b)  | Define agent planning and classify planning.   | [8M] |
| 6(a) | Explain about swarm intelligence systems.  | [7M] |
| (b)  | Demonstrate knowledge acquisition with respect to expert systems.  | [8M] |
| 7(a) | Define min max algorithm and explain it using neat diagram.  | [7M] |
| (b)  | Construct a block diagram for learning agent and illustrate its components.                              | [8M] |
| 8(a) | Define genetic algorithms and illustrate its phases.   | [7M] |
| (b)  | How would you illustrate about crypt analysis problem in the context of Constraint Satisfaction Problem? | [8M] |

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## LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

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

B.Tech.VSemester ~~Regular~~/Supplementary Examinations**S167 – COMPUTER GRAPHICS**

(IT)

Time : 3 hours

Max.Marks:75

**PART-A**

(Answer all questions)

- 1(a) What do you mean by emissive and non-emissive displays? [1M]
- (b) Define Circle. [1M]
- (c) What is Transformation? [1M]
- (d) Distinguish between world coordinates and normalized device coordinates. [1M]
- (e) Define Projection. [1M]
- (f) What are the merits and demerits of Flat panel display? [2M]
- (g) What is the symmetry property of an ellipse? [2M]
- (h) Consider point P(5,3) and find the new coordinate P' after rotating with an angle of  $45^\circ$  in anti-clockwise direction. [2M]
- (i) Draw the clipped polygon for the following polygon after performing  
a.Right clip    b. Left clip    c. Bottom clip    d. Top clip



- (j) Describe the spherical surface in parametric form using latitude and longitude angles. [2M]

**PART-B**

(Answer any FOUR questions)

- 2(a) Differentiate between random scan & raster scan display. [7M]
- (b) Discuss various methods for producing color displays with CRT Monitors in detail. [8M]
3. Design an algorithm for Mid-point circle generation and Draw the First quadrant of the circle with radius 12cm. [15M]
- 4(a) A mirror is placed such that it passes through (2,0) and (0,2). Find the reflected view of a triangle with vertices (3,4), (5,5) and (4,7) in this mirror. [7M]
- (b) Explain the following Transformations in detail.  
1. Translation    2. Rotation    3. Scaling    4. Shearing [8M]
- 5(a) Explain Liang-Barsky line clipping algorithm. [7M]
- (b) Use the Liang-Barsky line clipping algorithm to clip the line P1(-15,-30), P2(30,60) against window having diagonal opposite corners as (0,0) and (15,15). [8M]
6. Derive the 3D transformation rotation matrix about an arbitrary line which is not parallel any one of principle axis. [15M]
7. Prove that the multiplication of 2D transformation matrices for each of the following sequence of operations is commutative:  
a. Two successive rotations  
b. Two successive translations  
c. Two successive scalings. [15M]
8. Discuss various Quadric Surfaces in detail. [15M]

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LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

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

B.Tech. V Semester ~~Regular~~/Supplementary Examinations

**S267-IC ENGINES AND GAS TURBINES**

(ME)

Time : 3 hours

Max.Marks:75

**PART-A**

(Compulsory question)

- 1(a) What is the function of a carburetor? [1M]
- (b) In what process the heat is added in Diesel cycle? [1M]
- (c) What is meant by a cetane number for diesel engine? [1M]
- (d) Usually the brake power is lower than indicated power why? [1M]
- (e) According to jet propulsion system what is meant by turboprop? [1M]
- (f) Differentiate individual pump system and common rail system. [2M]
- (g) Distinguish between air standard cycle and the actual cycle. [2M]
- (h) State the requirements of a combustion chamber for SI engine. [2M]
- (i) List the unavoidable losses of an IC engines. [2M]
- (j) Differentiate turbojet engine and turbo propeller engine. [2M]

