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| 1 | | Mention various processes in a Rankine Cycle? |
| 2 | | Mention various factors considered for the selection of Boilers? |
| 3 | | Describe various types of Steam nozzles? |
| 4 | | What is meant by Wilson Line? |
| 5 | | Mention the classification of Steam Turbines? |
| 6 | | What is the workingprinciple of an Impulse Turbine? |
| 7 | | Write the classification of Gas Turbines? |
| 8 | | What is the function of a Steam Condenser? |
| 9 | | What is the working principle of Jet propulsion? |
| 10 | | Define the Thrust power? |
| 1 | | What are the methods used to improve Rankine cycle efficiency? |
| 2 | | Classify the different types of boilers? |
| 3 | | What is the function of a steam nozzle? |
| 4 | | What is the stagnation pressure of steam nozzle? |
| 5 | | Draw the combined velocity tringle diagram of an Impulse turbine? |
| 6 | | Draw the pressure velocityprofile of Reaction turbine? |
| 7 | | Classify the steam condensers? |
| 8 | | What are methods to improve the overall efficiency of gas turbine? |
| 9 | | What is the principle of Rocket propulsion? |
| 10 | | What is the classification of Jet Propulsion? |
| 1 | | Discuss in brief the function Feed check valve? |
| 2 | | What is regeneration, explain briefly? |
| 3 | | Write the expression of critical pressure ratio? |
| 4 | | Define metastable state in a steam nozzle? |
| 5 | | What is Blade efficiency of steam turbine? |
| 6 | | Briefly explain about Reaction turbine? |
| 7 | | What are the comparisons of Jet and Surface condensers |
| 8 | | Draw the T-S diagram of multistage intercooling in gas turbine |
| 9 | | Why does a ramjet engine notrequire a compressor or turbine? |
| 10 | | Define the propulsive power |
| Define nozzle efficiency? | | |
| Name the various types of nozzles and their function? | | |
| Define Diagram efficiency? | | |
| What is meant by Degree of Reaction? | | |
| Define isentropic efficiency of a compressor and turbine? | | |
| Draw the T-S diagram of Reheating process in gas turbine? | | |
| Write the difference between a turbo propeller engine and turbo jet engine? | | |
| What are the advantages of a ramjet engine? | | |
| 1 | Draw the P-V and T-S diagrams of simple Rankine cycle? | |
| 2 | Define the boiler mountings and accessories? | |

Short answer questions

LONG ANSWER QUESTIONS

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| 11 | | A simple Rankine cycle works between pressures 28 bar and 0.006 bar, the initial condition of steam being dry saturated. Calculate the cycle efficiency, work ratio and specific steam consumption? |
|  | | OR |
| 12 | | Explain with a neat sketch working of Benson Boiler and mention its advantages? |
| 13 | Derive an expression for the mass of steam discharged  through a Nozzle? | |
|  | OR | |
| 14 | Dry saturated steam at 6.5 bar with negligible velocity expands isentropically in a convergent divergent nozzle to 1.4 bar and dryness fraction 0.956. Determine the final velocity of steam from the nozzle if 13% heat is loss in friction. Find the % reduction in the final velocity? | |
| 15 | In a De-Laval turbine steam issues from the nozzle with a velocity of1200 m/s. The nozzle angle is 200, the mean blade velocity is 400m/s, the inlet and outlet angles of blades are equal. The mass of steamflowing through the turbine per hour is 1000 kg. Calculate:  (i)Blade angles,  (ii)Relative velocity of steam entering the blades,  (iii)Tangential force on the blades,  (iv)Power developed  (v)Blade efficiency, Take blade velocity co-efficient as 0.8. | |
|  | OR | |
| 16 | A single stage impulse turbine rotor has a diameter of 1.2 m runningat 3000 rpm. The nozzle angle is 180. Blade speed ratio is 0.42. Theratio of the relative velocity at outlet to relative velocity at inlet in0.9. The outlet angle of the blade is 3osmaller than the inlet angle.The steam flow rate is 5 kg/s. Draw the velocity diagram and find thefollowing:  (i) Velocity of whirl  (ii) Axial thrust on the bearing  (iii) Blade angles  (iv) Power developed | |
