

Question Bank (I-scheme)

Name of subject: Emerging Trend in Mechanical Engg.

Unit Test: I

Subject code: 22652

Course: ME6I

Semester: VI

Chapter 1: Recent Trend in Automobile Industry

2 marks questions

1.1 HYBRID CAR MANUFACTURERS

1. The fuel efficiency of Mild hybrids vehicle is more as compared to conventional hybrid systems by _____ %?

- a) 10- 15%
- b) 7-15%**
- c) 3-15%
- d) 1-15%

2. Which voltage is likely to be available from the battery of an electric vehicle also known as Mild hybrid?

- a) 12V
- b) 24V
- c) 300V**
- d) 100V

3. The MHEV system consists of which volt?

- a) 12V
- b) 24V
- c) 48V**
- d) none of the above.

4. world's first commercially mass-produced and marketed hybrid automobile was the Toyota Prius. It became available on the Japanese market in what year?

- A 1998
- B. 1996
- C. 1997**
- D 1999

5. Hybrid vehicles convert energy that is normally lost through braking into electrical energy. What is the term that is used for this recycling of energy?

A Perpetual motion

B Regenerative braking

- C. Kinetic conversation
- D. Hybrid archamy

6. First mass produced hybrid vehicle internationally is.....

- 1) Tesla model X.
- 2) Mahindra e2o.
- 3) Toyota Prius.**
- 4) Ford GT.

7. The first vehicle with hybrid technology was developed by.....

- 1) **Ferdinand Porsche.**
- 2) Thomas Edison.
- 3) Isaac Newton.

4) Alexander Graham Bell.

8. Which of the following is not an advantage of hybrid vehicles.

1) Environmentally friendly.

2) **Initial cost is low.**

3) Better mileage.

4) Higher energy conservation.

9. Which of the following is not a disadvantage of hybrid vehicles?

1) You will not get as many discounts or incentives as you will get with electric vehicles.

2) They aren't as powerful.

3) **Lower mileage and higher emissions.**

4) They are not exempted from tax.

10. Which of the following is not the type of hybrid vehicle?

a) Plug in hybrid

b) Parallel hybrid

c) **Natural gas for vehicle**

d) Series hybrid

11. Regenerative braking involves :

a) Nano fibers that repair the surface of brake pads

b) Reducing the amount of friction

c) **Reclaiming heat from the brake and using it for power**

d) All of the above

12. What purpose does a generator serve in a hybrid vehicle?

(a) It converts nuclear energy to more nuclear energy.

(b) **It converts mechanical energy into electrical energy.**

(c) It converts chemical energy into electrical energy.

(d) It converts electrical energy into mechanical energy.

13. _____ technology helps to stop a combustion engine when the vehicle pulls to a stop and restart it when driver accelerates.

- Start stop technology
- Passive braking technology
- **Regenerative braking technology**
- Internal cooling technology

14. _____ what does MHEV stands for

- **Mild hybrid electric vehicle**
- Micro hybrid electric vehicle
- Mild horsepower electric vehicle
- Micro horsepower electric vehicle

15. The electric motor in hybrid car can also act as _____

- **A generator**
- A Fuel pump
- Cooling fan
- Compressor

16. The full form of the BAHV's.

- A) **Battery assisted hybrid vehicle.**
- B) Battery proxy hybrid vehicle.
- C) Battery assist hydro vehicle.
- D) None of the above.

17. The BAS mild hybrid system used..... To start the internal combustion engine.

- a. **Belt drive**
- b. Chain drive
- c. Direct drive
- d. None of the above.