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

- 2(a) Distinguish between the four- stroke diesel cycle and the four-stroke petrol cycle. [7M]
- (b) Describe with suitable sketches the working principle of a four-stroke spark ignition engine. [8M]
- 3(a) Differentiate among the air-standard cycle and fuel-air cycle analysis. Explain the significance of the fuel-air cycle. [7M]
- (b) Explain the working principle of magneto ignition system with a neat sketch. [8M]
- 4(a) Discuss various factors that affect ignition delay period in diesel engine. [7M]
- (b) Differentiate between the turbulent and non-turbulent type combustion chambers used in diesel engine. [8M]

- 5(a) The following readings were obtained from a test on a single cylinder oil engine working on the four stroke cycle.  
 Area of the indicator diagram = 4.1 cm<sup>2</sup>  
 Length of the indicator diagram = 6.25 cm  
 Indicator spring constant = 0.9 mm  
 Cylinder bore = 105 mm  
 Engine stroke = 150 mm  
 Mean diameter of brake wheel = 0.3 m  
 Brake load = 18 kg  
 Spring balance reading = 3 kg  
 Engine speed = 480 rpm  
 Evaluate (i) brake power (ii) indicated power (iii) mechanical efficiency. [7M]
- (b) Define the following. i) Compression ratio ii) Mean effective pressure  
 iii) Volumetric efficiency iv) Relative efficiency [8M]
- 6(a) Illustrate the working of a closed cycle gas turbine. [7M]
- (b) A Gas Turbine unit has a pressure ratio of 6:1 and maximum cycle temperature of 610 °C. The isentropic efficiencies of the compressor and turbine are 0.8 and 0.82 respectively. Calculate the power output in kW when the air enters the compressor at 15°C at the rate of 16 kg/s. Take  $C_{p1}$  is 1.005 kJ/kg-K and  $\gamma$  is 1.4 for compression process and take  $C_{p2}$  is 1.11 kJ/kg-K and  $\gamma$  is 1.333 for the expansion process. [8M]
- 7(a) Elucidate the operation of splash lubrication system with suitable diagram. [7M]
- (b) Explain the concept of fuel rating for SI and CI engines. [8M]
- 8(a) The following details were noted in a test on a four cylinder, four stroke engine, diameter = 100 mm, stroke = 120 mm, speed of the engine = 1600 rpm, fuel consumption = 0.2 kg/min, calorific value of fuel is 44000 kJ/kg, difference in tension on either side of the brake pulley = 40 kg, brake circumference is 300 cm. If the mechanical efficiency is 80%, calculate (i) brake thermal efficiency (ii) indicated thermal efficiency (iii) indicated mean effective pressure (iv) brake specific fuel consumption [7M]
- (b) Illustrate the working of a turboprop engine and also list the merits and demerits. [8M]

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

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

B.Tech. V Semester ~~Regular~~/Supplementary Examinations

**S291-MACHINE DESIGN - I**

(ME)

Time : 3 hours

Max.Marks:75

**PART-A**

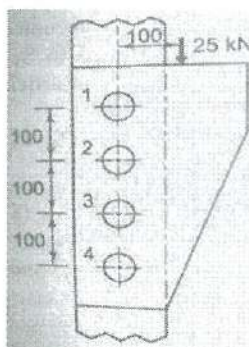
(Compulsory question)

- 1(a) Define machine design. [1M]
- (b) What is the value of fatigue stress concentration factor when the material has no notch sensitivity? [1M]
- (c) State the relation between the throat and leg of the weld. [1M]
- (d) Write the expression for determining the crushing stress in a square key. [1M]
- (e) State the expression for equivalent bending moment of shafts under fatigue loads. [1M]
- (f) The power transmitted by a shaft is 100kW at 180 rpm. Find the torque transmitted by the shaft. [2M]
- (g) What is the reason to modify Goodman diagram? [2M]
- (h) Sketch any two types of welded joints. [2M]
- (i) List out the advantages of knuckle joint. [2M]
- (j) The power to be transmitted by a shaft is 100kW at 200 rpm. Find out the diameter of the shaft, if the permissible shear stress is  $60 \text{ N/mm}^2$ . [2M]

