

Unit 5 - Week 3

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Assignment 3

The due date for submitting this assignment has passed. **Due on 2019-08-21, 23:59 IST.**
 As per our records you have not submitted this assignment.

1) Which of the following is not related to steam power plant? 1 point

(a) Boiler
 (b) Condenser
 (c) Intercooler
 (d) Economizer

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 (c) Intercooler

2) In the Rankine cycle, heat addition takes place at 1 point

(a) Constant volume
 (b) Constant pressure
 (c) Constant enthalpy
 (d) None of the above

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 (b) Constant pressure

3) What is the use of economizer in a steam power plant? 1 point

(a) Preheating of fuel
 (b) Preheating of feed water
 (c) Raising the pressure of the steam
 (d) To boil the water

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 (b) Preheating of feed water

4) What is the effect of superheated steam in a Rankine cycle? 1 point

(a) Increase the thermal efficiency
 (b) Decrease the thermal efficiency
 (c) Decrease the fuel consumption
 (d) Decrease the dryness fraction of steam after expansion

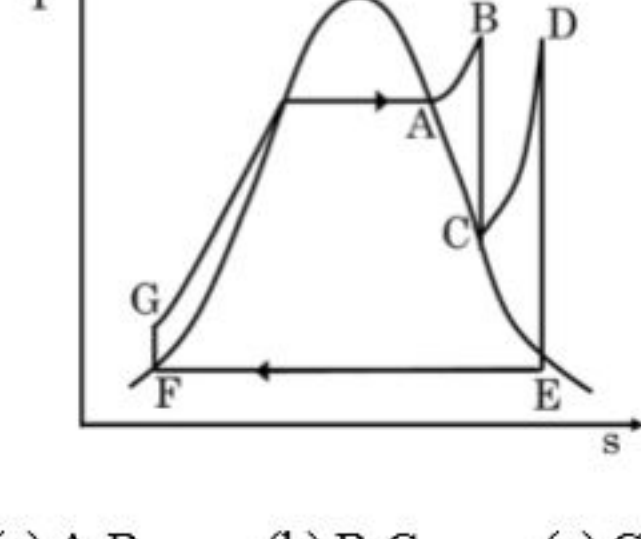
No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 (a) Increase the thermal efficiency

5) Open feed water heater is a 1 point

(a) Indirect contact heat exchanger
 (b) Direct contact heat exchanger
 (c) Neither direct nor indirect contact heat exchanger
 (d) Storage type heat exchanger

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 (b) Direct contact heat exchanger

6) A steam power plant operates on a Rankine cycle with reheating. The cycle is shown as below on a T-s plane. Which one is representing high-pressure turbine expansion? 1 point

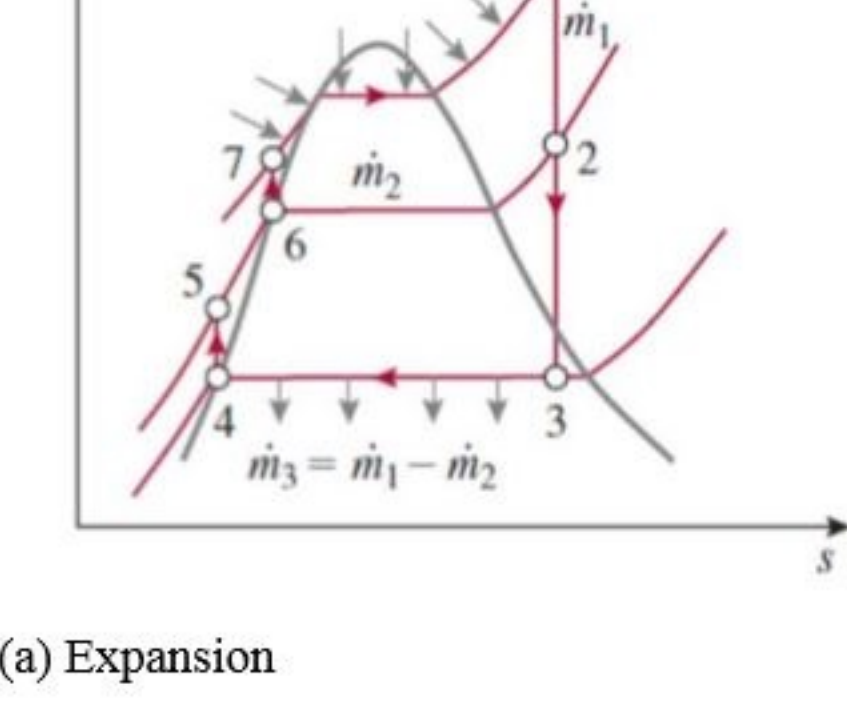


- (a) A-B (b) B-C (c) C-D (d) D-E

- a
 b
 c
 d

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 b

7) The T-s diagram of a Rankine cycle is given below. What are the processes associated with 2-6? 1 point



