



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

L.B. Reddy Nagar :: Mylavaram-521 230 :: Krishna Dist. :: A.P
Approved by AICTE, New Delhi. Affiliated to JNTUK, Kakinada

B.Tech.(V Semester)(R14) Supplementary Examinations, August 2021

TIME TABLE

TIME :10.00 AM to 01.00 PM

A.Y. 2020-21

DATE	ASE	CE	CSE	ECE	EEE	EIE	IT	ME
17-08-2021 (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
18-08-2021 (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
20-08-2021 (Friday)	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
21-08-2021 (Saturday)	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
23-08-2021 (Monday)	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 S174 - Control Systems	S167 - Computer Graphics	S308 - Metal Cutting and Machine Tools
24-08-2021 (Tuesday)	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 the time table may please be informed to the Controller of Examinations immediately.

Date: 31-07-2021

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CONTROLLER OF EXAMINATIONS

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PRINCIPAL

Copy to: 1. Vice-Principal, Deans & HoDs
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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

(Answer all questions)

- 1(a) Quote an example for convection. [1M]
- (b) What is transient state heat conduction? [1M]
- (c) For a fluid with Prandtl number one sketch the thermal and hydrodynamic boundary layers. [1M]
- (d) State Plank's Distribution Law. [1M]
- (e) Define Overall Heat Transfer Coefficient. [1M]
- (f) What is Laplace Equation? [2M]
- (g) What are the dimensionless observed in lumped heat capacity analysis? [2M]
- (h) Sketch the velocity and temperature profiles for fluid flowing over a vertical plate in free convection. [2M]
- (i) For a black body with emissive power of 1500 W/m^2 what is it's intensity of radiation. [2M]
- (j) What is minimum fluid? [2M]

PART-B

(Answer any FOUR questions)

- 2(a) Derive general differential heat conduction equation in cartesian co-ordinates. [8M]
- (b) With the help of examples demonstrate the basic modes of heat transfer [7M]
- 3(a) An Aluminum sphere weighing 7kg and initially at a temperature of 260°C is suddenly immersed in a fluid at 10°C . If $h=50 \text{ W/m}^2\text{K}$, compute the time required to cool the sphere to 90°C . [7M]
- (b) Write a brief note on dimensionless numbers observed in lumped heat capacity analysis [8M]
4. Using dimensional analysis, derive the general form of equation for forced convective heat transfer in terms of Nusselt number, Reynolds number and Prandtl numbers. [15M]
- 5(a) State and explain Weins Displacement Law. Show that the $E_{b\lambda}$ will be maximum when $\lambda_{\max} T = 2898 \mu\text{mK}$. [7M]
- (b) Explain the terms absorptive, reflectivity, transmissivity of radiant energy. [8M]

S226-ELEMENTS OF HEAT TRANSFER

- 6(a) In a food processing plant water is to be cooled from 18°C to 6.5° by using brine solution entering at an inlet temperature of -1.1°C and leaving at 2.9°C . What area is required when using a shell and tube Heat Exchanger with the water making two shell pass and the brine making four tube pass. Assume an average overall heat transfer coefficient of $850\text{W/m}^2\text{K}$ and a design load of 6000W . [7M]
- (b) Classify Shell and Tube Heat Exchangers [8M]
- 7(a) With the help of neat sketches differentiate Parallel flow, Counter flow and Cross flow heat exchangers. [7M]
- (b) Oil with the capacity rate of 2500W/K flows through a double pipe Heat Exchanger. It enters at 360°C and leaves at 300°C . Cold fluid enters at 30°C and leaves at 200°C . If the overall heat transfer coefficient is $800\text{W/m}^2\text{K}$. Determine the heat exchanger area required for a) Parallel flow and b) Counter Flow [8M]
- 8(a) What is critical radius of insulation? Derive an expression for critical radius insulation for cylinder. [7M]
- (b) A steam pipe 10cm Inner diameter and 11cm outer diameter is covered with an insulating substance $K=1\text{W/mK}$. The steam temperature and ambient temperature are 200°C and 20°C respectively. If the convective heat transfer coefficient between insulation surface and air is $8\text{W/m}^2\text{K}$. Find the critical radius of insulation. For this value of critical radius calculate the heat lost per meter length of pipe. [8M]

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

S119-AIRCRAFT PERFORMANCE

(AE)

Time : 3 hours

Max. Marks : 75

PART-A

(Answer all questions)

- 1(a) Mention different types of motions of aircraft? [1M]
- (b) Enlist different types of leading edge high lift devices? [1M]
- (c) In which condition thrust required is minimum? [1M]
- (d) At which condition maximum rate of climb is important? [1M]
- (e) Define touchdown velocity? [1M]
- (f) What is TSFC and write its units? [2M]
- (g) Specify the significance of high lift devices? [2M]
- (h) Write the equation for maximum aerodynamic efficiency and velocity at power required minimum? [2M]
- (i) Define endurance and write the equation for endurance. [2M]
- (j) After attain the corner velocity the co-efficient of lift is less than its maximum value. why? [2M]

PART-B

(Answer any FOUR questions)

- 2(a) What is the basic principle required to generate the thrust and list out the assumptions to made to derive the momentum theory? [7M]
- (b) CJ-2 airplane is cruising at an altitude 15 KM with a velocity 250 m/s. Then find the atmospheric ratios, mach number and EAS of an aircraft? [8M]
- 3(a) Write about the critical mach number and explain how thickness of an airfoil effects the critical mach number. [7M]
- (b) Discuss in detail about the drag divergence mach number. [8M]
- 4(a) Show that coefficient of drag due to zero lift is equal to one third of the coefficient of drag due to lift, using this condition derive the equation for velocity at power required minimum. [8M]
- (b) An aircraft is cruising at an altitude 3 KM, the mass of the aircraft is 33112.24 kg surface area is 88 m² the drag profile of the aircraft is $C_D = 0.015 + 0.08C_L^2$. Calculate the velocity at thrust required minimum and velocity at power required minimum. Comment on the results. [7M]

S119-AIRCRAFT PERFORMANCE

- 5(a) Deduce the equation of motion for the climbing flight and derive the expression for rate of climb using these equations of motion. [7M]
- (b) The maximum lift to drag ratio for a CP-1 airplane is 13.6. At 3 KM assume a total loss of engine thrust. Calculate the 1) Minimum glide angle and maximum range covered by airplane 2) Calculate the corresponding equilibrium glide velocity at 3 KM and at sea level. Where the airplane has the wing loading 811.6 N/m^2 and drag polar profile is $C_D = 0.025 + 0.053C_L^2$ [8M]
- 6(a) Derive the expression for the minimum turn radius, [7M]
- (b) An airplane cruising at sea level with velocity 150 m/s. Assume that the weight of the fuel is constant. The total weight of the aircraft is one tenth of the lift of the aircraft. Calculate turn rate and turn radius for the level turn at this velocity. [8M]
- 7(a) Mention different types of propellers and explain any of them. [7M]
- (b) A propeller of diameter 18 m is mounted on a airplane, when it is moving at speed of 200 Km/h, produces a thrust of 2070 N under standard sea level conditions. Calculate the velocity of slip stream far behind the propeller. [8M]
8. Consider the flow over the flat plate that is 3 cm long in the flow direction and 0.5 m wide. The free stream conditions are corresponding to standard sea level and the flow velocity is 120 m/s. Assume the flow is turbulent in nature. i) Compare the thickness of the turbulent boundary layer to laminar boundary layer. ii) Calculate the total skin friction coefficient in both turbulent and laminar boundary layer. iii) Calculate the total drag in case of laminar and turbulent boundary layers. [15M]

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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 is actuator? [1M]
- (b) Difference between Fixed and Retractable Landing Gear? [1M]
- (c) Role of spark plug in an ignition system? [1M]
- (d) Explain about Fenwal System? [1M]
- (e) Where the pitot-static tube is mounted on the aircraft? [1M]
- (f) Write about conventional control system? [2M]
- (g) List out any two disadvantages of hydraulic system? [2M]
- (h) Write the role of a distributor in ignition system? [2M]
- (i) How to detect the fire in an aircraft? [2M]
- (j) Abbreviate ADC & DADC? [2M]

PART-B

(Answer any FOUR questions)

- 2(a) How to use the auto pilot system in an aircraft? [7M]
- (b) Explain in detail about fly by wire system in an aircraft? [8M]
- 3(a) Illustrate the typical pneumatic system for an aircraft with neat sketches? [7M]
- (b) What are the advantages of the pneumatic system over the hydraulic system? [8M]
- 4(a) What are the basic components present in the aircraft fuel system? Explain briefly about gravity feed fuel system. [8M]
- (b) What are the differences between electric starter and Air-Turbine starter? [7M]
- 5(a) Why oxygen systems are need in an aircraft explain it? [7M]
- (b) Explain the concept of the boot-strap air cycle system? [8M]
- 6(a) Write down the working principle of Air speed indicator with neat sketches? [7M]
- (b) Explain the working principle of gyroscopic instruments? [8M]
- 7(a) Explain in detail about Extinguishing Agents and Portable Fire Extinguishers? [7M]
- (b) Illustrate in detail about the Shock Absorbing and Non-Shock Absorbing Landing Gears? [8M]
- 8(a) Mention differences between the airspeed indicator and vertical speed indicator? [7M]
- (b) Explain the fuel system for boeing757 with the help of neat sketches? [8M]

