FACULTY OF ENGINEERING
B.E (I.T) (AICTE) VII - Semester (Main) Examination, March / April 2022

Subject: VLSI Design

Time: 3 Hours   **Max marks: 70**
(Missing data, if any may be suitably assumed)
PART – A
Note: **Answer all questions**.   **(10 x 2 = 20 Marks)**

1. What is meant by scaling? How is it related to MOS transistor?

2. Write about pass characteristics of PFET.

3. Draw the CMOS diagram of XOR gate

4. Write about the layers used to create MOSFET.

5. Define rise time, fall time and delay time.

6. Draw the basic cells of NOT2, NAND2 using cell based design.

7. what is C^2MOS circuit

8. Define Dual rail logic network

9. Differentiate between initial and always blocks.

10. Discuss the need for testing in VLSI

PART - B
Note: Answers any five questions.   **(5 x 10 = 50 Marks)**

11. a) Illustrate bubble pushing using De Morgan's Law.
    b) Draw the CMOS diagram of NAND and XNOR logic gate and explain with a truth table.

12. Draw the layout of the function using CMOS logic.
$$a)\ Y = \overline{A + BC}$$
$$b)\ Y = \overline{(A + B)}(C + D)$$

13. a) Explain the CMOS inverter switching characteristics and derive the delay expression.
    b) Discuss the Latch up and its prevention

14. a) Explain Complementary Pass Transistor Logic (CPL)
    b) Explain the effect of charge storage on the floating gate.

15. a) Design an 8:1 MUX using 2:1MUX transmission gates.
    b) Write about RTL and Behavioral modeling.

16. a) What is pseudo NMOS logic? Obtain the expression for the low output voltage VOL of a CMOS inverter using pseudo NMOS logic.
    b) Explain read and write operation of DRAM cell

17. Discuss the following topics:
    a) Scaling theory
    b) Layout of a Transmission gate
    c) Photo lithography

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FACULTY OF ENGINEEERING
B.E. (AICTE) (M/AE) VII-Semester (Main) Examination, March / April 2022

Subject: OPERATIONS RESEARCH

Time: 3 Hours   **Max marks: 70**

(Missing data, if any may be suitably assumed)

PART – A

Note: **Answer all questions**.   **(10 x 2 = 20 Marks)**

1. Discuss in brief the role of OR model in decision making.
2. Define the following: (i) Feasible solution   (ii) Optimum solution
3. What is the use of slack and surplus variables in linear programming?
4. Distinguish between primal and dual problems.
5. Explain unbalanced transportation problem. How do you resolve it?
6. What is travelling salesman problem?
7. Discuss the principle of dominance in games.
8. Write the assumptions of queuing theory.
9. Mention the applications of PERT/CPM.
10. What are the limitations of game theory?

PART - B

Note: Answers any five questions.   **(5 x 10 = 50 Marks)**

11. Solve the following LPP:
    Maximize $z=3x_1-x_2$
    Subject to constraints $2x_1+x_2 \geq 2$
    $x_1 + 3x_2 \leq 3$
    $x_2 \leq 4$
    $x_1, x_2 \geq 0$

12. Use dual simplex method to solve the following LPP:
    Maximize $z=3x_1+2x_2$
    Subject to constraints $x_1+x_2 \geq 1$
    $x_1 + x_2 \leq 7$
    $x_1 + 2x_2 \leq 10$
    $x_2 \leq 3$
    $x_1, x_2 \geq 0$

13. Products are to be transported from factories A, B and C to destinations D_1, D_2, D_3, and D_4. The factory capacities are 1000, 700 and 900. The destination requirements are 900, 800, 500 and 400. The unit transportation costs from various factories to destinations are given in the table. Determine the optimum transportation schedule.

	D_1	D_2	D_3	D_4
A	2	2	2	4
B	3	5	3	2
C	4	3	2	1

..2

14. (a) A travelling salesman problem has to visit 5 cities. The distance between the cities is given in the matrix. Determine the optimum route to minimize the distance travelled.