- (a) Expansion
 (b) Condensation
 (c) Open feed water heating
 (d) Closed feed water heating

- a
 b
 c
 d

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 c

8) In a Rankine cycle, regeneration results in 1 point

(a) Higher efficiency but lower net work output
 (b) Higher efficiency and higher net work output
 (c) Lower efficiency but higher net work output
 (d) Lower efficiency and lower net work output

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 (a) Higher efficiency but lower net work output

9) What is Pinch point? 1 point

(a) Difference between the temperatures of flue gases and inlet of economizer
 (b) Difference between the temperatures of flue gases and inlet of evaporator
 (c) Difference between the temperatures of flue gases and inlet of superheater
 (d) None of the above

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 (b) Difference between the temperatures of flue gases and inlet of evaporator

10) Exergy destroyed in the turbine is equal to 1 point

(a) exergy delivered to the turbine by the working fluid only
 (b) exergy delivered by the turbine to the shaft only
 (c) difference between the exergy delivered to the turbine by the working fluid and exergy delivered by the turbine to the shaft
 (d) None of the above

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 (c) difference between the exergy delivered to the turbine by the working fluid and exergy delivered by the turbine to the shaft

11) The data at inlet and exit of the turbine, running under steady flow, is given below. 1 point

	Specific Enthalpy (kJ/Kg)
Inlet Condition	3250
Outlet Condition	2160

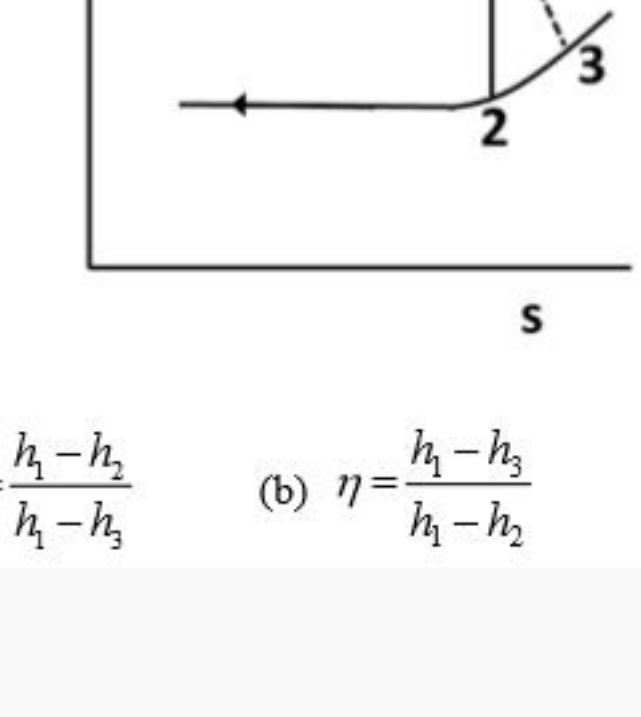
The rate of heat loss per kg of steam is 300 kJ. The changes in potential and kinetic energy of steam are negligible. Calculate the turbine work (kJ/kg)

- (a) 1090 (b) 1390 (c) 790 (d) None of the above

- a
 b
 c
 d

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 c

12) In the diagram given below, process 1-3 shows the actual expansion in a turbine and process 1-2 is the isentropic expansion from boiler pressure to condenser pressure. What is the isentropic efficiency of the turbine (η) 1 point



- (a) $\eta = \frac{h_2 - h_3}{h_1 - h_3}$ (b) $\eta = \frac{h_1 - h_2}{h_1 - h_3}$ (c) $\eta = \frac{s_2 - s_3}{s_3 - s_1}$ (d) $\eta = \frac{s_3 - s_1}{s_3 - s_2}$

- a
 b
 c
 d

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 b

13) In the Rankine cycle, the saturated liquid water coming out from condenser enters into the pump and the pump feeds further the water into the boiler. The condenser and the boiler pressures are 0.5 bar and 10 bar, respectively. The specific volume of the water at the condenser outlet is 0.001005 m³/kg. Find out the pump work (kJ/kg) required to feed per unit mass of water if the isentropic efficiency of the pump is 85 % 1 point