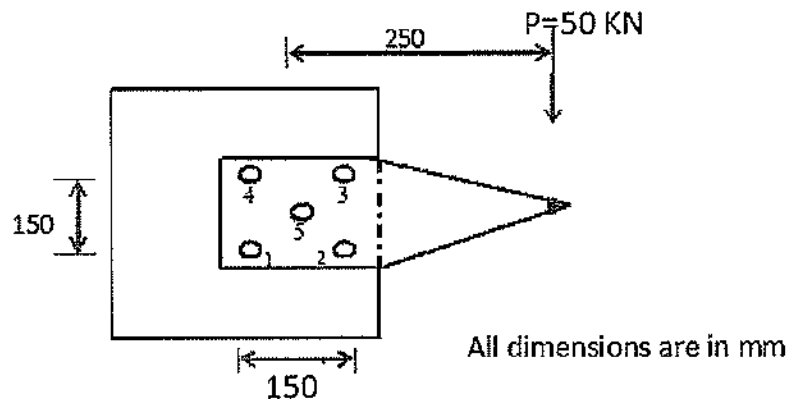
**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

- 2(a) Enumerate general considerations taken into account while designing a machine element. [7M]
- (b) The stresses induced at a critical point in a machine component made of steel 45C8 ( $S_{yt} = 380 \text{ N/mm}^2$ ) are as follows:  $\sigma_x = 100 \text{ N/mm}^2$ ;  $\sigma_y = 40 \text{ N/mm}^2$ ;  $\tau_{xy} = 80 \text{ N/mm}^2$ . Calculate the factor of safety by (i) Maximum principal stress theory and (ii) Von-Misses theory of failure. [8M]
- 3(a) Illustrate the methods adopted for reducing the effect of stress concentration. [7M]
- (b) A shaft made of steel having ultimate tensile strength of 700MPa and yield point 420MPa is subjected to a torque of 2000N-m clockwise to 600N-m anticlockwise. Estimate the diameter of the shaft for reliability of 90%, if the factor of safety is 2 and it is based on the yield point and the endurance strength is shear. Assume surface factor = 0.87, size factor = 0.85 and fatigue stress concentration factor = 1. [8M]
- 4(a) A 50mm diameter solid shaft of length 200mm is welded at one end to a plate while the other end is subjected to a load of 10 kN acting vertically downwards. If the size of the weld is 15 mm, find the maximum normal and shear stress in the weld. [7M]
- (b) The riveted joint as shown in the figure is eccentrically loaded. Determine the diameter of the rivet, if the permissible shear stress is not to exceed  $60 \text{ N/mm}^2$ . [8M]



- 5(a) The structural connection consists of five bolts as shown in figure is subjected to an eccentric force of 50kN with an eccentricity of 250 mm from the center of gravity of the bolts. If the maximum shear stress in the bolt is limited to 63MPa, determine the size of the bolt.



[7M]

- (b) It is required to design a square key for fixing a gear on a shaft of 25mm diameter that transmits 15kW power at 720 rpm from the shaft to the gear. The key is made of steel 50C4 for which tensile yield stress is 460MPa and factor of safety is 3. For the key material the yield strength in compression can be assumed to be equal to the yield strength in tension. Evaluate the dimensions of the key.

[8M]

- 6(a) Find the diameter of a solid steel shaft to transmit 25 kW at 240 rpm. The ultimate shear stress for steel is 360MPa with a factor of safety = 8. If a hollow shaft is to be used in place of solid shaft and if the ratio of inside to outside diameters is 0.6, find its diameters.