	1	2	3	4	5
1	∞	10	25	25	10
2	1	∞	10	15	2
3	8	9	∞	20	10
4	14	10	24	∞	15
5	10	8	25	27	∞

(b) Solve the rectangular game, whose pay-off matrix for player A is:

Players	Player B			
	Strategies	I	II	III	IV
	I	3	2	4	0
Player A	II	3	4	2	4
	III	4	2	4	0
	IV	0	4	0	8

15. (a) Briefly explain queuing system and its characteristics.
    (b) In a store with one server, 9 customers arrive on an average of 5 minutes, service is done for 10 customers in 5 minutes. Find
    (a) The average number of customers in the system
    (b) The average queue length
    (c) The average time a customer spends in the store
    (d) The average time a customer waits before being served

16. (a) Define the following: (i) Total float (ii) Free float.
    (b) A project has the following time schedule:

Activity	1-2	1-3	1-4	2-5	3-6	3-7	4-6	5-8	6-9	7-8	8-9
Time (months)	2	2	1	4	8	5	3	1	5	4	3

17. Write short notes on the following:
    (a) Scope of OR
    (b) MPSO technique
    (c) Differences between PERT and CPM

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FACULTY OF ENGINEERING
B.E. (AICTE) (Prod) VII – Semester (Main) Examination, March / April 2022

Subject: Tool Design

Time: 3 Hours   **Max marks: 70**

(Missing data, if any may be suitably assumed)

PART – A

Note: **Answer all questions**.   **(10 x 2 = 20 Marks)**

1. Enlist the desired properties of cutting tool materials.

2. List out the product applications of USM.

3. Draw the neat sketch of broaching tool and label it.

4. Classify the milling cutters. State the materials and features of each.

5. Explain the effect of variation of angles in torque of twist drill.

6. How will you decide the number and size of flutes while designing a tap?

7. What are locating methods and devices?

8. Outline the principles of jigs and fixtures design.

9. Explain clearly about the redundant location in tool design.

10. Explain about fool proofing in tool design.

PART - B

Note: Answers any five questions.   **(5 x 10 = 50 Marks)**

11. (a) Classify the cutting tool materials.
    (b) Explain why EBM process is performed usually in a vaccum chamber.

12. (a) Differentiate between honing and polishing.
    (b) Differentiate between EDM and ECM.

13. (a) Sketch and explain the design procedure of a single point cutting tool.
    (b) Explain the design procedure of a circular form tools.

14. (a) Sketch and explain the design procedure of a plain milling cutter.
    (b) Sketch and explain the design procedure of a broaching tool.

15. (a) Explain the twist drill shank design in detail.
    (b) Sketch the twist drill with complete nomenclature.

16. a) Explain with sketch 3-2-1 principle of location.
    b) What are the different types of clamps used with jigs and fixtures. Briefly
       describe any two.

17. Write short notes on:
    (a) Design of taps and dies
    (b) Factors in selecting the clamps
    (c) Types of locating pins

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FACULTY OF ENGINEEERING
B.E. (Civil) (AICTE) VII - Semester (Main) Examination, March / April 2022

Subject: Construction Engineering and Management

Time: 3 Hours   **Max marks: 70**

(Missing data, if any may be suitably assumed)

PART – A

Note: **Answer all questions**.   **(10 x 2 = 20 Marks)**

1 List out the various stages in the construction of a project
2 Why do you think "Ethics" in the construction management is important?
3 Show the work breakdown structure for concreting activity with regard to RCC slab.
4 Represent the dummy with an example diagram
5 Explain briefly about the classification of scheduling

6 What is Normal time and crash time?
7 What is the necessary data required for project updating?
8 Define BIM with regard to project management
9 List out the causes for the accidents in construction projects
10 What is the Simplex Method of Linear Programming?

PART - B

Note: Answers any five questions.   **(5 x 10 = 50 Marks)**

11 Explain the roles and responsibilities of various construction project stakeholders

12 Discuss the need for legislation in the construction industry

13 Explain the salient features of the Minimum Wages Act and the Payment of Wages Act with regard to fixing the terms of employment of construction labour

14 Discuss the limitations of a bar chart and a milestone chart

15 For the given network, calculate the i) Earliest Expected Time and Latest Allowable Time for all the activities. ii) Determine the critical path
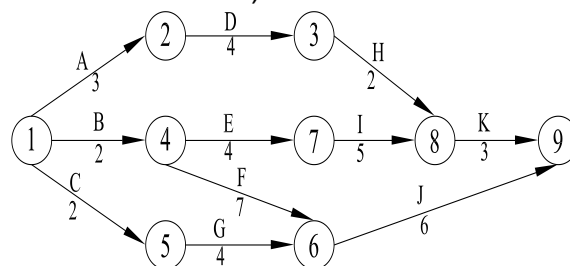
16 Explain in detail about the steps involved in optimization of a cost in construction projects

