

Unit 6 - Week 4

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Assignment 4

The due date for submitting this assignment has passed. **Due on 2019-08-28, 23:59 IST.**
 As per our records you have not submitted this assignment.

1) What is the advantage (s) of a combined cycle power plant? 1 point

(a) Fuel flexibility
 (b) High availability
 (c) Higher thermal efficiency
 (d) All of the above

a
 b
 c
 d

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

2) Identify the probable topping and bottoming cycles for a combined cycle power plant, where SPP-steam power plant, TE- thermoelectric power and TI-thermionic power generation. 1 point

a) TE + SPP
 b) SPP + TE
 c) SPP + TI
 d) None of the above

a
 b
 c
 d

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

3) Efficiency of a gas turbine is (where $P_2 > P_1$ and $k = c_p/c_v$) 1 point

(a) $\eta_{th} = 1 - \frac{1}{(P_2 / P_1)^{(k-1)/k}}$
 (b) $\eta_{th} = 1 - \frac{1}{(P_1 / P_2)^{(k-1)/k}}$
 (c) $\eta_{th} = 1 - \frac{1}{(P_2 / P_1)^{k/(k-1)}}$
 (d) $\eta_{th} = 1 - \frac{1}{(P_2 / P_1)^{(k-1)/k}}$

a
 b
 c
 d

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

4) Which one is true for ideal Brayton cycle 1 point

i. It is commonly used as topping cycle
 ii. Its efficiency depends on the pressure ratio and type of gas used
 iii. It is used as bottoming cycle
 iv. In it heat addition takes place at constant temperature

(a) i only (b) iii and iv (c) i and ii (d) i, ii, iii and iv

a
 b
 c
 d

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

5) Identify the correct T-s diagram of an ideal Brayton cycle 1 point

a
 b
 c
 d

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

6) The difference in temperature of the exit of the economizer and inlet of evaporator is known as? 1 point

(a) Pinch
 (b) Terminal temperature difference
 (c) Approach
 (d) None of these

a
 b
 c
 d

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

7) The performance of heat recovery steam generator (HRSG) can be improved by 1 point

(a) Using high pinch point
 (b) Using low pinch point
 (c) Single pressure steam generation
 (d) None of these

a
 b
 c
 d

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

8) Why selective catalytic reactor is used in HRSG 1 point

(a) to remove NO_x
 (b) to remove SO_x
 (c) to remove water vapour
 (d) to remove flue gases

a
 b
 c
 d

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

9) Efficiency of the Brayton cycle is enhanced by 0 points

(a) Intercooling
 (b) Decreasing the pressure ratio
 (c) Increasing the pressure ratio
 (d) Decreasing the value of k (= cp/cv)

a
 b
 c
 d

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

10) Why there should be a difference in temperature of the exit of the economizer and inlet of evaporator? 1 point

(a) To avoid boiling in evaporator
 (b) To avoid boiling in economizer
 (c) To avoid subcooling in evaporator
 (d) None of these

a
 b
 c
 d

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

11) Efficiency of the combined cycle power plant 1 point

(a) $\eta = \eta_1 - \eta_2 - \eta_1 \eta_2$
 (b) $\eta = \eta_1 + \eta_2 + \eta_1 \eta_2$
 (c) $\eta = \eta_1 + \eta_2 - \eta_1 \eta_2$
 (d) $\eta = \eta_1 + \eta_2$

a
 b
 c
 d

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

12) In a gas turbine, the atmospheric air is compressed to 6 atm. The maximum and minimum cycle temperatures are 1200 K and 300 K. Find the ratio of the gas turbine cycle efficiency to the Carnot cycle efficiency. The ambient is at 1 atm, 300 K. ($\gamma = 1.4$) 1 point

(a) 0.43
 (b) 0.57
 (c) 0.53
 (d) 1.88

a
 b
 c
 d

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

13) The efficiency of the topping and the bottoming cycle of a combined cycle power plant are 0.4 and 0.3 respectively. The efficiency of combined cycle is 1 point

(a) 48%
 (b) 58%
 (c) 68%
 (d) 78%

a
 b
 c
 d

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

14) In the arrangement described above problem, heat supplied is 700 units and heat loss is 150 units between two plants. The efficiency of combined cycle is 1 point

a) 70% b) 55% c) 74 % d) 52 %

a
 b
 c
 d

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

15) The figure shows the block diagram of a gas turbine power plant. Identify correct match (s). 1 point

(i) P- Combustion chamber.
 (ii) R-Combustion chamber.
 (iii) R-Intercooler.
 (iv) Q- After burner

(a) i only (b) ii only (c) iii and iv (d) i, ii and iii

a
 b
 c
 d

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

16) In a (Gas turbine - Steam turbine) combined cycle, the ratio of mass flow rate of water to gas is 0.25. The enthalpy gained by the water in HRSG is 500 kJ/kg. If gas enters into HRSG with an enthalpy of 650 kJ/Kg, what is enthalpy of outgoing gas? 1 point

a) 525 kJ/kg b) 795 kJ/kg c) 335 kJ/kg d) None of these

a
 b
 c
 d

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