[7M]

- (b) A mild steel shaft transmits 20kW at 400 rpm. It carries a central load of 900 N and is simply supported between the bearings 3m apart. i) Design the shaft if the allowable shear stress is 45N/mm<sup>2</sup> ii) Diameter of the shaft that is required, if the shaft is subjected to gradually applied loads. The values of  $K_m$  and  $K_t$  are 1.5 and 1 respectively.

[8M]

7. It is required to design a bushed-pin type flexible coupling to connect the output shaft of an electric motor to the shaft of a centrifugal pump. The motor delivers 20 kW power at 720 rpm. The starting torque of the motor can be assumed to be 1.5 times the rated torque. The allowable bearing pressure is 0.7MPa. Design the coupling and specify the dimensions of its components.

[15M]

8. Design a knuckle joint used to connect two mild steel bars under a tensile load of 25 kN. The allowable stresses are 65MPa in tension, 50MPa in shear and 83MPa in crushing.

[15M]

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

L.B.Reddy Nagar :: Mylavaram – 521230:: Krishna Dist.: A.P.

B.Tech. V Semester ~~Regular~~/Supplementary Examinations

**S203-DYNAMICS OF MACHINES  
(ME)**

JCH

Time: 3 hours

Max. Marks: 75

**PART-A**

(Compulsory question)

- |      |  |      |
|------|--|------|
| 1(a) | Name various types of Dynamometers.        | [1M] |
| (b)  | Explain the principle of Flywheel.         | [1M] |
| (c)  | State Gyroscopic effects of ship.          | [1M] |
| (d)  | Write stability equation for two wheelers. | [1M] |
| (e)  | Explain dynamic balancing.                 | [1M] |
| (f)  | Differentiate between and dynamometer.     | [2M] |
| (g)  | Explain the term fluctuation of energy.    | [2M] |
| (h)  | Draw Porter governor.                      | [2M] |
| (i)  | Explain dynamic balancing.                 | [2M] |
| (j)  | Define whirling of shafts.                 | [2M] |

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

2. A differential band brake has a drum of diameter 800 mm. The two ends of the band are fixed to the pins on the opposite sides of the fulcrum of the lever at distances of 40 mm and 200 mm from the fulcrum. The angle of contact is  $270^\circ$  and the coefficient of friction is 0.2. Determine the brake torque when a force of 600 N is applied to the lever at a distance of 800 mm from the fulcrum. [15M]
3. A three cylinder single acting engine has its cranks set equally at  $120^\circ$  and it runs at 600 rpm. The torque-crank angle diagram for each cycle is a triangle for the power stroke with a maximum torque of 90 N-m at  $60^\circ$  from dead centre of corresponding crank. The torque on the return stroke is sensibly zero. Determine : 1.power developed 2. coefficient of fluctuation of speed ,if the mass of the flywheel is 12 kg and has a radius of gyration of 80 mm 3. coefficient of fluctuation of energy 4.maximum angular acceleration of the flywheel. [15M]
4. The rotor of the turbine ship as a mass of 2500 kg and rotates at a speed of 3200 rpm counterclockwise when viewed from stern. The rotor as radius of gyration of 0.4 m. Determine the gyroscope couple and its effect when i) the ship steers to the left in a curve of 80 m radius at a speed of 15 knots (1 knot = 1860 m/h ) ii) the ship pitches  $5^\circ$  above and below the normal position and the bow is de-sending with its maximum velocity- the pitching motion is simple harmonic with a periodic time of 40 seconds. iii) the ship rolls at and at the instant, its angular velocity is 0.4 rad/sec clookwise when viewed from stern, also find the maximum angular acceleration during pitching. [15M]