17 Discuss the occupational health issues in construction industry.

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FACULTY OF ENGINEERING
B.E. (EEE) (AICTE) VII - Semester (Main) Examination, March / April 2022

Subject: Control of Electric Drives

Time: 3 Hours   **Max. Marks: 70**
(Missing data, if any, may be suitably assumed)

PART – A
Note: Answer all questions.   **(10 x 2 = 20 Marks)**

1. List the advantages of magnetic control over manual control.
2. Represent the following components with their symbols.
   (i) Switch Fuse Unit   (ii) On-Delay Relay Contacts
   (iii) Off-Delay relay contacts and (iv) Fuse.
3. Compare HRC fuse and a normal fuse.
4. Compare MCB and MCCB.
5. Explain, why Induction Motor draws high current during starting.
6. What are the disadvantages of Resistance type starter?
7. Explain, why DC motor draws high starting current.
8. List the methods of reversing DC motor.
9. Classify stepper motors.
10. Define step angle.

PART – B
Note: Answer any five questions.   **(5 x 10 = 50 Marks)**

11. (a) List the disadvantages of manual control.
    (b) Explain remote control operation of a motor with diagram.

12. (a) Discuss the principle of operation of an electronic timer.
    (b) .Make a labelled diagram for clapper type contactor. Explain the function.

13. (a) Explain why reduced voltage is applied across the motor terminals during starting of an induction motor.
    (b) Discuss the working of a semi-automatic stepless resistance starter.

14. (a) Describe Automatic Starter using Polarised Field Frequency Relay.
    (b) Draw control circuit for plugging circuit of a dc compound motor from either direction of rotation.

15. (a) Illustrate chopper drive for a stepper motor control.
    (b) Explain Bipolar drives for Stepper motor.

16. (a) Explain inter locking of drives with a neat control circuit.
    (b) Explain the principle of operation of a solenoid type contactor.

17. (a) Explain principle of operation of limit switch.
    (b) Explain increment resistance starter used for an induction motor control.

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FACULTY OF ENGINEERING

B. E. (Instrumentation) (AICTE) VII – Semester (Main) Examination,
March / April 2022
Subject: Virtual Instrumentation

Time: 3 hours   Max. Marks: 70

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions.   **(10 x 2 = 10 Marks)**

1. What are the advantages of Virtual Instrumentation?
2. What does broken arrow in LabVIEW indicates?
3. What is shift register and stacked shift register?
4. Explain the functions Rotate 1D array and Reverse 1 D array.
5. Enlist the components of DAS.
6. What is DAQ assistant?
7. What is the need of VXI?
8. What do you mean by Talker and Listener in GPIB?
9. Write advantages of current loop over voltage mode output transducer.
10. What are the features of PCMCIA?

PART – B

Note: Answer any five questions.   **(5 x 10 = 50 Marks)**

11 Explain the architecture of Virtual Instrumentation in detail.

12 (a) Write the block diagram construction steps to create a VI for converting Celsius to Fahrenheit and draw the block diagram.

   (b) Explain in detail waveform chart and its types used in LabVIEW.

13 What is the use of ADC, DAC and DIO in data acquisition? Explain with suitable example.

14 (a) Explain RS232C in detail.

   (b) Write a short notes on VISA.

15 Explain motion control application in LabVIEW.

16 What is serial communication interface? Explain any one in detail for interfacing an Instrument.

17 (a) Explain about clusters.

   (b) Write a short note on arrays.

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FACULTY OF ENGINEERING
B.E. (CSE) (AICTE) VII - Semester (Main) Examination, March / April 2022

Subject: Information Security

Time: 3 Hours   **Max. Marks: 70**

(Missing data, if any, may be suitably assumed)

PART – A
Note: Answer all questions.   **(10 x 2 = 20 Marks)**

1. Differentiate between threat and attack.
2. Explain Information security terminology.
3. Different types of laws for Information Security.
4. How to document the result of Risk assessments.
5. Explain about security blue print.
6. Define Firewall and List its characteristics.
7. Define Honey pots, Honey nets and Paddle cell system.
8. Define Cipher Methods.
9. Write about Fiestel Rounds in DES (Data Encryption Standards) Algorithm.
10. Write about Security Certification and Accreditation.

PART – B
Note: Answer any five questions.   **(5 x 10 = 50 Marks)**

11. (a) Briefly explain SecSDLC model.

    (b) Explain different type of Attacks.

12. (a) Explain about International Laws and Legal Bodies?

    (b) Write about Risk Control Strategy?