18. The electric motor in a mild hybrid is acting as a

- a. **Power booster**
- b. Hydro boost
- c. Buffalo power booster
- d. Booster plug

19. In _____ vehicle energy is stored in an auxiliary battery and then it is used to quickly start a vehicle

- a) Full hybrid
- b) **Micro hybrid**
- c) Series hybrid
- d) Mild hybrid

20. In which vehicle system lowest size of a battery is used

- a) **Micro hybrid**
- b) Mild hybrid
- c) Series hybrid
- d) Parallel hybrid

7. In which vehicle system bigger size of a battery is used

- a) Micro hybrid
- b) Mild hybrid
- c) Series hybrid
- d) **Full hybrid**

21. Following is not type of hybrid electric vehicle.

- A) Series
- B) Parallel
- C) **Vertical**
- D) Complex

22. In parallel hybrid vehicle Internal Combustion Engine and electric motor are coupled by adevice.

- a. Hydraulic
- b. Pneumatic
- c. **Mechanical**
- d. Electric

23. The combustion engine can operate in RPM range, even as a car change a speed.

- a. Moderate
- b. Wide
- c. **Narrow**
- d. None of the above

24. In this configuration, efforts are made to operate the electric motor alone at..... and ICE alone at.....

- a) medium speed and lower speed.
- b) higher speed and lower speed
- c) higher speed and medium speed
- d) **lower speed and higher speed**

25. Full form of CVT

- a) continuously variation transform
- b) continue various transmission
- c) continuously various transformation

d) continuously variable transmission

26. Full form of ICE

a) Internal continuous engine

b) Internal combination engine

c) internal continue emission

d) none of the above

27. Full form of PEM in fuel cell

a) petrol-exchange membrane

b) proton-execute membrane

c) proton-exchange membrane

d) petrol-execute membrane

28. Which vehicles do not require the same level of battery power and do not achieve the same levels of fuel economy

a) Mild Hybrid

b) Full Hybrid

c) Series Hybrid

d) Parallel Hybrid

29. What does PHEV stands for

a) Plug-in Hybrid Electronic Vehicles

b) Plug-in Hybrid Electric Vehicles

c) Plug-out Hybrid Electronic Vehicles

d) Plug-out Hybrid Electric Vehicles

30. Which of these is the purpose of power-split device

a) To split Electrical Energy into Mechanical Energy.

b) To allow both the engine and Electric motor to propel the vehicle

c) To recharge the battery while braking

d) To recharge the brakes while driving

31. A Hybrid Vehicle equipped with push button start will enter the power ON mode but will not enter the ready to drive mode .No diagnostic trouble code are stored this could cause by

a) The high voltage safety plug is removed

b) A failed brake on/off switch

c) An empty fuel tank

d) A disconnect 12v battery

32. The MIL is illuminated and a battery module deterioration diagnostic trouble code is stored the most like cause is a failed by

a) High voltage battery

b) High voltage inverter

c) Motor/ generator

d) DC/ DC converter

33. A conventional vehicle costs 10 to 15 percent per mile in fuel to operate. How much does an electric vehicle cost per mile?

- **2 to 4 cents**
- 5 to 6 cents
- 7 to 8 cents
- 9 to 10 cents

34. The strategic petroleum reserve was created to lower oil prices during supply disruptions .How much did the US spend to build and fill the SPR?

- \$980 billion
- \$2 million
- \$4.5 billion
- **\$22 billion**

35. Current levels of off-peak electric capacity are sufficient to power how much of our nations car and light-duty truck fleet?

- 19%
- 33%
- 55%
- **73%**

36. Which of these is the purpose of the power-split device?

- To split electrical energy into mechanical energy
- **To allow both the engine and electric motor to propel the vehicle**
- To recharge the battery while braking

37. The electric cars available in india are:

- A . Hyndai Kona Electric
- B. Mahindra E20
- C . Tata tigor EV 2019

D. All of the above

38. The following companies have launched electric motor cycles in india :

- A . revolt**
- B . hero
- C . Yamaha
- D . all of the above

39. India's first electric bus was launched in in 2014.

- A . Chennai
- B . Mumbai
- C . Gujarat

D . Banglore

40. Ashok Leyland launched its electric bus in.....

- A . oct 2015
- B . oct 2016**
- C . april 2016
- D . april 2015

41. SMEV stands for

- A . society of manufacturing of ergonic volts
- B . society of manufacturing of electronic vehicles
- C . society of manufacturing of environment vehicles

D . society of manufacturing of electric vehicles

42. Society of Indian automobile manufactures:

- A . SMEV**
- B . VMCV
- C . SEMV
- D . SSEV

43.. There is main reason for which the automotive manufacturers are developing and selling HEVs.