## S203-DYNAMICS OF MACHINES

5. A shaft carries four masses A,B,C and D of magnitude 200 kg,300 kg,400 kg and 200 kg respectively and revolving at radii 80 mm,70 mm,60 mm and 80 mm in planes measured from A at 300 mm,400 mm and 700 mm. The angles between the cranks measured anticlockwise are A to B  $45^\circ$ , B to C  $70^\circ$  and C to D  $120^\circ$ .The balancing masses are to be placed in planes X and Y. The distance between the planes A and X is 100 mm, between X and Y is 400 mm and between Y and D is 200 mm. If the balancing masses revolve at a radius of 100 mm, find their magnitudes and angular positions. [15M]
- 6(a) A shaft supported freely at the ends has a mass of 120kg placed 250mm from one end. The shaft diameter is 40mm. Determine the frequency of the natural transverse vibrations if length of the shaft is 700mm,  $E=200\text{GN/m}^2$ . [8M]
- (b) A shaft of 40mm diameter and 2.5m length has a mass of 15kg per meter length. It is simply supported at the ends and carries three masses of 90kg, 140kg and 60kg at 0.8m, 1.5m and 2m respectively from the left support. Taking  $E=200\text{GN/m}^2$ , Find the frequency of the transverse vibrations and whirling speed. [7M]
- 7(a) A flywheel of mass 10 kg has a radius of gyration of 20cm. It is rotating at 1000 rpm about its axis which is horizontal. The fly wheel is suspended at a point 15cm from the plane of rotation of the flywheel. Determine the precessional motion of the flywheel. [7M]
- (b) The moment of inertia of a rotating disc in aeroplane is  $15\text{kg}\cdot\text{m}^2$  and the direction of rotation is clockwise when looking from front side of the aeroplane. The speed of the disc is 1600rpm. The speed of flight is  $240\text{km/hr}$ . If the aeroplane makes a right turn on a curved path of 170m radius,find the gyroscopic couple on the aeroplane and discuss the effects on it. [8M]
- 8(a) A vibrating system consists of a mass of 50kg, a spring with a stiffness of  $30\text{ kN/m}$  and a damper. The damping provided is only 20% of the critical value. Determine the i) damping factor ii)critical damping coefficient iii) natural frequency of damped vibrations iv)logarithmic decrement v)ratio of two consecutive amplitudes. [7M]
- (b) A single plate clutch transmits 25 kW at 900 rpm. The maximum pressure intensity between the plates is  $85\text{ kN/m}^2$ . The outer diameter of the plate is 360 mm. Both the sides of the plate are effective and the coefficient of friction is 0.25. Determine the i) inner diameter of plate ii) axial force to engage the clutch. [8M]

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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. (V Semester) Supplementary Examinations

**S270-INDUSTRIAL MANAGEMENT**

Time : 3 hours

(ME)

Max.Marks:75

**PART-A**

(Compulsory question)

- |      |  |      |
|------|--|------|
| 1(a) | Who gave the "Two factor" theory of motivation?                    | [1M] |
| (b)  | Illustrate product layout.   | [1M] |
| (c)  | Define Quality.  | [1M] |
| (d)  | List out various sources of Recruitment.                           | [1M] |
| (e)  | Define critical path.  | [1M] |
| (f)  | Mention any four principles of management as given by Henri Fayol. | [2M] |
| (g)  | What do you understand by Plant layout?                            | [2M] |
| (h)  | Describe EOQ.  | [2M] |
| (i)  | Differentiate wage and salary.                                     | [2M] |
| (j)  | Discuss direct and indirect cost.                                  | [2M] |

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

- |      |  |      |
|------|--|------|
| 2(a) | Briefly discuss the Taylors Principles of Scientific Management.   | [7M] |
| (b)  | Mention different needs as identified by Abraham Maslow. Give an example for each.   | [8M] |
| 3(a) | What are the factors affecting plant location? Explain in brief.   | [7M] |
| (b)  | Differentiate between job and batch production.  | [8M] |
| 4(a) | Compute EOQ in the following case. The annual demand for an item is 20, 000 units. The cost of holding One unit in Stock for a year is 0.30 and an order cost 30.  | [7M] |
| (b)  | Write a short notes on (i) ABC Analysis (ii) Stock levels.   | [8M] |
| 5(a) | Discuss in detail the objectives of Human Resource Management.   | [7M] |
| (b)  | Describe the functions of Human Resources Management.  | [8M] |
| 6(a) | A small project consisting of 7 activities A,B,C,D,E,F and G, has its duration and data for normal and crash is given below .Draw the network .crash the network to achieve optimum duration and optimum cost if the indirect cost is estimated at Rs .180 per day of the project duration |      |