13. Describe firewall Architecture in detail.

14. Write about Crypographic Tools and Protocols for Secure Communications.

15. (a) Explain Employment Policies and Practices?

(b) Differentiate contract and temporary Employees.

16. Describe any two:

    (a) EISP, ISSP, SysSP

    (b) Dial-up and VPN'S

    (c) Access control devices.

17. Write a short note on

    (a) Export and Espionage law.

    (b) RSA Algorithm.

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FACULTY OF ENGINEERING
B.E. (ECE) (AICTE) VII - Semester (Main) Examination, March / April 2022

Subject: VLSI Design

Time: 3 Hours   **Max. Marks: 70**

(Missing data, if any, may be suitably assumed)
PART – A
**Note: Answer all questions.**   **(10x2 = 20 Marks)**

1 Define the Body Effect and its expression.
2 Define Trans conductance and its Expression.
3 Distinguish between CMOS and BJT.
4 Define Figure of merit.
5 Draw the schematic diagram of BiCMOS inverter.
6 Draw the Shifter give its logic.
7 Draw the schematic diagram of 3 Transistor DRAM cell.
8 Define sheet resistance.
9 What are the different level of Testing?
10 Draw the small signal model of MOSFET.

PART – B
Note: Answer any five questions.   **(5x10 = 50 Marks)**

11 (a) Explain the IC Fabrication Steps.
   (b) With a neat sketch explain the CMOS Fabrication Process (nwell or pwell).

12 Derive the drain current Ids expression for n channel enhancement MOSFET in the Non-Saturation Region, Chanel Length Modulation.

13 (a) Draw the stick diagram and layout for CMOS NAND design.
   (b) Calculate the ON resistance of the circuit shown in the figure from Vddto Gnd if the n-
   channel sheet resistance Rsn = 104 Ω per square and the P-channel sheet resistance Rsp = 3.5 *104 Ω per square.
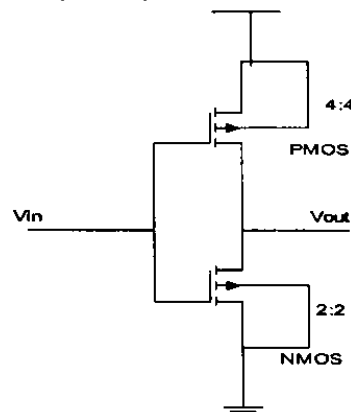
14 (a) Explain the operation of Manchester Chain adder.
   (b) Explain the operation of NOR based ROM design.

15 (a) Explain in detail the need for testing and explain groups of testing.
   (b) How Layout can be designed for improved testability?

16 (a) Explain the Common Source Amplifier. Gives its expression.
   (b) Explain the Source degeneration current mirror. Gives its expression.

17 Write any two short notes on:
   (a) Shifters
   (b) Draw and explain the 6T SRAM Cell Design
   (c) Wilson Current Mirror.

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FACULTY OF ENGINEERING
B.E. (EEE) VII – Semester (CBCS) (Backlog) Examination, March / April 2022

Subject: Power System Operation and Control
Time: 3 hours   Max. Marks: 70
(Missing data, if any may be suitably assumed)

PART – A
Note: **Answer all questions**.   **(10 x 2 = 20 Marks)**

1 What is the effect of Acceleration factor used in the load flow solution?
2 What is Jacobian matrix and give details?
3 Given the incremental fuel cost of two generators 0 - .4pg1 + 40 and 0.48pg2 + 32, give the generators schedule for optimum operation cost of generators to share a load of 900 Mw.
4 What is the conditions of economic operation of 3 generators including transmission losses?
5 Define steady state and transient stability.
6 What is the role of UPFC in power system?
7 Draw the equal area criterion graphs for a 3 phase fault.
8 Draw the generator and load block diagram model used in load frequency control.
9 What is the effect of saliency of synchronous machine in the stability of power system?
10 The power angle characteristic of a generator is 1.8 sin δ and is operated of 0.8 PU before the DLG fault of its terminal. What is the initial operating angle?

PART - B
**Note: Answers any five questions**.   **(5 x 10 = 50 Marks)**

11 (a) Derive the expression for critical clearing angle when a fault is cleared immediately by opening the faulted line and normally is restored.

    (b) Draw and explain the ALFC block diagram of two area control system.