| 17 | A gas turbine plant consists of two stage compressors with perfect intercooler and a single stage turbine. If the plant works between the temperature limits of 300 K and 1000K and 1 bar and 16 bar. Find the net power of the plant per kg of air. Take CP= 1kJ/kg K | |
|  | OR | |
| 18 | 1. Calculate the vacuum efficiency from the following data:   Vacuum at steam inlet to condenser=70 mm of Hg  Barometer reading=760 mm of Hg  Hot well temperature t=300C   1. What are the comparisons between jet condenser and surface condenser | |
| 19 | Explain the principle of operation of a turbojet engine and state its advantagesand disadvantage | |
|  | OR | |
| 20 | Explain the following terms   1. Thrust 2. Thrust power 3. Propulsive power 4. Propulsive efficiency 5. Thermal efficiency | |
| 11 | Explain the working principle of Babcock and Wilcocks boiler with neat sketch? | |
|  | OR | |
| 12 | A turbine is supplied with steam at a pressure of 32 bar and a temperature of 4100C. The steam the expanded isentropically to a pressure of 0.08 bar. Find the dryness fraction at the end of expansion and thermal efficiency of the cycle.  If the steam is reheated at 5.5 bar to a temperature of 3950C and then expanded isentropically to a pressure of 0.08 bar, what will be the dryness fraction and thermal efficiency of the cycle? | |
| 13 | Derive the condition for maximum discharge through a nozzle(Critical pressure ratio) | |
|  | OR | |
| 14 | Dry saturated steam enters a frictionless adiabatic nozzle withnegligible velocity at a temperature of 300oC. It is expanded topressure of 5000 KPa. The mass flow rate is 1 kg/s. Calculate the exitvelocity of the steam. | |
| 15 | The velocity of steam exiting the nozzle of the impulse stage of aturbine is 400 m/s. The blades operate close to the maximum bladingefficiency. The nozzle angle is 20°. Considering equiangular bladesand neglecting blade friction, calculate for a steam flow of 0.6 kg/s,the diagram powerand the diagram efficiency. | |
|  | OR | |
| 16 | In a De-Laval turbine steam issues from the nozzle with a velocity of 1200m/s. The nozzle angle is 200, the mean blade velocity is 400m/s and the inlet and outlet angles of blades are equal. The mass of steam flowing through the turbine per hour is 1000kg. Calculate  i) Blade angles  ii) Relative velocity of steam entering the blade  iii) Tangential force on the blades  iv) power developed v) Blade efficiency. Take blade velocity coefficient as 0.8 | |
| 17 | 1. Explain working principle the down flow surface condenser with neat sketch 2. Explain working principle the central flow surface condenser with neat sketch | |
|  | OR | |
| 18 | In a gas turbine plant, the air is compressed in a single stage compressor from 1 bat to 9 bar and from an initial temperature of 300 K. The same air is then heated to a temperature of 800 K and then expanded in the turbine. The air is then reheated to a temperature of 800 K and expanded in the second turbine. Find the maximum power that can be obtained from the installation, if the mass of air circulated per second is 2 kg. Take CP=1 kJ/ kg K | |
| 19 | Describe the working oframjetengine with a neat sketch. List out itsadvantages and disadvantages. | |
|  | OR | |
| 20 | A turbo-jet engine flying at a speed of 1000 km/h consumes air at the rate of 60.2 kg/s. calculate:  i) Exit velocity of the jet when the enthalpy change for the nozzle is 230 KJ/kg and velocity coefficient is 0.96.  ii) Fuel flow rate in kg/s when air fuel ratio is 70:1 iii)Thrust specific fuel consumption iv). propulsive power  iv) Thermal efficiency of the when the combustion efficiency is 92% and calorific value of the fuel used is 42000 kJ/kg  v) Propulsive power  vi) Propulsive efficiency  vii) Overall efficiency | |
| 11 | A simple Rankine cycle works between pressures 28 bar and 0.006 bar, the initial condition of steam being dry saturated. Calculate the cycle efficiency, work ratio and specific steam consumption? | |
|  | OR | |
| 12 | Explain with a neat sketch working of Benson Boiler and mention its advantages? | |