ACTIVITY	Normal time (DAYS)	Cost (Rs)	Crash time (Rs)	Cost
1-2	3	350	2	400
2-3	6	1440	4	1620
2-4	9	2160	8	2220
2-5	7	1300	5	1600
3-5	8	500	7	600
4-5	5	1600	3	1770
5-6	8	450	7	750

- |      |  |       |
|------|--|-------|
| 7(a) | Describe in detail Herzberg's Two-Factor Theory of Motivation.                   | [15M] |
| (b)  | Define method study. Illustrate the basic procedure.                             | [8M]  |
| 8(a) | Enumerate the steps involved in purchase procedure followed at store management. | [7M]  |
| (b)  | Briefly discuss the need for training in organization.                           | [8M]  |
|      |  | [7M]  |



28 OCT 2020

H.T.No

R14

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

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

B.Tech. (V Semester) Supplementary Examinations

**S329-OPERATIONS RESEARCH**

(ME)

Time : 3 hours

Max. Marks : 75

**PART-A**

(Compulsory question)

- 1(a) State any four areas for the application of OR. [1M]
- (b) Carve the applications of assignment problem. [1M]
- (c) Write a short note on zero-sum Game. [1M]
- (d) Describe some important Replacement Situation. [1M]
- (e) Define design vector. [1M]
- (f) Write a historical note in brief about Operation Research. [2M]
- (g) Draw the network diagram for a transportation problem. Brief out. [2M]
- (h) What did you understand the term Economic order Quantity (EOQ)? [2M]
- (i) What are performance measures of a queuing system? [2M]
- (j) State Bellman's principle of optimality. [2M]

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

2. Select suitable method to solve the following LPP and find the optimal solution: Maximize  $Z = 6x_1 + 8x_2$  subjected to  $5x_1 + 10x_2 \leq 60$ ,  $4x_1 + 4x_2 \geq 40$ , and  $x_1, x_2 \geq 0$ . [15M]
- 3(a) Find the initial solution the following transportation problem using VAM method.

		Destination				Supply
Source		D1	D2	D3	D4	
	S1	21	16	15	13	11
	S2	17	18	14	23	13
	S3	32	27	18	41	19
Demand		6	10	12	15	

- (b) Find the optimal solution to the above problem using MODI method. Consider initial solution obtained at VAM. [7M]
  - 4(a) Two players A & B showing each other, put on a table a coin, with head or tail up. A wins Rs. 8 when the coins show head and Rs. 1 when both are tails. B wins Rs. 3 when the coins do not match. Given the choice of being matching player A or non-matching player B which one would you choose and what would be your strategy. [8M]
  - (b) An automobile manufacturer purchases 2400 castings over a period of 360 days. This requirement is fixed and known. These castings are subject to quantity discounts. Ordering cost is Rs. 70000 per order and shortage cost per day is 0.12 % of the unit cost. Determine the optimal purchase quantity if the supplier has offered the following unit prices for the castings. [7M]
- Unit price is Rs. 1000 for  $q < 1000$   
Unit price is Rs. 950 for  $q \geq 1000$ . [8M]



**S329-OPERATIONS RESEARCH**

- 5(a) The cost of a machine is Rs.6, 100 and its scrap value is Rs 100. The maintenance costs found from experience are as following. When should the machine be replaced?