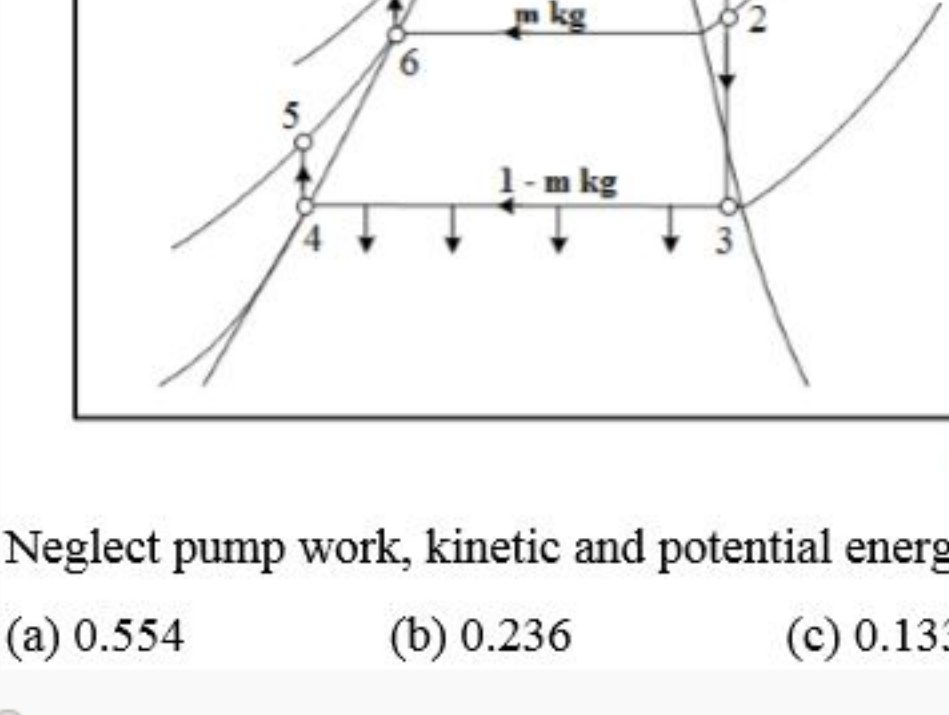
(a) 0.12 (b) 1.12 (c) 2.12 (d) None of the above.

- a
 b
 c
 d

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 b

14) A steam power plant operates on an ideal regenerative Rankine cycle with one open feed water heater. Determine the fraction of steam extracted from the turbine. T-s diagram of the cycle is shown in the figure. The enthalpies of various states are given. 1 point

$h_2 = 2560$ kJ/kg
 $h_4 = 190$ kJ/kg
 $h_6 = 750$ kJ/kg



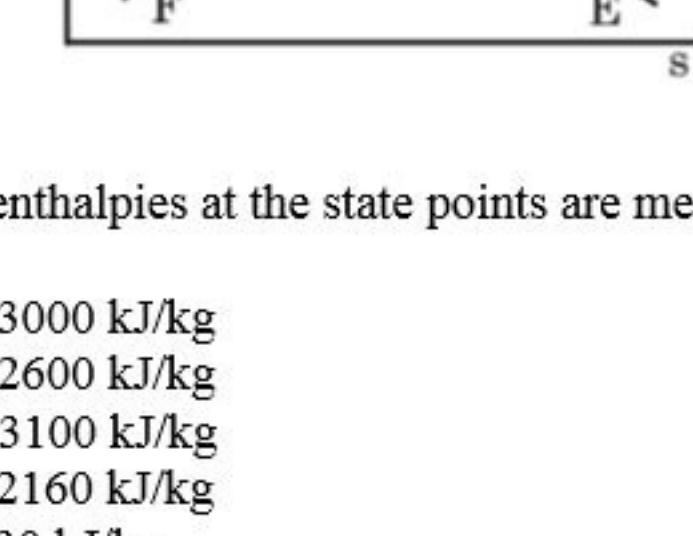
Neglect pump work, kinetic and potential energy changes.

- (a) 0.554 (b) 0.236 (c) 0.133 (d) 0.884

- a
 b
 c
 d

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 b

15) A T-s diagram of the steam power plant operating on a Rankine cycle with reheating is given below. 1 point



The enthalpies at the state points are mentioned as:

$h_B = 3000$ kJ/kg
 $h_C = 2600$ kJ/kg
 $h_D = 3100$ kJ/kg
 $h_E = 2160$ kJ/kg
 $h_F = 30$ kJ/kg

What is the thermal efficiency of the plant? Neglect pump work.

- (a) 0.54 (b) 0.45 (c) 0.39 (d) 0.35

- a
 b
 c
 d

No, the answer is incorrect.
 Score: 0
 Accepted Answers:
 c