- A. Reduction of Co2 emission.
- B. Direction of exhaust gas toxic emission.
- C. Improvement of powertrain dynamics
- D. All of the above**

1.2 E- Vehical

44. Who is the largest manufacturer of lithium batteries?

- A] Us giga factory**
- B] Samsung solco
- C] Panasonic
- D] Toshiba

45. How many km can an electric car go?

- A] 500 Km
- B] 700 km
- C] 450 km**
- D] 100km

46. The storage battery generally used in electric power station is

- A] nickel-cadmium battery
- B] zinc-carbon battery
- C] lead-acid battery**
- D] None of the above

47. The output voltage of a charger is

- A] less than the battery voltage
- B] Higher than the battery voltage**
- C] The same as the battery voltage
- D] None of the above

48. What is the challenge with electric vehicles?

- A] Vehicle durability
- B] Cell life
- C] Cost
- D] Both A and B**

49. What is the life of battery in an electric car ?

- A] 8 year**
- B] 10 year
- C] 4 year
- D] 20 year

50. What type of battery is used in an electric car?

- A] Lithium ion
- B] Nickel -metal hydride
- C] Both A and B**
- D] None of the above

51. The capacity of a battery is expressed in terms of

- A ampere per hour**
- B current
- C volt
- D ampere

52. Life of a battery in the electric vehicle is about

A 8 years

B 5 years

C 10 years

D 20 years

53. Who was the inventor of electric batteries in electric cars

A Thomas Davenport

B newton

C Dr Abdul kalam

D Nikola tesla

54. How much time it takes for a electric car of 60kWh battery to charge

1. 5 hours

2. 8 hours

3. 6-7 hours

4. None of above

55. Advantages of lithium batteries

1. Light weight

2. Compact

3. Low maintenance

4. **All of the above**

56. How many volts it take to charge an electric car?

1. 140

2. 150

3. **120**

4. 200

57. How many known modes of charging of EVs are available

1. 3

2. 2

3. **4**

4. 1

58. Which from the listed are fuel cells

1. SOFC

2. MCFC

3. PAFC

4. **ALL OF THE ABOVE**

59. Modern lithium ion batteries provide average range of

• 120-280 kilometres

• **320-480 kilometres**

• 520-680 kilometres

• 720-980 kilometres

60. The electrolyte used in sodium nickel chloride batteries is

• Sodium chloride

• **Tetra chloraluminatate**

• Sodium bicarbonate

• Sodium glutamate

61. Average temperature of electrolyte in sodium nickel chloride batteries

• 100 to 200 degree Celsius

• **270 to 350 degree Celsius**

• 380 to 410 degree Celsius

• None of the above

62. Average lifespan of sodium nickel chloride batteries
- 5 years
 - 10 years
 - **15 years**
 - 20 years
63. Sodium nickel chloride batteries are also called as
- Horse
 - **Zebra**
 - Cobra
 - Turbo
64. What are the various types of batteries used in electric vehicles
- Lithium ion batteries
 - Sodium nickel chloride batteries
 - Sodium sulphur batteries
 - **All of the above**
65. Sodium sulphur battery is a type of molten-salt battery constructed from _____ sodium and sulphur.
- Solid
 - **Liquid**
 - Plasma
 - Gases
66. The following is the operating temperatures of the sodium –sulphur battery.
- 400 to 600°C
 - 1000 to 1500°C
 - **300 to 350°C**
 - 100 to 200°C
67. The cell is usually _____ in shape.
- Triangular
 - Circular
 - Rectangular
 - **Cylindrical**
68. Entire cell is enclosed by a steel casing that is protected usually by _____ and _____.
- Nickel, chromium
 - **Chromium, molybdenum**
 - Aluminium, molybdenum
 - Nickel, aluminium
69. Full form of BASE is _____.
- Basic Analysis and Security Engine.
 - Biefeld Academic Search Engine.
 - Basel Agency for Sustainable Energy.
 - **Beta-Aluminium Solid Electrolyte.**
70. The sulphur in sulphur sodium battery is absorbed by _____ sponge.
- Sodium
 - **Carbon**
 - Wire
 - Cellulose
71. Which of the following is not the name of charging station?