12 (a) Two generator operating in parallel of 50 Hz supplying a total load of 700 MW. The generator is rated 600 MW with 4% speed-droop characteristics, generator 2 is rated 500 MW, with 5% speed-drop characteristic. Generator 1 is supplying 400 MW and generator 2 is supplying a load of 300 MW. IF the load is suddenly increased to 800MW, determine new loading of each unit cost the common frequency change.

    (b) What is the role of tap changing transform in voltage control.

13 (a) In a generating station, these are 4 generators. The incremental fuel costs are 0.012pg1 + 9.0, 0.0096 pg2 + 6.0 0.008pg3 + 8 ; 0.0068 pg4 + 10. The inequality constraints are 200 < pg1 < 50 , 400 < pg2 < 100 ; 250 < pg3 < 80 ; 300 < pg4 < 110. If the total load to be shared is 250 MW, find the incremental fuel cost and output of each unit for the economic operation.

   (b) Given the loss $PL = 0.04Pg_1^2 + 0.2Pg_1Pg_2 + 0.06Pg_2^2$ find the loss factors for each generator at a generator of 20MW and 40 MW.

14 (a) Derive the swing equation and explain the parameters.

   (b) A phase shifting transformer is inserted. Find the YBUS with and without phase studying transform.
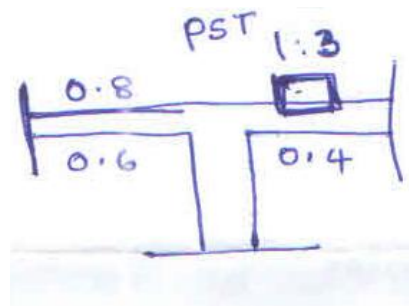
15 (a)Develop the load flow equation and Guass sides iterative method applied to obtain load flow solution.

   (b)Explain the assumption made to Fast decoupled load study and give mathematical expression.

16 (a)Draw the flow chart for load flow solution using Newton-Raphson method, with voltage controlled buses included.

   (b)Two generators are supplying power to a system. Their ratings are 50MW and 500 MW, operated at 60Hz and each generator is half loaded. The load is suddenly increased by 110MW, as a result the frequency dropped to 59.5 Hz. If generators increase their turbine powers in properties to their ratings, what is the regulation constant of 50 MW generator.

17 Develop the single area ALFC loop block diagram with primary and secondary loops.

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FACULTY OF ENGINEERING
B.E. (Inst.) VII - Semester (CBCS) (Backlog) Examination, March / April 2022

Subject: Opto Electronic Instrumentation

Time: 3 Hours   **Max. Marks: 70**

(Missing data, if any, may be suitably assumed)
PART – A

Note: Answer all questions.   **(10 x 2 = 20 Marks)**

1. List out the characteristics of Laser stabilization.
2. Explain pulse echo techniques for measurement of distance using lasers?
3. Compare Active and passive fibre sensors.
4. Give classification of fibre optic sensors.
5. Mention the desirable characteristics of photo diodes?
6. Explain the principle of lasers?
7. Define fibre splicing and transit time dispersion.
8. Mention different Biomedical applications of lasers.
9. List out the fibre fabrication techniques.
10. Explain the operational principle of Solar cell?

PART – B

Note: Answer any five questions.   **(5 x 10 = 50 Marks)**

11. (a) Explain with necessary diagrams the mechanism of Lase action?
    (b) With its constructional diagram, explain the operation of CO_2 Laser?

12. With necessary diagrams, explain the following applications of Laser:
    (a) Laser Nephelometry (b) Laser machining (c) Laser Spectroscopy

13. Briefly discuss about fibre fabrication method and explain any one method with neat diagram?

14. Explain measurement of Voltage and fluid level optical fibre?

15. (a) With I-V characteristics, explain the operation of photo transistors?
    (b) Explain the working operation of photo couplers with relevant figures and applications?

16. (a) State conditions for internal reflection.
    (b) Discuss the Rod in tube fibre drawing method with a neat sketch?

17. Discuss briefly the following:
    (a) Electro-optic modulation.
    (b) Optical Time Domain reflectometer.
    (c) Laser Interferometers.

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FACULTY OF ENGINEERING
B.E. (ECE) VII - Semester (CBCS) (Backlog) Examination, March / April 2022

Subject: Embedded Systems

Time: 3 Hours   Max. Marks: 70

(Missing data, if any, may be suitably assumed)
PART – A

Note: Answer all questions.   **(10 x 2 = 20 Marks)**

1 Differentiate between a general purpose computing system and an embedded system.
2 Discuss about the challenges of embedded systems.
3 Draw and explain the configuration of CPSR register.
4 Mention the various interrupt sources and its addresses of ARM.
5 Describe the TCP/IP protocol.
6 What are the important characteristics of PCI and PCI-X protocols?
7 Define: (a) Linker   (b) Loader.
8 Distinguish between the host system and target system.
9 With the help of a neat block diagram, explain about IDE.
10 Why is testing preferred on host system rather than on target system?