S122-AIRCRAFT STRUCTURES-II

- 8(a) Define the term 'shear center' of a thin-walled open section and determine the position of the shear center of the thin-walled open section is subjected to a shear load of $S_y = 100 \text{ N}$ as shown in Figure. 8(a). Take $I_{xx} = 6.22t^3$ where $t = 1.6 \text{ mm}$, $r = 100 \text{ mm}$. [7M]

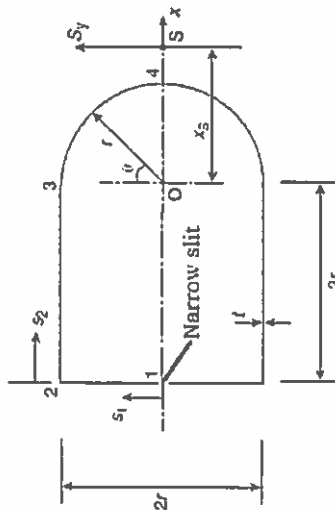


Figure. 8(a)

- (b) Calculate the position of the shear center of the thin-walled section shown in Figure. 8(b). Take $I_{xx} = 724 094 \text{ mm}^4$. [8M]

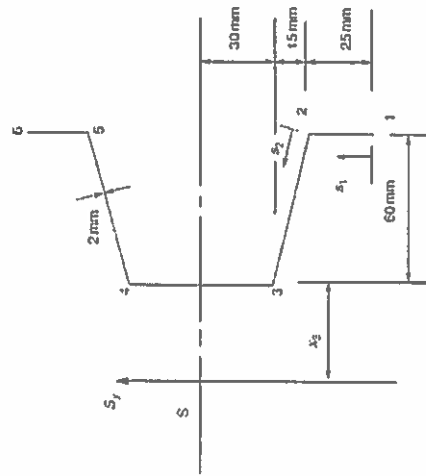


Figure. 8(b)

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B.Tech.V Semester Regular/Supplementary Examinations

S122-AIRCRAFT STRUCTURES-II

(AE)

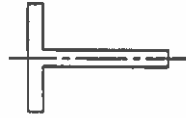
Time : 3 hours

Max.Marks:75

PART-A

(Answer all questions)

- Define neutral plane. [1M]
- Write any two assumptions of theory of shear flow of open section beams. [1M]
- What is the difference between open and closed section shear flow? [1M]
- Write direct stress (σ_x) formula for bending of thin plates. [1M]
- Define buckling load of complete tension field beam. [1M]
- What is direct stress (σ_x) when bending moment M_y is zero of the beam? [2M]
- Locate the shear center for the cross-section shown in Figure. 1(g)? And explain how it's located. [2M]



Single (T-section)

Figure. 1(g)

- Write any two assumptions of theory of torsion of closed section beams (Bredt-Batho theory). [2M]
- Define buckling coefficient (k). [2M]
- Write about tapered wing spar. [2M]

PART-B

(Answer any FOUR questions)

- Derive the direct stress distribution equation due to bending for a beam having Unsymmetrical cross section. [7M]
- How a neutral axis located for any arbitrary cross-section? [8M]
- Prove that the shear center lies at the junction for an angle section with equal legs. [7M]

- (b) Calculate the position of the shear center of the thin-walled channel section shown in Figure. 3(b). The thickness t of the walls is constant. Take $I_{xx} = h^3 t (1 + 6b/h) / 12$.

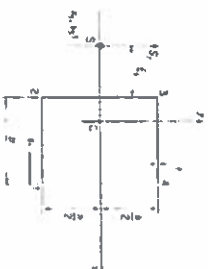


Figure. 3(b)

[8M]

- 4(a) How a shear center can be estimated for any closed cross-section explain with sketches?

[7M]

- (b) Determine the maximum shear stress in the channel section shown in Figure. 4(b), when it is subjected to an anticlockwise torque of 10 N m . $G = 25\,000 \text{ N/mm}^2$.

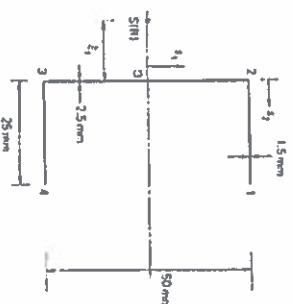


Figure. 4(b)

[8M]

- 5(a) Describe Gerard's method of calculation of crippling stress.

[7M]

- (b) A panel, comprising flat sheet and uniformly spaced inverted hat section stringers, a part of whose cross-section is shown in Figure. 5(b), is to be investigated for strength under uniform compressive loads in a structure in which it is to be stabilized by frames a distance l apart, l being appreciably greater than the spacing b . State the modes of failure which you would consider and how you would determine appropriate limiting stresses.

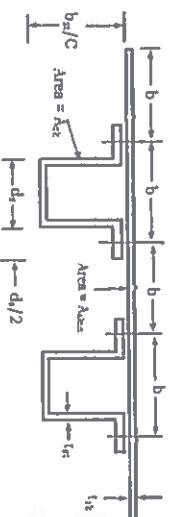


Figure. 5(b)

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[8M]

- 6(a) Write a short notes about loads on structural components of an aircraft.

[7M]

- (b) The fuselage section shown in Figure. 6(b) is subjected to a bending moment of 100 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 boom 1 to 5 only. Take $I_{xx} = 1854 \times 10^6 \text{ mm}^4$.

[8M]

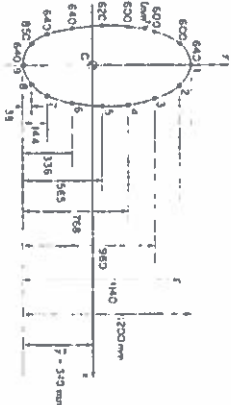


Figure. 6(b)

- 7(a)

[7M]

A beam having the cross-section shown in Figure. 7(a), is subjected to a bending moment of 1500 Nm in a vertical plane. Calculate the direct stresses due to bending at point B and E. Take $I_{xx} = 1.09 \times 10^6 \text{ mm}^4$, $I_{yy} = 1.31 \times 10^6 \text{ mm}^4$, $I_{xy} = 0.34 \times 10^6 \text{ mm}^4$.

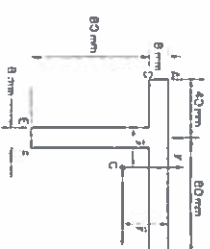


Figure. 7(a)

- (b)

[8M]

The thin-walled beam section shown in Figure. 7(b) is subjected to a bending moment $M_x = 3000 \text{ N-m}$ applied in a negative sense. Find the position of the neutral axis and the maximum direct stress in the section. Take $I_{xx} = 2a^3 t$, $I_{yy} = a^3 t / 3$, $I_{xy} = 1.732 a^3 t / 6$, when $a = 90 \text{ mm}$ and $t = 5 \text{ mm}$.



Figure. 7(b)

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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

(Answer all questions)

- 1(a) Calculate the speed of sound in air at an altitude of 2 kilometers? [1M]
- (b) What is meant by underexpanded condition? [1M]
- (c) What is detached bow shock wave? [1M]
- (d) What is the effect of heat addition on downstream flow for supersonic inlet flow on Mach number? [1M]
- (e) What is the effect of airfoil thickness on critical Mach number? [1M]
- (f) What is the relation between stagnation temperature and static temperature in the isentropic flow process to calculate Mach number? [2M]
- (g) What is the relation between area and velocity in subsonic and supersonic flows? [2M]
- (h) Draw the formation of shock waves over symmetric wedge? [2M]
- (i) Write the expression for critical temperature ratio for Fanno flow? [2M]
- (j) What is the application of supercritical airfoil? [2M]

PART-B

(Answer any FOUR questions)

- 2(a) Derive the relations connecting stagnation pressure, static pressure and Mach number for a perfect gas with isentropic flow process. Derive similar relations for temperature and density ratios also? [7M]
- (b) The static temperature and pressure of an air stream flowing at 300 m/s are 300 K and 95 kPa, respectively. Determine the stagnation temperature and stagnation pressure of the air. Assume the flow to be isentropic. [8M]
- 3(a) Derive the expression for compressibility correction to dynamic pressure? [7M]
- (b) A convergent-divergent nozzle is designed to operate with exit Mach number of 1.75. The nozzle is supplied from an air reservoir at 68×10^5 N/m² (abs). Assuming one-dimensional flow, calculate the following: (a) maximum back pressure to choke the nozzle. (b) back pressure for the nozzle to be perfectly expanded to the design Mach number. [8M]

-

(b)

(b) A uniform supersonic stream at Mach 2.2 expands around two convex corners of 10° each. Determine the Mach number downstream of the second corner and the angle of the second fan.

