

**Answer any FIVE questions  
All questions carry EQUAL marks**

1. a) Define a turbo machine? Give any 4 different classifications of turbomachines. 6  
b) With the help of  $h-s$  diagram, explain various efficiencies of power generating turbo machines. 6
2. a) What is reheat factor? Show that the reheat factor is greater than unity in a multistage turbine. 8  
b) State the assumptions made in deriving Euler's energy transfer equation. 4
3. a) Define specific speed of pumps. Show that specific speed of pump is given by  $N_s = N\sqrt{Q} / H^{3/4}$  7  
b) What is work done factor in axial flow compressor? 5
4. a) Draw the sketches of the three types of impellers and the velocity triangles at their entries and exits. 6  
b) Determine the pressure ratio developed and the power required to drive a centrifugal air compressor with impeller diameter 45 cm running at 7200 rpm. Assume zero swirl at the entry and  $T_{01}$  as 288 K. 6
5. The velocities for upstream and downstream of an open propeller fan of diameter 50 cm are 5 and 25 m/s, respectively. If the ambient conditions are 1.02 bar and 37 °C, determine: 12  
(a) Flow rate through the fan,  
(b) Total pressure developed by the fan, and  
(c) The power required to drive the fan assuming the overall efficiency of the fan as 40%.
6. The tangential velocity component of air at the volute base circle of radius 25 cm is 177.5 m/s. determine its shape and throat-to-diameter ratio for a constant width of 12 cm and discharge 5.4 m<sup>3</sup>/s assuming: 12  
(a) Free vortex flow and  
(b) Constant mean velocity of 145 m/s.
7. Steam at 20 bar, 500 degree centigrade expands in a steam turbine to 0.01 bar. There are four stages in the turbine and the total enthalpy drop is divided equally among the stages. The stage efficiency is 75% and it is the same in all the stages. Calculate the inter-stage pressures, the reheat factor, and the turbine internal efficiency. 12
8. At a stage of a 50% reaction turbine, the rotor diameter is 1.4 m and speed ratio 0.7. If the blade outlet angle is 20 degrees and the rotor speed 3000 rpm, find the blade inlet angle and diagram efficiency. Find the percentage increase in diagram efficiency and rotor speed, if the turbine is designed to run at the best theoretical speed. 12



# AR19

CODE: 19MCS1006

SET-2

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)**

**I M.Tech. I Semester Regular & Supplementary Examinations, August-2021**

**DATA SCIENCE**

**(Computer Science and Engineering)**

**Time: 3 Hours**

**Max Marks: 60**

**Answer any FIVE questions  
All questions carry EQUAL marks**

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|----|----|---|----|
| 1. | a) | Examine the data science toolkit  | 6M |
|    | b) | List and explain various terminologies used in data science?                      | 6M |
| 2. | a) | What are the different data types explain the techniques with examples.           | 6M |
|    | b) | Construct the methods for data storage and management?                            | 6M |
| 3. | a) | Write the applications of clustering in different fields                          | 6M |
|    | b) | Discuss the partitional algorithms in detail with an example                      | 6M |
| 4. | a) | Explain the procedure for Mapping variables to encodings                          | 6M |
|    | b) | Explain the application of Data science and technologies for visualization        | 6M |
| 5. | a) | Explain the CLT theorem   | 6M |
|    | b) | With an example analyze the technologies used for Visualization.                  | 6M |
| 6. | a) | What is variance explain with an example.   | 6M |
|    | b) | Apply the command how to explore and fixing the data in to the Python Environment | 6M |
| 7. | a) | Discuss application development methods of used in data science?                  | 6M |
|    | b) | Explain the Recent techniques used in data collection and analysis                | 6M |
| 8. | a) | What are the basic Machine Learning algorithms                                    | 6M |
|    | b) | Apply the commands to show the Linear SVM and confusion Matrix for iris Dataset?  | 6M |

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)****I M.Tech I Semester Regular & Supplementary Examinations, August-2021****DSP PROCESSORS AND ARCHITECTURES****(VLSI System Design)****Time: 3 Hours****Max Marks:60****Answer any FIVE questions****All questions carry EQUAL marks**

1. a) Consider an analog signal  $x(t) = A \cos(2\pi ft)$ . It is sampled using T as sampling interval. (4M)  
i) Relate the digital frequency of the sampled signal to analog frequency.  
ii) What will be the digital frequency range for a properly sampled signal.  
b) Explain digital signal processing system with block diagram (8M)
2. a) What are the various sources of errors in the implementation of DSP algorithms and how to control these errors while designing DSP systems? (6M)  
b) Explain A/D and D/A conversion errors in DSP systems (6M)
3. a) What is meant by overflow and underflow? Explain how to limit the accumulator contents to avoid wrap around error using saturation logic? (8M)  
b) Compare the bus structure of Von Neumann architecture and Harvard architecture. (4M)
4. Explain how pipelined implementation improves the performance of DSP processor when compared to Non-pipelined instruction execution. How do hazards affect the performance of the processor? (12M)
5. a) Describe the operation of the following MPY instructions: (6M)  
i) MPY 13, B; ii) MPY #01234, A  
ii) MPY \*AR2-,\*AR4+0, B  
b) Explain indirect addressing mode of TMS320C54XX processor using block diagram. (6M)
6. a) Determine the value of each of the following 16-bit numbers represented using the given notation: (4M)  
i) 4400 as a Q15 number ii) 4400 as a Q7 number  
b) Describe FIR and IIR filters in DSP systems (8M)
7. a) Illustrate interrupt handling by C54XX processor using flow chart. (6M)  
b) Explain the memory interface of the C5416 processor using block diagram. (6M)
8. a) Explain the index computation using Bit-reversed Addressing mode for an 8-point FFT. (4M)  
b) Explain Direct Memory Access in digital signal processing systems. (8M)

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)****I M.Tech I Semester Regular & Supplementary Examinations, August-2021****ADVANCED CONCRETE TECHNOLOGY  
(Structural Engineering)****Time: 3 Hours****Max Marks:60****Answer any FIVE questions  
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1. a) What is the role of chemical admixtures in concrete? Mention four types of chemical admixtures and their functions. (6M)  
b) What are the properties and uses of air entraining admixtures in concrete? (6M)
2. a) Describe the causes of corrosion of steel in concrete. (6M)  
b) What are the factors which affecting the reinforcement corrosion in concrete? (6M)
3. a) Explain the factors affecting the measurement of ultrasonic pulse velocity. (6M)  
b) Write a short note on depth of carbonation (6M)
4. a) Write a short note on rehabilitation of structural element. (6M)  
b) Explain about reinforcing steel cleaning, repair and protection (6M)
5. Explain procedure for beam shear capacity strengthening. (12M)
6. Write short note on the following  
a) Beam shear capacity strengthening (6M)  
b) Stress reduction technique (6M)
7. a) Discuss the factors influencing the properties of fibre reinforced concrete. (6M)  
b) Explain the mechanical properties of fiber reinforced concrete (6M)
8. a) Explain in detail high-performance concretes. (6M)  
b) Explain light weight concrete. How it is manufactured. What are its advantages (6M)