PART – B

Note: Answer any five questions.   **(5 x 10 = 50 Marks)**

11 (a) Describe various hardware components of embedded systems with the help of a neat diagram.
   (b) Explain the classifications of embedded systems and give one example for each.

12 (a) With the help of a neat diagram, explain the architecture of ARM core.
   (b) Explain clearly about ingle register and multiple register Transfer Load Store Instructions.

13 (a) Explain in detail about CAN Bus.
   (b) Describe the various internet enabled system network protocols.

14 (a) Explain the techniques used to burn or port an embedded application into actual target microcontroller unit (MCU).
   (b) Differentiate between Linker and Locator.

15 (a) Describe the case study of a chocolate vending machine.
   (b) Discuss about the modes of Logic Analyser.

16 (a) Discuss about the design process in embedded system.
   (b) Explain the specifications and Frame format of USB Bus.

17 Explain any two
   (a) Native Tool Chain
   (b) In Circuit Emulator
   (c) Register Organisation of ARM Processor.

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FACULTY OF ENGINEERING
B.E. (MECH) VII - Semester (CBCS) (Backlog) Examination, March / April 2022

Subject: Thermal Turbo Machines

Time: 3 Hours   Max. Marks: 70
(Missing data, if any, may be suitably assumed)

PART – A
Note: Answer all questions.   **(10 x 2 = 20 Marks)**

1. How is Rayleigh flow different from Fanno flow?
2. Show that at maximum entropy point on Rayleigh curve M=1.
3. Define semi-cone angle, what is its significance?
4. Define Mach number. What is the impact of Mach number in compressible fluids?
5. Explain surging and chocking in compressor.
6. Define slip factor of compressor with neat sketch?
7. Differentiate between optimum pressure ratio and maximum pressure ratio in gas turbine.
8. Explain energy transfer phenomena in turbo machines.
9. Differentiate jet propulsion and rocket propulsion.
10. List out the applications of gas turbines.

PART – B
Note: Answer any five questions.   **(5 x 10 = 50 Marks)**

11. The pressure, temperature and Mach number at the entry of flow passage are 2.6bar, 30^0C and 1.5 respectively. If the exit Mach .No is 4.0 determine for adiabatic flow of perfect gas (i) Stagnation temperature (ii) Temperature and velocity of gas at exit and (iii) The flow rate /square meter of inlet cross section.

12. From the first principles derive the Fanno equations and sketch T-S plane, and characteristics of Fanno line.

13. The inlet conditions of a centrifugal compressor are1bar 30^0C running at10000 Rpm. It delivers a free air stream of 1.5m/s. The compression ratio is 5 .The velocity of flow is 50m/s and is constant. Assume that the blades are radial at outlet. The slip factor is 0.92.Calculate a) the temperature of air at outlet b) The power required c) the impeller diameter d) blade angle at inlet e) the diffuser inlet angle Assume isentropic efficiency as 0.9.

14. An axial –flow compressor having 10stages works with 50% degree of reaction. It compresses air with pressure ratio of 5 .The inlet conditions of air are 27^0C and 100kPa.The air enters the compressor with a velocity of 110m/s .The mean speed of rotor blade is 220m/s .The isentropic efficiency of the compressor is 85%.calculate the work input per kg of air and blade angles.

15. Write the classification of steam turbines and explain its working principle based on Rankine cycle. Derive an expression for work done and efficiency.

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16. In a Parsons turbine running at 2000 Rpm, the available enthalpy drop for the expansion is 60 kJ/kg. If the mean diameter of the rotor is 0.75m, find the number of the rows of the moving blade required. Assume stage efficiency as 80%, blade outlet vane angle is 20^0 and speed ratio is 0.7.

17. Write short notes on the following:
    (a) Define (i) thrust power, (ii) propulsive power, (iii) propulsive and overall efficiency of jet Engine.
    b) The effective jet velocity from a rocket is 2600m/s .The forward flight velocity is 1300m/s and the propellant consumption is 75kg/s. Calculate (a) Thrust (b) Thrust power
    (c) Propulsive efficiency.

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