[7M]

- [8M]

- [7M]

- [8M]

- [15M

- [15M

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

S359-PROPULSION-I
(ASE)

Time : 3 hours

Max. Marks : 75

PART-A

(Compulsory question)

Q.No	Questions	Marks
1(a)	Define thrust augmentation.	1M
(b)	What are the functions of a supersonic inlet?	1M
(c)	Write the applications of a centrifugal compressor.	1M
(d)	What is the major pollutant coming out of the combustion chamber?	1M
(e)	Write the equation for degree of reaction of a reaction turbine.	1M
(f)	Show the graph for pressure ratio vs mass flow rate for a axial compressor.	2M
(g)	What are the design variables for a nacelle?	2M
(h)	Compare about the frontal area of axial and centrifugal compressors.	2M
(i)	What is tertiary or dilution zone in a combustion chamber?	2M
(j)	What is maximum utilization factor for a single impulse stage?	2M

PART-B

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

2(a)	The effective jet exit velocity from a jet engine is 2700 m/s. The forward light velocity is 1350 m/s and the air flow rate is 78.6 kg/s. Calculate (i) Thrust, (ii) Thrust power (iii) Propulsive efficiency.	7M
(b)	Mention the various advantages and disadvantages of a turboprop engine and also bring out the applications.	8M
3(a)	Explain the supersonic inlets	7M
(b)	What are the various functions of an exhaust nozzle?	8M
4(a)	What are the three type of blade shapes possible and how they are classified?	7M
(b)	What is meant by volute? Explain the purpose of volute casing.	8M
5(a)	What are the basic requirements of a combustion chamber? Explain.	7M
(b)	Write a short note on (i) Flame tube cooling (ii) fuel injection.	8M
6(a)	Draw the velocity triangle diagrams of Impulse turbine and reaction turbine and explain the difference between them.	7M
(b)	Define degree of reaction and derive and expression for the same.	8M
7.	Explain with a sketch and h-s diagram, the working of a reaction turbine.	15M
8(a)	Explain the phenomena of surging and stalling in an axial flow compressor. Explain also the rotating stall.	7M
(b)	Air enters an axial flow compressor at 1bar and 20°C at low velocity. It is compressed through a pressure ratio of 11. Find the final temperature and pressure at outlet from the compressor. Take the compressor efficiency as 85%.	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)

- 1(a) Define Microprocessor. [1M]
- (b) How to operate 8086 in minimum mode. [1M]
- (c) What is the need of DMA controller? [1M]
- (d) List the various modes of operation of 8255. [1M]
- (e) Give an example of external interrupts. [1M]
- (f) Mention the size of the each segment of 8086. [2M]
- (g) How many octal latches and octal buffers are needed for the address and data separation in 8086? [2M]
- (h) Calculate the number of address lines required to interface 64KB EPROM with 8086. [2M]
- (i) Draw the control word register format for BSR mode of 8255. [2M]
- (j) Write the use of interrupt request register in 8259A. [2M]

PART-B

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

- 2(a) Classify the registers of 8086 according to their functionality and explain the applications of each register. [7M]
- (b) Calculate the physical addresses for the following. [8M]
 - (i) DS = 2000H, SI = 5600H. (ii) CS = 2500H, IP = 25FFH (iii) SS = 2345H, SP = 1BFCH (iv) ES = 97A4H, DI = 1A00H.
- 3(a) Develop an assembly language program in 8086 to arrange a given series of hexadecimal bytes in ascending order. [7M]
- (b) Discuss the functions of the following pins of 8086 [8M]
 - (i) ALE (ii) $\overline{DT/\overline{R}}$ (iii) \overline{DEN} (iv) \overline{TEST} .
4. Design an interface between 8086 CPU and two chips of 16K×8 EPROM and two chips of 32K×8 RAM. Select the starting address of EPROM suitably. The RAM address must start at 00000H. [15M]
- 5(a) List out the Salient features of 8255 in different modes. [7M]
- (b) Describe the operation of a Stepper Motor with a neat sketch. [8M]
- 6(a) Analyze the interrupt sequence in a 8086-8259A system. [7M]
- (b) Draw and discuss about the formats of mode instruction control word and command instruction control word of 8251A for asynchronous mode. [8M]
- 7(a) Develop an assembly language program in 8086 to find square root of a two digit number. Assume the number is a perfect square. [7M]
- (b) Choose appropriate instructions of 8086 to write a program for displaying the message "LBRCE" on the CRT screen of a microcomputer. [8M]
- 8(a) Categorize the instruction set of 8086 and write the use of each type. [7M]
- (b) Illustrate the various addressing modes supported by 8086. [8M]

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

S168-COMPUTER NETWORKS

(CSE & EIE)

Time : 3 hours

Max. Marks : 75

PART-A

(Compulsory question)

Q.No	Questions	Marks
1(a)	What is ISO and OSI model?	1M
(b)	What are the 5 network topologies?	1M
(c)	RARP Full Form.	1M
(d)	TCP Full Form.	1M
(e)	What is the example of application layer?	1M
(f)	What are the different types of networking hardware?	2M
(g)	What is data link layer and its functions?	2M
(h)	What are the two types of routing?	2M
(i)	What is meant by transport layer?	2M
(j)	What happens in application layer?	2M

PART-B

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

2(a)	Explain in detail ISO-OSI reference model.	7M
(b)	Write short notes on Arpanet.	8M
3(a)	Explain one -bit sliding window protocol. Give the advantages and disadvantages of one-bit sliding window protocol.	7M
(b)	Discuss the services provided by the data link layer to the network layer.	8M
4(a)	What is Routing Algorithm? What are the classifications of it?	7M
(b)	What is optimality principle? With an example, explain shortest path Routing Algorithm.	8M
5(a)	Give the format of UDP segment and TCP segment. Explain when UDP is preferred to TCP.	7M
(b)	In TCP, Why three way handshake is required for connection establishment and release.	8M
6(a)	Mention the different types of electronic mail and also illustrate the different parts of E-mail address.	7M
(b)	List out the various functionalities of application layer.	8M
7(a)	Explain the TCP connection management.	7M
(b)	Why does UDP exist? Explain the features of UDP.	8M
8(a)	Write short notes on the following: (i) MIME (ii) HTTP (iii) DNS	7M
(b)	What is network security and its importance?	8M

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B.Tech. (V Semester) Supplementary Examinations

**S327-OPERATING SYSTEMS
(CSE)**

Time : 3 hours

Max. Marks : 75

PART-A

(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	List any four types of system calls.	1M	CO1	L1
(b)	Define process state and mention the various states of a process.	1M	CO2	L1
(c)	Distinguish between logical address and physical address.	1M	CO3	L1
(d)	Distinguish between shared and exclusive lock.	1M	CO4	L1
(e)	List the implementation techniques of access matrix.	1M	CO5	L1
(f)	Describe the use of fork () and exec () system calls.	2M	CO1	L1
(g)	Define semaphores. Mention its importance in operating system.	2M	CO2	L1
(h)	Distinguish between demand paging and pure demand paging.	2M	CO3	L1
(i)	List the different disk-space allocation methods.	2M	CO4	L1
(j)	Define resource. List some resources that a process might need for its execution.	2M	CO5	L1

PART-B

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

2(a)	Define an operating system. State and explain the basic functions or services of an operating system.	7M	CO1	L3
(b)	Explain the differences between multiprogramming and time-sharing systems.	8M	CO1	L3
3(a)	Discuss the attributes of the process. Describe the typical elements of process control block.	7M	CO2	L2
(b)	List out the various process states and briefly explain the same with a state diagram.	8M	CO2	L1
4(a)	List the common file types along with their extensions and describe each file type.	7M	CO3	L2
(b)	Describe indexed file and indexed sequential file organization.	8M	CO3	L2
5(a)	Explain the basic Scheme of page replacement and about the various page replacement strategies with examples.	7M	CO4	L2
(b)	Differentiate the main memory organization schemes of contiguous- memory allocation, segmentation, and paging with respect to the following.	8M	CO4	L2
6(a)	Explain briefly resource allocation graph with examples.	7M	CO5	L2
(b)	Describe resource-allocation graph. Explain how resource graph can be used for detecting deadlocks.	8M	CO5	L3
7(a)	Explain how protection is provided for the hardware resources by the operating system.	7M	CO1	L3
(b)	Discuss in detail about different architectures of a computer system.	8M	CO3	L2
8(a)	Describe process scheduling. Explain the various levels of scheduling.	7M	CO4	L3
(b)	Distinguish pre-emptive and non-pre-emptive scheduling algorithms.	8M	CO5	L2

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B.Tech. (V Semester) Supplementary Examinations

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

Time : 3 hours

Max. Marks : 75

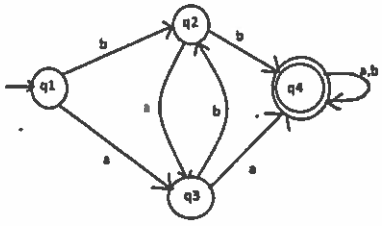
PART-A

(Compulsory question)