- Electric vehicle charging station
- EVSE
- ECS
- **ESSV**

72. The charging time depends on which of the following factor?

- Battery size
- **Battery capacity**
- Size of vehicle
- Voltage of battery

73. The capacity of a battery is expressed in terms of

- A. Current rating
- B. Voltage rating
- C. Ampere hour rating**
- D. None of the above

74. The storage battery generally used in electric power station is

- A. Nickel-cadmium battery
- B. Zinc carbon battery
- C. Lead-acid battery**
- D. None of the above

75. Trickle charger of a storage battery helps to

- A. Maintain proper electrolyte level
- B. Increase its reverse capacity
- C. Prevent sulphation
- D. Keep it fresh and fully charged**

76. On over charging a battery

- A. It will bring about chemical change in active materials
- B. It will increase the capacity of the battery
- C. It will raise the specific gravity of the electrolyte
- D. None of the above**

77. Battery container should be acid resistance therefore it is made up of

- A. Glass
- B. Plastic
- C. Wood
- D. All of the above**

78. Following will happen if battery charging rate is too high

- A. Excessive gassing will occur
- B. Temperature rise will occur
- C. Bulging and buckling of plates will occur
- D. All of the above**

79. To prevent local action in battery, onlyis used in electrolytes

- A. Pump water
- B. Distilled water**
- C. Tap water
- D. Both A and C

80. Ampere hour capacity of an industrial battery is based onhours discharge rate

- A. 8**
- B. 12
- C. 16
- D. 24

81. Lithium cells operates ranging from

- a. -25°C to 25°C
- b. -50°C to 25°C
- c. **-50°C to 75°C**
- d. -75°C to 75°C

82. The positive plates of nickel iron cell is made up of

- a. **Nickel hydroxide**
- b. Lead peroxide
- c. Ferrous hydroxide
- d. Potassium hydroxide

83. In lead acid accumulators, the container is filled with distilled water and concentrated sulphuric acid in the ratio of

- a. 1 : 2
- b. 2 : 1
- c. **3 : 1**
- d. 1 : 3

84. The emf of the dry cell is about

- a. 0 V
- b. 0.5 V
- c. 1 V
- d. **1.5 V**

85. In cell, the current flows in outer circuit from

- a. **Positive terminal to negative terminal and electrons from negative terminal to positive terminal**
- b. Positive terminal to negative terminal and electrons from positive terminal to negative terminal
- c. Negative terminal to positive terminal and electrons from negative terminal to positive terminal
- d. Negative terminal to positive terminal and electrons from positive terminal to negative terminal

86. Which of the following battery is used for aircraft?

- A. Lead acid battery
- B. Nickel-iron battery**
- C. Dry cell battery
- D. Silver oxide battery

87. When two batteries are connected in parallel, it should be ensured that

- A. They have same emf**
- B. They have same make
- C. They have same ampere hour capacity
- D. They have identical internal resistance

88. The electrode for a battery must be

- A. A semi conductor
- B. An insulator
- C. A good conductor of electricity**
- D. A bad conductor of electricity

89. A dead storage battery can be revived by

- A. Adding distilled water
- B. Adding so-called battery restorer
- C. A dose of H_2SO_4
- D. None of the above**