| 13 | Dry saturated steam enters a steam nozzle at a pressure of 15 bar andis discharged at a pressure of 2 bar. If the dryness fraction ofdischarge steam is 0.96, what will be the final velocity of steam?Neglect initial velocity of steam. If 10% of heat drop is lost infriction, Examinethe percentage reduction in the final velocity. | |
|  | OR | |
| 14 | Derive an expression for maximum discharge through convergentdivergent nozzle for steam. | |
| 15 | The velocity of steam exiting the nozzle of the impulse stage of aturbine is 400 m/s. The blades operate close to the maximum bladingefficiency. The nozzle angle is 20°. Considering equiangular bladesand neglecting blade friction, calculate for a steam flow of 0.6 kg/s,the diagram power and the diagram efficiency. | |
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| 16 | A single stage impulse turbine rotor has a diameter of 1.2 m runningat 3000 rpm. The nozzle angle is 180. Blade speed ratio is 0.42. Theratio of the relative velocity at outlet to relative velocity at inlet in0.9. The outlet angle of the blade is 3osmaller than the inlet angle.The steam flow rate is 5 kg/s. Draw the velocity diagram and find thefollowing : (i) Velocity of whirl  (ii) Axial thrust on the bearing  (iii) Blade angles  (iv) Power developed | |
| 17 | 1. Calculate the vacuum efficiency from the following data:   Vacuum at steam inlet to condenser=70 mm of Hg  Barometer reading=760 mm of Hg  Hot well temperature t=300C   1. What arethe comparisons between jet condenser and surface condenser | |
|  | OR | |
| 18 | A gas turbine plant consists of two stage compressors with perfect intercooler and a single stage turbine. If the plant works between the temperature limits of 300 K and 1000K and 1 bar and 16 bar. Find the net power of the plant per kg of air. Take CP= 1kJ/kg K | |
| 19 | Describe the working oframjetengine with a neat sketch. List out itsadvantages and disadvantages. | |
|  | OR | |
| 20 | The effective jet exit velocity of a rocket is 3500 m/s, the forward flight velocity is 1250 m/s, and the propellant consumption if 75 kg/s. Calculate: i) The thrust; ii) The thrust power and iii) The propulsive efficiency. | |
| 11 | A turbine is supplied with steam at a pressure of 32 bar and a temperature of 4100C. The steam the expanded isentropically to a pressure of 0.08 bar. Find the dryness fraction at the end of expansion and thermal efficiency of the cycle.  If the steam is reheated at 5.5 bar to a temperature of 3950C and then expanded isentropically to a pressure of 0.08 bar, what will be the dryness fraction and thermal efficiency of the cycle? | |
|  | O | |
| 12 | Explain with neat sketch any three of the following mounting:  i) Water level indicator  ii) Pressure gauge  iii) Feed check value  iv) Blow of cock  v) High steam and low water safety value  vi) Junction or stop value | |
| 13 | Dry saturated steam at a pressure of 11 bar enters a convergent-divergent nozzle andleaves at a pressure of 2 bar. If the flow is adiabatic and frictionless, determine: (i) The exit  velocity of steam. (ii) Ratio of cross section at exit and that at throat. Assume the index ofadiabatic expansion to be 1.135? | |
|  | OR | |
| 14 | Derive Critical pressure ratio of nozzle and determine the maximum mass rate of flow  through steam nozzle? | |
| 15 | The blade speed of a single ring impulse blading is 250 m/s and nozzle angle is 20°. Theheat drop is 550 kJ/kg and nozzle efficiency is 0.85. The blade discharge angle is 30° andthe machine develops 30 kW, when consuming 360 kg of steam per hour. Draw thevelocity diagram and calculate: 1. Axial thrust on the blading and 2.the heat equivalent perkg of steam friction of the blading. | |
|  | OR | |
| 16 | In a certain stage of an impulse turbine, the nozzle angle is 20° withthe plane of the wheel. The mean diameter of the ring is 2.8 meters. Itdevelops 55 kW at 2400 rpm. Four nozzles, each of 10 mm diameters  expand steam isentropically from 15 bar and 250°C to 0.5 bar. Theaxial thrust is 3.5 N. Calculate: 1.Blade angles at entrance and exit,and 2.power lost in blade friction. | |
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