Q.No	Questions	Marks
1(a)	Define Nondeterministic Finite Automaton.	1M
(b)	Define Regular set.	1M
(c)	Define Ambiguous and Unambiguous grammar.	1M
(d)	Define Acceptance of Languages of PDA by final state.	1M
(e)	Define Recursive enumerable Languages.	1M
(f)	What is the difference between Mealy and Moore machines?	2M
(g)	Mention any 4 closure operations on regular sets.	2M
(h)	Define Useless productions, Null productions and Unit Productions.	2M
(i)	Give Deterministic pushdown Automaton to accept the Language 0^* . If not, give the reason why?	2M
(j)	Define NP-Complete and NP-hard Problems.	2M

PART-B

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

2(a)	Design a Finite Automaton that accepts the Language over the alphabet $\{0,1\}$ such that every block of five consecutive symbols contains at least two 0's.	7M
(b)	"Every Deterministic Finite Automata(DFA) is Nondeterministic Finite Automata(NFA), but every NFA is not DFA". Justify the statement.	8M
3(a)	Construct Nondeterministic Finite Automaton for the regular expression $(01+2^*)^*1$.	8M
(b)	Using Pumping lemma to show that the following language is not regular: $L=\{0^n10^n \mid n \geq 0\}$.	7M
4(a)	Construct a Regular Grammar for the below Regular Expression $(ab+a)^*(aa+b)$.	7M
(b)	Construct a Regular Grammar for the below FA. 	8M
5(a)	Design a PDA for accepting the language $L=\{a^ib^jck^k \mid i=j \text{ and } i,j,k \geq 1\}$.	8M
(b)	Design PDA for the language $L=\{ww^R \mid w \in (a+b)^* \text{ and } w^R \text{ is the reverse of } w\}$.	7M
6(a)	Explain briefly the classes of P and NP problems.	7M
(b)	Define Post's Correspondence Problem. Find the solution for the following instance of Post's correspondence problem $A=\{ba,abb,bab\}$ $B=\{bab,bb,abb\}$.	8M
7(a)	Design a DFA that accepts all strings over the alphabet $\{0,1\}$ such that strings does not contain the substring 001.	7M
(b)	Find a Non deterministic Finite Automaton(NFA) with three states that accepts the Language $L=\{a^n \mid n \geq 1\} \cup \{b^m a^k \mid m,k \geq 0\}$.	8M
8(a)	Obtain Nondeterministic Finite Automaton(NFA) for the Regular Expression $(a+b)^*b(a+bb)^*$.	7M
(b)	Write a Regular expression for the following languages $L1=\{w \in \{a,b\}^* \mid w \text{ has even no of a's}\}$ $L2=\{wxw^R \mid w,x \in \{a,b\}^+\}$	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) Draw the equivalent circuit of a transmission lines. [1M]
- (b) Why a short circuited stub is ordinarily performed to an open circuited stub? [1M]
- (c) What is the aspect ratio for the rectangular waveguide? [1M]
- (d) Mention the applications of cavity resonator. [1M]
- (e) Define a micro-strip line. [1M]
- (f) At a frequency of 800Mhz, a transmission line has a characteristic impedance 300 ohms and an electrical length is 2.5cm then find L. [2M]
- (g) What is a stub? Why it is used between transmission lines? [2M]
- (h) Draw the TM_{22} mode field pattern in rectangular waveguide. [2M]
- (i) What is the purpose of Q-factor and define? [2M]
- (j) What is the cut- off frequency for micro-strip lines and which mode waves propagating? [2M]

PART-B

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

- 2(a) Obtain the expression for current and voltage at any point along a line with it is terminated by characteristic impedance. [7M]
- (b) A transmission line operating at frequency 796hz and its length is 25km. $Z_{sc} = 3220 \angle -79.28^\circ$, $Z_{oc} = 1301 \angle 76.83^\circ$ then determine the primary constants. [8M]
- 3(a) Explain the double stub matching of a line. [7M]
- (b) Determine the length and location of a single short circuited stub to produce an impedance match on a transmission line with characteristic impedance 600Ω and terminated by 1800Ω . [8M]
- 4(a) Why TEM modes are not possible in hollow rectangular waveguide? Prove it. [7M]
- (b) A rectangular air filled copper waveguide with dimensions $2\text{cm} \times 1\text{cm}$ cross section and 30cm length is operated at 9Ghz with a dominated mode find cut-off frequency, guided wavelength, phase velocity and attenuation constant. [8M]
- 5(a) Examine the effectiveness Bessel's differential equations and Bessel function with reference to waveguide. [7M]
- (b) A 10Ghz signal is to be transmitted inside hallow circular conducting pipe. Determine the inside diameter of the pipe in such that its lowest cutoff frequency is 20% of its single frequency. [8M]
- 6(a) Derive the equation for resonant frequency in circular cavity resonator. [7M]
- (b) If the wave number of an EM wave is 301/m in the micro-strip line with relative permittivity being equal to 2.6, with a width of 5mm and thickness equal to 8mm is given then the propagation constant and characteristic impedance. [8M]
- 7(a) Explain the general solution of a transmission line terminated with any load impedance. [7M]
- (b) Derive the conditions for the distortion less operation of a transmission line and also discuss which parameters are effecting by introducing distortion on transmission line. [8M]
8. A generator of 1volt 1000cycles supplies a power to a 100 mile open wire line terminated with 200Ω resistance. The parameters are $R=10.4\Omega/\text{mile}$, $L=0.00367\text{H}/\text{mile}$, $G=0.8 \times 10^{-6}\text{mho}/\text{mile}$, $C=0.00835\mu\text{F}/\text{mile}$. Find the reflection coefficient, input impedance, input current delivered to the load P_R , input power P_s and efficiency of a transmission line. [15M]

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

S169-COMPUTER ORGANIZATION

(EEE)

Time : 3 hours

Max. Marks : 75

PART-A

(Compulsory question)

Q.No	Questions	Marks
1(a)	Name different types of micro-operations.	1M
(b)	What is a micro-program?	1M
(c)	Expand the terms: SISD and SIMD.	1M
(d)	What is associative memory?	1M
(e)	What is an I/O port?	1M
(f)	What is a tri-state buffer?	2M
(g)	What is the basic difference between a branch instruction and a call instruction?	2M
(h)	How branch prediction improves instruction execution time?	2M
(i)	Give 4- levels of a memory hierarchy system.	2M
(j)	What is cycle stealing?	2M

PART-B

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

2(a)	What is register transfer language (RTL)? With the help of suitable diagrams explain the features of RTL.	7M
(b)	A digital computer has a common bus system for 16 registers of 32 bits each. The bus is constructed with multiplexers (i) How many selection inputs are there in each multiplexer? (ii) What is the size of multiplexer needed? (iii) How many multiplexers are there in the bus?	8M
3(a)	What are micro-subroutines? Explain.	7M
(b)	Differentiate between RISC and CISC systems.	8M
4(a)	How the pipeline for RISC and CISC systems differs?	7M
(b)	Give a general 3-segment instruction pipeline used in RISC machines and explain its features. How the following sequence of 4 instructions are computed in RISC pipeline? Without data conflicts. i) LOAD R1 ii) LOAD R2 iii) ADD iv) STORE.	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)	Name any 4 peripheral devices and give their characteristics.	7M
(b)	What are the characteristic differences between central processing unit and peripherals?	8M
7(a)	Explain Enable (EI) and disable (DI) interrupt instructions.	7M
(b)	What is the significance of Sign, Zero and overflow bits?	8M
8.	What is the purpose of DMA? Draw the block diagram for DMA controller. What is the sequence of operations in DMA transfer?	15M

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B.Tech. (V Semester) Supplementary Examinations

S406-THERMAL AND HYDRO PRIME MOVERS

(EEE)

Time: 3 hours

Max. Marks : 75

PART-A

(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	Define path.	1M	CO1	L1
(b)	What is port timing diagram?	1M	CO2	L1
(c)	What is impulse turbine?	1M	CO3	L1
(d)	Define density.	1M	CO4	L1
(e)	State use of turbine.	1M	CO5	L1
(f)	Define Enthalpy.	2M	CO1	L1
(g)	What is closed cycle gas turbine?	2M	CO2	L1
(h)	State applications of steam turbine.	2M	CO3	L1
(i)	State continuity equation.	2M	CO4	L1
(j)	Explain working principle of Kaplan turbine.	2M	CO5	L2