90. The open circuit voltage of any storage cell depends wholly upon

- A. Its chemical constituents

- B. On the strength of its electrolyte
 - C. Its temperature
 - D. **All of the above**
91. Each cell has a vent cap
- A. To allow gases out when the cell is on charge
 - B. To add water to the cell if needed
 - C. To check the level of electrolyte
 - D. **To do all above functions**
92. What is one of the primary downsides of fuel cells?
- A. Weight
 - B. **Cost**
 - C. Pollution
 - D. Maintenance
93. A fuel cells convertsenergy into electrical energy
- A. Mechanical
 - B. Magnetic
 - C. Solar
 - D. **Chemical**
94. Which of the following primary cells has the highest voltage ?
- A. Manganese-alkaline
 - B. Carbon-zinc
 - C. **Lithium**
 - D. Mercury
95. Which of these is a problem electric car makers are trying to solve?
- A. **Electric cars aren't noisy enough.**
 - B. They don't produce enough sulphur dioxides.
 - C. They don't cost enough.
96. Identify incorrect statement of Electric vehicle
- A. Insufficient charging stations
 - B. Long charging period
 - C. Limited range
 - D. **High operating cost**
97. Which vehicle has the smallest number of principle components?
- A. Traditional vehicle
 - B. Hybrid vehicle
 - C. **Electric vehicle**
 - D. Both A and B
98. Which of the following vehicles produces zero emissions?
- A. Traditional
 - B. Hybrid
 - C. **Electric**
 - D. Both A and B
99. How long does an electric car battery lasts per charge?
- | | |
|------------------|-------------------------------|
| A. 20 min.-10hr. | <u>B. 30min.-12hr.</u> |
| C. 40min.-9hr. | D. 60min.-8hr. |
100. What is the life span of electric car batteries?
- | | |
|-------------------------|--------------|
| <u>A. 8 Year</u> | B. 10 years. |
| C. 9 years | D. 11 years. |
101. Which electric vehicle has 30 kwh and 160 km range?
- | | |
|-----------------------|---------------|
| A. Nissan leaf | B. Ford focus |
|-----------------------|---------------|

C. Mitsubishi MiE5 D. Smart ED

102. Which is the modified form of batteries in today's electronic cars?

A. Lithium ion B. Nickel iron

C. Lead Acid D. Sodium Nitrate

103. How to increase the range on electric vehicles?

a. By increasing the battery capacity.

b. By reducing battery capacity.

c. By installing a turbocharger.

d. By installing another DC motor.

