University of Mumbai
Online Examination 2020
Program: BE Chemical Engineering
Curriculum Scheme: Revised 2012
Examination: Fourth Year Semester VIII
Course Code: CHC804
Course Name: Energy System Design

Time: 1 Hour Max. Marks: 50

Note to the Students: All Questions are compulsory and carry equal marks.

Q.1.	Co-generation is the simultaneous generation of_____
Option A:	Heat and power
Option B:	Mechanical energy and power
Option C:	Steam and condensate
Option D:	Heat and steam
Q.2.	The unit of illumination level in facilities measured by light meter
Option A:	Watt
Option B:	Voltage
Option C:	Foot-candles
Option D:	Inches
Q.3.	The process of replacement of boiler water with fresh water is called as
Option A:	Throttle control
Option B:	Blow down
Option C:	On-off control
Option D:	Load –unload control
Q.4.	Threshold problem is achieved when _____
Option A:	Both utilities are present
Option B:	Both utilities are absent
Option C:	Either hot utility or cold utility is present
Option D:	Hot utility or both are present
Q.5.	Find the actual steam rate (lb/kWh) of a steam turbine system with theoretical steam rate 30.5 lb/kWh and 77% turbine efficiency
Option A:	23.4
Option B:	39.6
Option C:	42.3
Option D:	25.6
Q.6.	A regenerator is widely used in_____
Option A:	Reheating furnaces
Option B:	Baking ovens
Option C:	Heat treatment furnaces
Option D:	Glass melting furnaces

Q.7.	The design method used for heat exchanger network if feasibility criteria do not match
Option A:	Breaking loop
Option B:	Stream splitting
Option C:	Composite curve
Option D:	Pinch decomposition
Q.8.	In heat integration of distillation column , expensive compression is not involved in _____
Option A:	Multi-effect distillation
Option B:	Heat pump
Option C:	Reboiler flashing
Option D:	Vapor recompression
Q.9.	Energy sources that are either found or stored in nature is known as _____
Option A:	Commercial energy
Option B:	Non commercial
Option C:	Primary energy
Option D:	Secondary energy
Q.10.	The Rankine cycle is a model used to predict the performance of_____ systems
Option A:	Gas turbine systems
Option B:	Diesel Engine systems
Option C:	Steam turbine systems
Option D:	Topping cycle
Q.11.	The section above the pinch in conventional composite curve
Option A:	Heat sink
Option B:	Heat source
Option C:	Qc min
Option D:	Area where system reject heat
Q.12.	Which of the following has capillary wick structure?
Option A:	Heat pump
Option B:	Heat pipe
Option C:	Heat wheel
Option D:	Regenerator
Q.13.	The process audit includes _____
Option A:	Air distribution for building
Option B:	Building lighting
Option C:	Domestic hot water supply for building
Option D:	Heat treatment
Q.14.	The control strategy where the motor and compressor never completely shut off
Option A:	Throttle control
Option B:	Turn –valve control
Option C:	On-off control
Option D:	Load –unload control

Q.15.	Calculate the heat available in kW, with the process stream of source temperature 220°C, target temperature 100°C with heat capacity flow rate 5kW/°C
Option A:	580
Option B:	600
Option C:	500
Option D:	630
Q.16.	In a backward triple effect evaporator the steam will be given to
Option A:	1^{st} Effect
Option B:	2^{nd} Effect
Option C:	3^{rd} Effect
Option D:	1^{st} and 2^{nd} Effect
Q.17.	Determine the minimum number of heat exchangers in a HEN (Heat exchanger network) with 5 process streams and 2 external utilities
Option A:	6
Option B:	5
Option C:	4
Option D:	7
Q.18.	An economizer is provided to reuse the flue gas heat for_____
Option A:	Preheating the boiler feed water
Option B:	Preheating the combustion air
Option C:	Preheating the stock
Option D:	Preheating fuel
Q.19.	Inexhaustible energy sources are known as _____
Option A:	Commercial energy
Option B:	Renewable energy
Option C:	Primary energy
Option D:	Secondary energy
Q.20.	The temperature at which the there is no energy transfer between hot and cold process streams is called as
Option A:	Pinch temperature
Option B:	Target temperature
Option C:	Source temperature
Option D:	Threshold temperature
Q.21.	Define simple payback period
Option A:	Total annual saving
Option B:	Extra investment / Total annual saving
Option C:	Extra investment
Option D:	Working period of equipment
Q.22.	Boiling point elevation causes the driving force of evaporation in the fluid to _____
Option A:	Decrease

Option B:	Increase
Option C:	Remains same
Option D:	Increase tenfold
Q.23.	What is the steam economy of an evaporator if the evaporator capacity is 42kg/hr and the steam consumption is 56kg/hr?
Option A:	0.89
Option B:	0.75
Option C:	0.64
Option D:	0.55
Q.24.	Define the term Evaporator Capacity
Option A:	Kg of vapor produced per steam consumed
Option B:	Kg of water evaporated per day
Option C:	Kg of feed supplied per hour
Option D:	Kg of water evaporated per hour
Q.25.	What is the boiling point elevation of the solution ,if the solution boils at a temperature of 395K and boiling point of water at the pressure in the vapor space is 380K
Option A:	10K
Option B:	20K
Option C:	15 K
Option D:	0 K

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Question	Correct Option
Q.1	A
Q.2	C
Q.3	B
Q.4	C
Q.5	B
Q.6	D
Q.7	B
Q.8	A
Q.9	C
Q.10	C
Q.11	A
Q.12	B
Q.13	D
Q.14	D
Q.15	B
Q.16	A
Q.17	A
Q.18	A
Q.19	B
Q.20	A
Q.21	B
Q.22	A
Q.23	B
Q.24	D
Q.25	C