PART-B

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

2(a)	Discuss zeroth law of thermodynamics.	7M	CO1	L2
(b)	Explain Kelvin-plank statement.	8M	CO1	L2
3(a)	Compare 2stroke and 4stroke engine.	7M	CO2	L2
(b)	What are the applications of gas turbine?	8M	CO2	L1
4(a)	State mechanical details of impulse turbine.	7M	CO3	L1
(b)	Explain blade of diagram efficiency.	8M	CO3	L2
5(a)	Explain U-tube manometer with example.	7M	CO4	L2
(b)	How do you measure flow with venturimeter?	8M	CO4	L2
6(a)	Draw neat sketch of pelton wheel and state its components.	7M	CO5	L2
(b)	State various features of Kaplan turbine.	8M	CO5	L1
7(a)	Explain polytropic process.	7M	CO1	L2
(b)	State performance parameters of gas turbine.	8M	CO2	L1
8(a)	Derive Bernoulli's equation.	7M	CO4	L2
(b)	Derive an expression for work done in case of pelton turbine.	8M	CO5	L2

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

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)	Give the applications of DSP.	1M
(b)	Draw the radix-2 FFT-DIT butterfly diagram.	1M
(c)	Why feed back is required in IIR systems?	1M
(d)	What is the difference between analog and digital filters?	1M
(e)	What are the disadvantage of Fourier series method?	1M
(f)	Define symmetric and anti symmetric signals.	2M
(g)	Draw the butterfly operation in DIT algorithm.	2M
(h)	What are the advantages of FIR filter?	2M
(i)	How can you design a digital filter from analog filter?	2M
(j)	What are the features of FIR filter design using Kaiser's approach?	2M

PART-B

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

2(a)	List the merits and demerits of Digital signal processing.	8M
(b)	Write short notes about the applications of DSP.	7M
3(a)	Explain the relationship between Z transform and DFT.	7M
(b)	Explain the following properties of DFT (i) Linearity (ii) Complex conjugate property (iii) Circular Convolution (iv) Time Reversal.	8M
4.	Explain the different types of structures for realizing IIR system with necessary diagram and expressions.	15M
5.	Write a short note on frequency translation in both analog and digital domain.	15M
6(a)	Compare the main features analog and digital filters.	7M
(b)	Explain various types of windows used in the design of FIR filters. Write their analytical equations and frequency response characteristics of each window.	8M
7.	Compute the N-point DFT of the sequence $x(n)$, Using the radix-2 decimation-in-frequency algorithm.	15M
8.	Design a bandpass filter to pass frequencies in the range 1 to 2 rad/sec using hanning window, with $N=5$.	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	CO	BL
1(a)	What is proximity effect?	1M	CO1	L1
(b)	Classify the transmission lines.	1M	CO2	L2
(c)	Define Voltage Regulation.	1M	CO3	L1
(d)	Classify overhead transmission line Insulator.	1M	CO3	L1
(e)	What is neutral earthing?	1M	CO4	L2
(f)	How to reduce the skin effect in overhead lines?	2M	CO1	L1
(g)	Write a short note on Ferranti effect.	2M	CO2	L2
(h)	Compare underground cables and overhead lines.	2M	CO3	L2
(i)	What is corona loss in case of overhead transmission line? Explain critical disruptive voltage.	2M	CO3	L2
(j)	Explain the importance of Bewley's Lattice diagram.	2M	CO4	L2

PART-B

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

2(a)	Derive an expression for inductance per unit length of an isolated current carrying conductor due to internal flux linkages alone.	7M	CO1	L2
(b)	Calculate the capacitance to neutral per km with and without considering the effect of earth. Radius of conductor is 0.01m, spaced 3.5 m apart and 8m above the ground.	8M	CO1	L4
3(a)	What are the effects of Ferranti effect on long lines and also give the suggestion to minimize the Ferranti effect.	7M	CO2	L2
(b)	Determine A,B,C,D constants for a 3-phase 50Hz transmission line 200km long having the following parameters $L=1.2 \times 10^{-3} \text{H/km}$, $C=8 \times 10^{-9} \text{F/km}$, $R=0.15 \Omega/\text{km}$. Use nominal-Pie method.	8M	CO2	L4
4(a)	Deduce an expression for per phase capacitance of a 3-core belted cable.	7M	CO3	L2
(b)	The capacitances of a 3-phase belted cable are $12.6 \mu\text{F}$ between the three cores bunched together and the lead sheath and $7.4 \mu\text{F}$ between one core and the other two connected to sheath. Find the charging current drawn by the cable when connected to 66 kV, 50 Hz supply.	8M	CO3	L4
5(a)	What are the disadvantages of corona? Explain how the corona considerations affect the design of a line.	7M	CO4	L2
(b)	In a 33 kV overhead line, there are three units in the string of insulators. If the capacitance between each insulator pin and earth is 11% of self-capacitance of each insulator, find (i) the distribution of voltage over 3 insulators and (ii) string efficiency.	8M	CO4	L4
6(a)	Explain the cause of overvoltage due to lightning.	7M	CO5	L3
(b)	Discuss the use of Bewley's lattice diagram in travelling wave analysis.	8M	CO5	L4
7(a)	Derive the expressions of reflection and refraction coefficients of line terminated through a resistance.	7M	CO5	L3
(b)	Find the most economical value of diameter of a single-core cable to be used on 50 kV, singlephase system. The maximum permissible stress in the dielectric is not to exceed 40 kV/cm.	8M	CO3	L4
8(a)	Write short notes on the following. (i) Critical disruptive voltage (ii) Visual disruptive voltage (iii) Radio interference due to corona.	7M	CO4	L2
(b)	A single phase transmission line has two parallel conductors 3 m apart, the radius of each conductor being 1 cm. Calculate the loop inductance per km length of the line if the material of the conductor is (i) copper (ii) steel with relative permeability of 100.	8M	CO2	L4

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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 losses occur in a thyristor during working conditions?	1M
(b)	What is the conduction period of thyristor in 3-phase full wave converters?	1M
(c)	Why thyristors are not preferred for inverters?	1M
(d)	What are the advantages of ac voltage controllers?	1M
(e)	What is the purpose of inductor in step-down chopper circuit?	1M
(f)	What are advantages of power electronic converters?	2M
(g)	What is meant by symmetrical and asymmetrical?	2M
(h)	What are the disadvantages of the harmonics present in the inverter system?	2M
(i)	What is integral cycle control?	2M
(j)	Calculate the duty cycle, if the chopper frequency is 200HZ and turn-on time period is 2ms?	2M

PART-B

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

2(a)	Discuss the principle of operation of SCR.	7M
(b)	Analyze the static anode-cathode characteristics of SCR.	8M
3(a)	Analyze the operation of class E commutation with neat circuit and waveforms.	7M
(b)	Analyze the operation of class F commutation with neat circuit and waveforms.	8M
4(a)	What are the draw backs of half bridge inverter?	7M
(b)	Discuss principle of operation of single phase half – bridge inverter with neat circuit diagram and wave forms.	8M
5(a)	What is a dc chopper? Describe the various types of chopper configurations, List out the major applications of DC choppers.	7M
(b)	Analyze the operation of Step-up chopper with neat circuit diagram and waveforms.	8M
6(a)	Discuss the operation of on-off control of AC voltage controller.	7M
(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	8M
7.	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
8(a)	Discuss the equivalent circuit of UJT.	7M
(b)	Draw and analyze V – I characteristics of series connected operation of thyristor.	8M

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

S288-LINEAR AND DIGITAL IC APPLICATIONS

(EEE)

Time : 3 hours

Max.Marks:75

PART-A

(Answer all questions)

- 1(a) List out the DC characteristics of an op-amp. [1M]
- (b) What is meant by oscillator? [1M]
- (c) Interpret the disadvantages of weighted resistor DAC. [1M]
- (d) Name the basic gate of DTL Logic. [1M]
- (e) Recall EPROM and UVEEPROM. [1M]
- (f) Schematize the non-inverting comparator using op-amp. [2M]
- (g) label the block diagram of an oscillator. [2M]
- (h) Design monostable multivibrator using IC 555 timer. [2M]
- (i) Explain the priority encoder. [2M]
- (j) How would you use refreshing cycle in memories? [2M]

PART-B

(Answer any FOUR questions)

- 2(a) illustrate the features of 741 op-amp and also draw the pin diagram. [7M]
- (b) Sketch a circuit using Op-amp which can work as adder (inverted and non- inverted) and explain how it works. [8M]
3. Schematizethe first order low-pass filter and analyze the same by deriving the gain and phase angle equation. [15M]
4. Draw the schematic circuit diagram of flash type A/D converter and explain its Operation. [15M]
- 5(a) Interpret the following terms:
i) Fan-in. ii) Fan-out. iii) Propagation delay iv) Noise-Margin. [8M]
- (b) Distinguish different logic families and mention their advantages and disadvantages. [7M]
- 6(a) Construct a modulas-12 counter using 74XX93 4-bit Asynchronous binary counter. [8M]
- (b) List out the types of ROM and explain. [7M]
- 7(a) AnalyzeADC and DAC converter. [7M]
- (b) list out different types of ADC and DAC Techniques. [8M]
- 8(a) Illustrate the applications and features of an op-amp. [7M]
- (b) Design a 16*4 Encoder using two no. of 74XX148 8*3 Encoders and additional logic gates. [8M]