Years	1	2	3	4	5	6	7	8
Maintenance Cost(Rs.)	100	250	400	600	900	1,200	1,600	2,000

[7M]

- (b) A self-service store employs one cashier at its counter. An average of nine customers arrives every 5 minutes while the cashier can serve 10 customers in 5 minutes. Assuming Poisson distribution for arrival rate and exponential distribution for service rate, find (i) Average number of customers in the system. (ii) Average number of customers in the queue or average queue length. (iii) Average time a customer spends in the system. (iv) Average time a customer waits before being served.

[8M]

6. Determine the value of  $u_1$ ,  $u_2$  and  $u_3$  so as to Maximization  $(Z) = u_1 \cdot u_2 \cdot u_3$  subjected to the constraints  $u_1 + u_2 + u_3 = 10$  and  $u_1, u_2$  and  $u_3 \geq 0$ .

[15M]

- 7(a) Use simplex method solve Maximize,  $Z = 3x_1 + 2x_2 + 5x_3$ , Subjected to  $x_1 + 2x_2 + x_3 \leq 430$ ,  $3x_1 + 2x_3 \leq 460$ ,  $x_1 + 4x_2 \leq 420$ ,  $x_1, x_2, x_3 \geq 0$ .

[7M]

- (b) A solicitors firm employs typists A, B, C, D, E for jobs P, Q, R, S, T. According to an earlier understanding only one job was given to one typist. Find least cost allocation for the following data.

	P	Q	R	S	T
A	85	75	65	125	75
B	90	78	66	132	78
C	75	66	57	114	69
D	80	72	60	120	72
E	76	64	56	112	68

[8M]

- 8(a) An item is produced at the rate of 50 items per day. The demand occurs at rate of 25 items per day. If the setup cost is Rs 100 per setup and holding cost is Rs 0.01 per unit of item per day. Find the economic lot size for one run, assuming that shortages are not permitted. Also find the time of cycle and minimum total cost for one run.

[7M]

- (b) Explain how the theory of replacement is used in replacement of item whose maintenance cost varies with time.

[8M]

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B.Tech. (V Semester) Supplementary Examinations

**S308-METAL CUTTING AND MACHINE TOOLS**

(ME)

Time : 3 hours

Max. Marks : 75

**PART-A**

(Compulsory question)

Q.No	Questions	Marks
1(a)	What is metal cutting?	1M
(b)	Sort out various parts in lathe.	1M
(c)	What is boring bar?	1M
(d)	What is friability on grinding wheel?	1M
(e)	What are the industrial applications of a broaching machine?	1M
(f)	How a chip can be formed?	2M
(g)	Sort out various lathe attachments.	2M
(h)	What is the necessity of steady mechanism in slotter?	2M
(i)	What is the importance of knee in the horizontal milling machine?	2M
(j)	What is the influence of rake angle in broach?	2M

**PART-B**

(Answer any FOUR questions. All questions carry equal marks)

2(a)	Discuss the following them on machining process. (i) End relief angle      (ii) Side relief angle      (iii) Nose radius	8M
(b)	What are the various types chips formed in machining process? Elucidate.	7M
3(a)	List out various types of tools used in lathe. Summarized them.	8M
(b)	Illustrate following operation in lathe them (i) Facing      (ii) Turning      (iii) Chamfering      (iv) Grooving	7M
4(a)	How does the shaper machine work on Crank and slotter mechanism? Explicate.	8M
(b)	What does mean by boring and types of boring machine?	7M
5(a)	How do you specify the milling machine?	8M
(b)	Elucidate the grinding process and state the advantages of grinding over other machining processes.	7M
6(a)	Describe the basic principle of a lapping process.	8M
(b)	Enumerate the different types of drill jigs.	7M
7(a)	Give the detail of Twist drill nomenclature.	8M
(b)	Differentiate between shaper and planer.	7M
8(a)	Brief out the nomenclature of a milling cutter with a neat sketch.	8M
(b)	What are the advantages, limitations and applications of a grinding machine?	7M

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