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

S192-DIGITAL SIGNAL PROCESSING

(EIE)

Time : 3 hours

Max. Marks : 75

PART-A

(Compulsory question)

Q.No	Questions	Marks
1(a)	At what condition, the sequence $x(n)$ is said to be anti-causal.	1M
(b)	How to compute final value of a causal sequence.	1M
(c)	Find the value of complex quantity W_8^1	1M
(d)	How the cutoff frequency of a filter can be computed in Chebyshev approximation procedure.	1M
(e)	Let us assume the Hanning window $w(n)$ is defined over the range $[0,10]$, then find the value of $w(0)+w(10)$.	1M
(f)	Evaluate the response of a system for an input of $x(n) = u(n)$ and impulse response $h(n) = u(n)$.	2M
(g)	Find a causal sequence from the z-domain $X(z) = \frac{1}{z-1}$	2M
(h)	What are the phase factors involved in the first stage computation of 8-Point DFT of a sequence in radix-2 DIT FFT algorithm.	2M
(i)	Draw the magnitude response of Butterworth filter.	2M
(j)	What are advantages of FIR filter?	2M

PART-B

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

2(a)	Explain about time shifting and time reversal operations with suitable examples.	8M
(b)	Analyse the system $y(n)=T\{x(n)\}=2x(n)+3y(n-1)$ for linearity, shift invariant, causality and stability.	7M
3(a)	Define Z-Transform. State and prove the time reversal and scaling in z-domain property of z-transform.	7M
(b)	Apply the z-transform, determine $X(z)$ of the sequence $x(n) = 3\left(\frac{1}{2}\right)^n u(n) - 2\left(\frac{1}{3}\right)^n u(n)$. Draw the pole zero plot and indicate its ROC.	8M
4(a)	State and prove the linear and time shifting property of DFT.	7M
(b)	Compute the 4- point DFT of a sequence $x(n)=\{1,2,3,4\}$. Obtain its magnitude and phase spectrum.	8M
5(a)	How analog and digital frequencies are related in bilinear transformation? Derive it.	7M
(b)	Design the transfer function of digital filter by using bilinear transformation. Given $H(s) = \frac{s}{(s+1)(s+2)}$ and assume $T=1$.	8M
6(a)	Compare Hanning and Blackman windows used in FIR filter design.	7M
(b)	Design a linear phase FIR filter corresponds to the transfer function $H(z) = 1 + 0.12z^{-1} + 0.34z^{-2} + 0.56z^{-3} + 0.78z^{-4} + 0.99z^{-5} + 0.78z^{-6} + 0.56z^{-7} + 0.34z^{-8} + 0.12z^{-9} + z^{-10}$	8M
7(a)	Discuss briefly classification of systems.	7M
(b)	Determine frequency response, magnitude response and phase response of a system having LCCDE. $y(n) - y(n-2) = x(n) + x(n-1)$	8M
8.	Compute the 8-point DFT of a sequence $x(n)=\{1,0,1,0,1,0,1,0\}$ using DIT FFT algorithm.	15M

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

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

B.Tech. (V Semester) Supplementary Examinations

S352 - PROCESS CONTROL INSTRUMENTATION

(EIE)

Q.w ✓

Time : 3 hours

Max. Marks: 75

PART-A

(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	What is the need for Process Control?	1M	CO1	L1
(b)	What is meant by Integral windup?	1M	CO2	L1
(c)	Write short notes on $\frac{1}{4}$ decay ratio.	1M	CO3	L1
(d)	What is meant by Valve sizing?	1M	CO4	L1
(e)	What is multi variable control?	1M	CO5	L1
(f)	Explain the different process characteristics in detail.	2M	CO1	L1
(g)	Write down the differences between PI, PD, PID control modes.	2M	CO2	L1
(h)	Explain the evaluation criteria of IAE, ISE and ITAE.	2M	CO3	L1
(i)	Explain the evaluation criteria of IAE, ISE and ITAE.	2M	CO4	L1
(j)	Explain ratio control, split range.	2M	CO5	L1

PART-B

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

2(a)	Discuss the continuous and batch process in process industry.	7M	CO1	L1
(b)	Write a short note on dynamics of simple pressure and four important process variables that are controlled in industries.	8M	CO1	L2
3(a)	Explain the principle of derivative control action with neat sketch. Summarize its characteristics.	7M	CO2	L1
(b)	Explain the method of realizing an electronic PI controller employing delayed positive feedback. Derive the expression for proportional gain and integral time.	8M	CO2	L2
4(a)	Explain about the damped oscillation method.	7M	CO3	L1
(b)	How do you determine the optimum settings for mathematically described process using time response in detail?	8M	CO3	L2
5(a)	What are Pneumatic control valves? Write down the classification and construction details of Pneumatic control valves.	7M	CO4	L1
(b)	What is meant by Cavitation and flashing in control valves? Explain the selection of control valves.	8M	CO4	L1
6(a)	State the fundamental difference feed forward and conventional feedback control.	7M	CO5	L1
(b)	What are the main advantages of cascade control? What kind of processes can you employ cascade control?	8M	CO5	L2
7(a)	Explain the selection of control modes for different processes.	7M	CO2	L1
(b)	What is meant by Controller tuning? Explain the different controller tuning methods.	8M	CO3	L2
8(a)	What are the control strategies in advanced regulatory control?	7M	CO1	L2
(b)	Explain about the I/P converter in detail.	8M	CO4	L1

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B.Tech. (V Semester) Supplementary Examinations

**S277-INTEGRATED CIRCUITS AND APPLICATIONS
(EIE)**

Time : 3 hours

Max.Marks : 75

PART-A

(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	What is Op-amp?	1M	CO1	L1
(b)	Define Oscillator.	1M	CO2	L1
(c)	What is PLL?	1M	CO3	L1
(d)	What is Combinational circuit?	1M	CO4	L1
(e)	What is IC?	1M	CO5	L1
(f)	What are the internal circuits in op-amp?	2M	CO1	L1
(g)	What are the active filters?	2M	CO2	L1
(h)	Relate the A/D-D/A converters.	2M	CO3	L1
(i)	What is IC interfacing?	2M	CO4	L1
(j)	What is sequential circuit?	2M	CO5	L1

PART-B

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

2(a)	Explain the ideal and practical Op-amp and its characteristics.	7M	CO1	L2
(b)	Draw and explain 741 op-amp. List the applications of it.	8M	CO1	L2
3(a)	Explain Wien and Quadrature type with neat diagram.	7M	CO2	L2
(b)	Demonstrate the 1 st order LPF, HPF filters with circuit diagram.	8M	CO2	L2
4(a)	Draw and explain the functional diagram of 555 timer.	7M	CO3	L2
(b)	Compare the R-2R ladder DAC and inverted R-2R DAC.	8M	CO3	L4
5(a)	Categorize and compare the various logic families.	7M	CO4	L4
(b)	Analyze the characteristics of standard type TTL-NAND gate.	8M	CO4	L4
6(a)	Demonstrate the ROM architecture and types.	7M	CO5	L2
(b)	Illustrate the Static & Dynamic RAMs with neat diagram.	8M	CO5	L2
7(a)	Extend the DC and AC characteristics of op-amp.	7M	CO1	L2
(b)	Demonstrate the principles and description of individual blocks of 565.	8M	CO2	L2
8(a)	Organize the counter type ADC and dual slope ADC.	7M	CO3	L3
(b)	Construct and explain the Digital comparator circuits.	8M	CO4	L3

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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

S329-OPERATIONS RESEARCH

(ME)

Time : 3 hours

Max. Marks : 75

PART-A

(Compulsory question)

Q.No	Questions	Marks	CO	BL
1(a)	Define Operations Research.	1M	CO1	L1
(b)	How to convert unbalanced assignment problem into balanced assignment problem?	1M	CO2	L1
(c)	Define pure strategy.	1M	CO3	L1
(d)	Classify queues in queuing theory.	1M	CO4	L2
(e)	What is meant by optimization technique?	1M	CO5	L1
(f)	Illustrate artificial variable in linear programming.	2M	CO1	L2
(g)	What are the applications of transportation problem?	2M	CO2	L1
(h)	Summarize the costs involved in inventory control.	2M	CO3	L2
(i)	List the applications of replacement theory.	2M	CO4	L1
(j)	Explain briefly the function of decision variable.	2M	CO5	L1

PART-B

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

2(a)	Discuss the advantages and limitations of Operations Research.	7M	CO1	L6																										
(b)	Use simplex method to solve the following problem, Maximize $Z = 12x_1 + 16x_2$ subject to $10x_1 + 20x_2 \leq 120$, $8x_1 + 8x_2 \leq 80$, & $x_1, x_2 \geq 0$.	8M	CO1	L3																										
3(a)	Illustrate the procedure of travelling salesman problem.	7M	CO2	L2																										
(b)	A company has 4 machines on which to do 3 jobs. Each job can be assigned to one and only one machine. The cost of each job on each machine is given in the following table. What are the assignments which maximize the cost? <table><tr><td colspan="2" rowspan="2"></td><td colspan="4">Machines</td></tr><tr><td>W</td><td>X</td><td>Y</td><td>Z</td></tr><tr><td rowspan="3">Jobs</td><td>A</td><td>18</td><td>24</td><td>28</td><td>32</td></tr><tr><td>B</td><td>8</td><td>13</td><td>17</td><td>19</td></tr><tr><td>C</td><td>10</td><td>15</td><td>19</td><td>22</td></tr></table>			Machines				W	X	Y	Z	Jobs	A	18	24	28	32	B	8	13	17	19	C	10	15	19	22	8M	CO2	L1
				Machines																										
		W	X	Y	Z																									
Jobs	A	18	24	28	32																									
	B	8	13	17	19																									
	C	10	15	19	22																									
4(a)	The annual demand of a product is 10000 units. Each unit costs Rs. 150 if the orders are placed in quantities below 200 units. For orders of 200 or above, however the price is Rs. 120. The annual inventory holding costs is 10 % of the value of the item and the ordering cost is Rs. 8 per order. Find the economic lot size.	7M	CO3	L1																										

(b)	Annual demand for an item is 6000 units. Ordering cost is Rs. 600 per order. Inventory carrying cost is 18 % of the purchase price per unit per year. The price break up is as shown below. <table><tr><th>Quantity</th><th>Price</th></tr><tr><td>$0 \leq q_1 \leq 2000$</td><td>20</td></tr><tr><td>$2000 \leq q_2 < 4000$</td><td>15</td></tr><tr><td>$4000 \leq q_3$</td><td>9</td></tr></table>	Quantity	Price	$0 \leq q_1 \leq 2000$	20	$2000 \leq q_2 < 4000$	15	$4000 \leq q_3$	9	8M	CO3	L3																			
Quantity	Price																														
$0 \leq q_1 \leq 2000$	20																														
$2000 \leq q_2 < 4000$	15																														
$4000 \leq q_3$	9																														
5.	The maintenance cost and resale value per year of a machine whose purchase price is Rs. 5000 is given below. When should the machine be replaced? <table><tr><th>Year</th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th></tr><tr><td>Maintenance Cost in Rs.</td><td>900</td><td>1200</td><td>1600</td><td>2100</td><td>2800</td><td>3700</td><td>4700</td><td>5900</td></tr><tr><td>Resale Value in Rs.</td><td>4000</td><td>2000</td><td>1200</td><td>600</td><td>500</td><td>400</td><td>400</td><td>400</td></tr></table>	Year	1	2	3	4	5	6	7	8	Maintenance Cost in Rs.	900	1200	1600	2100	2800	3700	4700	5900	Resale Value in Rs.	4000	2000	1200	600	500	400	400	400	15M	CO4	L1
Year	1	2	3	4	5	6	7	8																							
Maintenance Cost in Rs.	900	1200	1600	2100	2800	3700	4700	5900																							
Resale Value in Rs.	4000	2000	1200	600	500	400	400	400																							
6.	A salesman is planning a business tour from Mumbai to Kolkata in the course of which he proposes to cover one city from each of the company's different marketing zones en route. As he has limited time at his disposal, he has to complete his tour in the shortest possible time. The network in figure shows the number of days' time involved for covering any of the various intermediate cities (time includes travel as well as working time). Determine the optimum tour plan. <div></div>	15M	CO5	L5																											
7(a)	Solve the following 3x3 game by the method of matrices. <table><tr><td colspan="2"></td><th colspan="3">Player B</th></tr><tr><td rowspan="4">Player A</td><th>1</th><td>1</td><td>-1</td><td>-1</td></tr><tr><th>2</th><td>-1</td><td>-1</td><td>3</td></tr><tr><th>3</th><td>-1</td><td>2</td><td>-1</td></tr></table>			Player B			Player A	1	1	-1	-1	2	-1	-1	3	3	-1	2	-1	7M	CO3	L3									
		Player B																													
Player A	1	1	-1	-1																											
	2	-1	-1	3																											
	3	-1	2	-1																											
	(b)	Describe the following terms. (i)Waiting time in system (ii) Waiting time in queue (iii) Length of queue (iv) Length of system.	8M	CO4	L2																										
8(a)	Use graphical method solve the following LP problem to maximize $Z = 300x_1 + 400x_2$ subjected to $5x_1 + 4x_2 \leq 200$, $3x_1 + 5x_2 \leq 150$, $5x_1 + 4x_2 \geq 100$, $8x_1 + 4x_2 \geq 80$ and $x_1, x_2 \geq 0$.	7M	CO1	L3																											
(b)	Explain the applications of dynamic programming problem.	8M	CO5	L2																											

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

S203-DYNAMICS OF MACHINES

(ME)

Time : 3 hours

Max. Marks : 75

PART-A

(Compulsory question)

Q.No	Questions	Marks
1(a)	List various types of brakes.	1M
(b)	What is the turning moment diagram?	1M
(c)	Write the expression for height of the watt governor in terms of governor speed.	1M
(d)	Define swaying couple.	1M
(e)	Define Damping coefficient.	1M
(f)	List types friction clutches.	2M
(g)	State D'Alembert's principle.	2M
(h)	What is meant by sensitiveness of a governor?	2M
(i)	Write the condition for static balancing.	2M
(j)	Define logarithmic decrement.	2M

PART-B

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

2(a)	List out various absorption type dynamometers. Illustrate rope brake dynamometer with a neat sketch.	7M
(b)	An aero-plane flying at 240 km/hr turns towards the left and completes a quarter circle of 60 m radius. The mass of the rotary engine and the propeller of the plane is 450 kg with a radius of gyration of 320 mm. The engine speed is 2000 rpm clockwise when viewed from the rear. Determine the gyroscopic couple on the aircraft and state its effect.	8M
3(a)	Define the following (i) Maximum fluctuation of energy (ii) Maximum fluctuation of speed (iii) Coefficient of fluctuation of speed.	7M
(b)	In a turning moment diagram, the areas above and below the mean torque line taken in order is 4400, -1150, 1300 and -4550 mm ² respectively. The scales of the turning moment diagram are: Turning moment, 1 mm = 100 N-m; Crank angle, 1 mm = 1°. Evaluate the mass of the flywheel required to keep the speed between 297 and 303 r.p.m., if the radius of gyration is 0.525 m.	8M
4(a)	Describe the working of a centrifugal governor with the help of neat sketch.	7M
(b)	Differentiate the open type and cross type Watt governors.	8M
5(a)	Discuss how different masses rotating in single plane of shaft are balanced.	7M
(b)	Four masses m ₁ , m ₂ , m ₃ and m ₄ are 200 kg, 300 kg, 240 kg and 260 kg respectively. The corresponding radii of rotation are 0.2 m, 0.15 m, 0.25 m and 0.3 m respectively and the angles between successive masses are 45°, 75° and 135°. Find the position and magnitude of the balance mass required, if its radius of rotation is 0.2 m.	8M
6(a)	Define the term damping factor & mention it's significance.	7M
(b)	Determine the time in which the mass in a damped vibrating system would settle down to 1/50th of its initial deflection for the following data: Mass m = 200 kg, damping ratio $\zeta = 0.22$ and stiffness s = 40 N/mm. And also find the number of oscillations completed to reach this value of deflection.	8M
7(a)	Draw & illustrate the turning moment diagram of a multi cylinder engine.	7M
(b)	A shaft fitted with a flywheel rotates at 250 r.p.m. and drives a machine. The torque of machine varies in a cyclic manner over a period of 3 revolutions. The torque rises from 750 N-m to 3000 N-m uniformly during 1/2 revolution and remains constant for the following revolution. It then falls uniformly to 750 N-m during the next 1/2 revolution and remains constant for one revolution, the cycle being repeated there after. Determine the percentage fluctuation in speed, if the driving torque applied to the shaft is constant and the mass of the flywheel is 500 kg with radius of gyration of 600 mm.	8M
8.	In the watt governor, length of each arm is 350 mm, and they are pivoted on the axis of rotation. Determine the governor height and the radii of rotation of the balls, when (i) the governor speed is 62 r.p.m. and (ii) the governor speed is 75 r.p.m	15M

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

S291-MACHINE DESIGN-I

(ME)

Time : 3 hours

Max. Marks : 75

PART-A

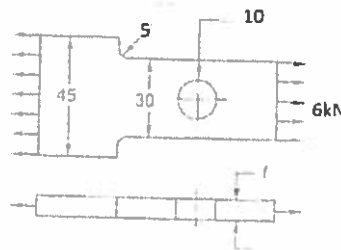
(Answer all questions)

- 1(a) What is a preferred number? [1M]
- (b) Define the term "notch sensitivity". [1M]
- (c) Define the term "caulking"? [1M]
- (d) Express the relation for calculating the length of the key in terms of diameter of the shaft. [1M]
- (e) Define a shaft coupling. [1M]
- (f) Find the numbers in R10 series. [2M]
- (g) List out at least four modifying factors. [2M]
- (h) Calculate the strength of welded butt joint per unit length, when the permissible tensile stress is 85 N/mm^2 , leg of the weld is 10 mm . [2M]
- (i) Give the relation between crushing stress and shear stress in a square key. [2M]
- (j) Write the expression for Torsional rigidity in case of a hollow shaft. [2M]

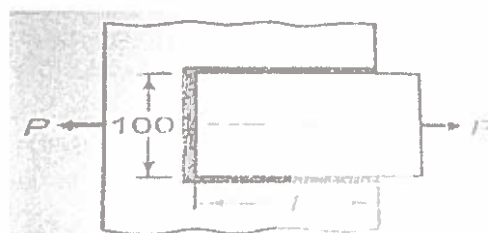
PART-B

(Answer any FOUR questions)

- 2(a) It is required to standardize 11 shafts from 100 mm to 1000 mm diameter. Specify their diameters using preferred numbers. [7M]
- (b) A hollow shaft is required to transmit 600 kW at 110 rpm the maximum torque being 20% greater than the mean. The shear stress is not to exceed 63 N/mm^2 and twist in length of 3 m not to exceed 1.4 degrees. Estimate the external diameter of the shaft, if the internal diameter to the external diameter ratio is $3/8$. Take modulus of rigidity as 84 MPa . [8M]
- 3(a) What is meant by endurance strength of a material and how would you determine endurance strength of a component? [7M]
- (b) A plate with hole ($\Phi 10 \text{ mm}$) is subjected to a tensile load of 6 kN as shown in figure. The material of the plate is Grey cast iron FG 150 and factor of safety is 2.5 . The ultimate tensile strength is 300 N/mm^2 . Determine the thickness of the plate. Fillet radius is 5 mm . The stress concentration factor is 1.5 .

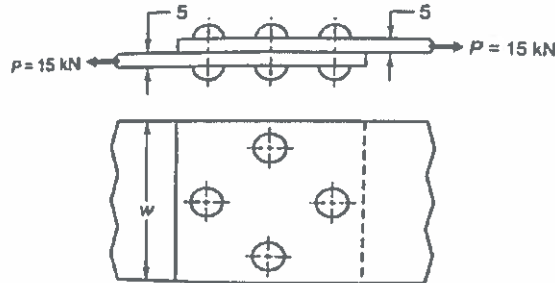


- 4(a) A welded connection is as shown in the figure. The strength of the welded joint must be equal to the strength of the plates to be welded. Determine length "l" of the weld, if the safe stress under shear is not to exceed 50 N/mm^2 and in tension is not to exceed 80 N/mm^2 .



S291-MACHINE DESIGN-I

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



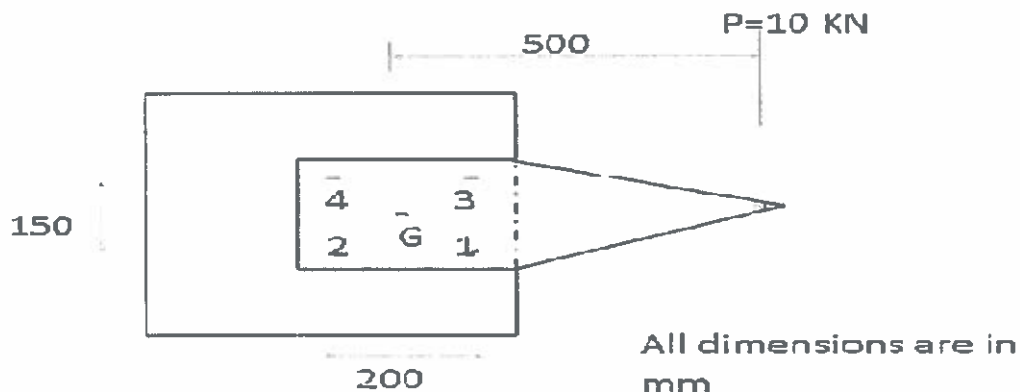
[8M]

- 5(a) Explain the method of determining the size of the bolt when the bracket carries an eccentric load perpendicular to the axis of the bolt.

[7M]

(b)

The structural connection shown in figure is subjected to an eccentric force of 10kN with an eccentricity of 500 mm from the centre of gravity of the bolts. The centre distance between the bolts 1 and 2 is 200 mm and the centre distance between the bolts 1 and 3 is 150 mm. All the bolts are identical. The bolts are made of plain carbon steel for which yield stress is 400MPa and factor of safety is 2.5. Determine the size of the bolts.



[8M]

- 6(a) Compute the diameter of a solid shaft which transmits 20 kW power at 300 rpm. Ultimate shear stress per shaft material is 350N/mm^2 and factor of safety for design is 5. If a hollow shaft replaces the solid shaft, find the inside and outside diameters if the ratio is 0.6.

[7M]

- (b) Two shafts one solid and the other hollow have the same weight and transmit that same torque. Calculate the ratio of the maximum shear stress induced in the solid shaft to that of hollow shaft. The inner diameter of the hollow shaft is 50% of the outer diameter.

[8M]

- 7(a) Explain about the various types of machine design.

[7M]

- (b) A plate of uniform thickness has two widths of 45mm and 30mm width and a fillet with a radius of 5mm. the smaller width portion has a transverse hole of 15mm diameter, for the plate material the ultimate tensile strength is 200N/mm^2 . Considering stress concentration effect and assuming a factor of safety 2.5. Find the thickness of plate for a maximum tensile load of 5kN.

[8M]

8. Design the knuckle joint to transmit 120 kN, the design stresses may be taken as with permissible stresses in tension, shear and compression are 75MPa , 60 MPa and 150MPa respectively.

[15M]

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

S267-IC ENGINES AND GAS TURBINES
(ME)

Time : 3 hours

Max.Marks:75

PART-A

(Answer all questions)

- 1(a) Define an external combustion engine. [1M]
- (b) What is meant by an air standard cycle? [1M]
- (c) State the function of a spark plug. [1M]
- (d) What do you mean by a heat balance sheet of an engine? [1M]
- (e) Illustrate the simple layout of a closed gas cycle gas turbine. [1M]
- (f) Sketch the theoretical port timing diagram of a two stroke SI engine. [2M]
- (g) Draw the P-V and T-S diagrams of dual cycle. [2M]
- (h) Enlist the essential requirements of a fuel for combustion. [2M]
- (i) Differentiate mechanical efficiency and brake thermal efficiency of IC engine. [2M]
- (j) List out the applications of gas turbines. [2M]

PART-B

(Answer any FOUR questions)

- 2(a) Illustrate a simple carburetor with a neat sketch and also state its limitations. [7M]
- (b) Explicate with a suitable sketch the functioning of a two-stroke cycle spark ignition engine and draw port timing diagram. [8M]
- 3(a) Compare various losses considered in actual cycles with respect to ideal cycle? [7M]
- (b) Develop an expression for the air- standard efficiency of the Joule cycle in terms of pressure ratio. [8M]
- 4(a) Discuss the various types of combustion chambers used in SI engine. [7M]
- (b) Illustrate the methods of induction swirl and compression swirl used in diesel engines. [8M]
- 5(a) Describe the use of rope brake dynamometer in measuring the brake power output of an engine. [7M]
- (b) A four-cylinder 4-stroke petrol engine with 6 cm bore and 9 cm stroke was tested at constant speed, the fuel supply is 0.13 kg/min. The spark plugs of 4 cylinders are successively short circuited without change of speed. The power measurements are as follows. With all cylinders working = 16.25 kW, with first cylinder cutoff = 11.55 kW, with second cylinder cutoff = 11.65 kW, with Third cylinder cutoff = 11.7 kW, with fourth cylinder cutoff = 11.5 kW. Evaluate (i) frictional power and Indicated power of the engine (ii) mechanical efficiency of the engine (iii) brake thermal efficiency (iv) relative Efficiency on indicated power basis. Take clearance volume = 65 cm³ and Calorific value of fuel= 42000 kJ/kg. [8M]

S267-IC ENGINES AND GAS TURBINES

- 6(a) Elucidate the working of a ramjet engine with a neat sketch. What are its merits and demerits? [7M]
- (b) Differentiate open cycle gas turbine plant and closed cycle gas turbine plant. [8M]
- 7(a) Discuss the essential qualities of SI engine fuel. [7M]
- (b) Compare Otto, diesel and Dual cycles for same peak pressure and heat rejection with the help of P-V and T-S diagrams. [8M]
- 8(a) Discuss the effect of the following factors on the performance of an SI engine. i) compression ratio ii) air-fuel ratio iii) engine speed iv) mass of inducted charge. [7M]
- (b) In a Brayton cycle the pressure ratio is 5 and maximum and minimum temperature is 800 K and 310K. Determine the network output and efficiency per kg of working substance. What will be the pressure ratio for the maximum cycle work? Determine the network output and efficiency for these conditions. [8M]