104. Inverter cell anode and cathode of the..... cell is used for vehicle

(a) Copper electrode zinc

(b) Zinc copper

(c) Aluminium zinc

(d) Nickel Cobalt

105. The positive plants of nickel iron cell is made up of

a. Nickel hydroxide

b. Lead peroxide

c. Ferrous hydroxide

d. Potassium hydroxide

106. A stable interface between solid _____ liquid _____ and gaseous _____ promotes high rate of electrode processes.

a) Fuel, electrolyte, electrode

b) Electrode, fuel, electrolyte

c) Electrode, electrolyte, fuel

d) Fuel, electrode, electrolyte

107. Which of the following is not an example of a fuel cell?

a) Hydrogen-oxygen cell

b) Methyl-oxygen-alcohol cell

c) Propane-oxygen cell

d) Hexanone-oxygen cell

108. The electrolytic solution used in a hydrogen-oxygen fuel cell is _____

a) 75% KOH solution

b) 25% KOH solution

c) 75% NaOH solution

d) 25% NaOH solution

109. The residual product discharged by the hydrogen-oxygen cell is _____

a) Hydrogen peroxide

b) Alcohol

c) Water

d) Potassium permanganate

1.3 Safety in Automobile

110. By what percentage do seatbelts reduce the risk of death for a person sitting in front seat?

a) 40%

b) 50%

c) 60%

d) 70%

111. Where do typical car seat belts apply most of the stopping force?

- a) To the shoulder and hips
 - b) To the chest and abdomen
 - c) **To the rib cage and pelvis**
 - d) To the head and legs
112. What area of car is designed to deform in a collision?
- a) **The crumple zone**
 - b) The interior
 - c) The doors
 - d) The rear end
113. What's the primary advantage of a anti- lock braking system
- a) They allow you to stop easier
 - b) They prevent locking
 - c) **They allow you to steer while braking**
114. Tempered safety glass is how many times stronger than regular glass
- a) 1 to 3 times stronger
 - b) **5 to 10 times stronger**
 - c) 3 to 5 times stronger
115. By what percentage can airbags reduce the risk of dying in a direct frontal crash?
- a) **30%**
 - b) 40%
 - c) 50%
 - d) 60%
116. What kind of gas inflates in an airbag
- a) Hydrogen
 - b) Oxygen
 - c) Helium
 - d) **Nitrogen**
117. How far behind the steering wheel should you sit to avoid injury from an inflated airbag?
- a) 8 inches
 - b) 5 inches
 - c) **10 inches**
 - d) 13 inches
118. What are the requirements for a child to sit in a forward facing child seat?
- a) He or she should weigh 10 to 15 pounds
 - b) He or she should weigh 13 to 15 pounds
 - c) He or she should weigh 15 to 18 pounds
 - d) **He or she should weigh 20 pounds or more**
119. When is a child ready to use an adult seat belt?
- a) **When they're around 4 feet,9 inches tall**
 - b) When they're around 3 feet,5 inches tall
 - c) When they're around 4 feet,5 inches tall
 - d) When they're around 3 feet,9 inches tall
120. What does airbag, used for safety of car driver, contain?
- A. Sodium bicarbonate
 - B. **Sodium azide**
 - C. Sodium nitrite
 - D. Sodium peroxide
121. What year did the government mandate driver's side airbags?
- A. 1989
 - B. **1996**

- C. 2001
D. The government has never mandated it.
122. Cruise control is used in which vehicles
A Road vehicles
 B water vehicles
 C aeroplane
 D bus
123. Adaptive cruise control is used to adjust _of vehicle
A speed
 B direction
 C magnitude
 D light
124. Adaptive cruise control system uses _
A all of the below
 B laser sensor
 C radar sensor
 D camera setup
125. Autonomous cruise control are considered a _ car
A level 1
 B level 2
 C Level 3
 D level 4
126. _____ Introduced laser 'preview distance control'
A Mitsubishi Diamante
 B BMW
 C Toyota
 D Mercedes
127. Toyota offered a _____ cruise control
A lazer
 B radar
 C camera
 D all of the above
128. What was based system do not detect and dark vehicles in adverse weather
A lazer
 B camera
 C phone
 D laptop
128. If the impulse response in absolutely integrate then the system is
(a) Absolutely stable
 (b) Unstable
 (C) Linear
 (d) Stable
129. Asymptotic stability is connected with:
 (a) A system under influence of input.
(b) A system not under influence of input.
 (c) A system under influence of input.
 (d) A system not under influence out.
130. If root of the characteristics equation has positive real part system is

- (a) Stable
- (b) Unstable**
- (c) Marginally stable
- (d) Linear

131. _____ is a quantitative measure of how fast the transients die out in the system.

- (a) Absolutely stable
- (b) Conditionally stable
- (c) Unstable
- (d) Relative stability**

132. A controller essentially is a

- A. Sensor
- B. Clipper
- C. Comparator**
- D. Amplifier

133. When brakes are applied on a moving vehicle the kinetic energy is converted to

- A. Mechanical energy
- B. Heat energy**
- C. Electrical energy
- D. Potential energy

134. The force required to stop a vehicle is dependent on

- A. The weight of vehicle
- B. The deceleration rate
- C. Both A and B**
- D. None of the above

135. Handbrake is applicable to

- A. Only front wheels
- B. Only rear wheels**
- C. Both front and rear wheel.
- D. All of the above.

136. The power brake may be exerted by

- A. Electrical energy**
- B. Engine vacuum
- C. Air pressure
- D. All of the above

137. What does air bags, used for safety of car driver contain?

- 1. sodium bicarbonate.
- 2. sodium azide**
- 3. sodium nitrate
- 4. sodium peroxide

138. Which country first use in air bags for aerospace industry.

- 1. India
- 2. U.S**
- 3. China.
- 4. Pakistan

139. Which spacecraft landing first use in air bags.

- 1. Luna 9 and Luna 13.**
- 2. Luna 10 and Luna 12
- 3. Luna 11 and Luna 4

- 4.luna 16 and luna 18
140. First used in pedestrian air bags.
1. Volvo v50
 2. Volvo v60
 - 3.volvo v40.**
 4. Volvo v70
141. Who invented air bags in Japan.
- 1.Yasuzaburou kanka.
 - 2. Yasuzaburou kobori**
 3. Varun Khatri.
 4. Saurabh zombie
142. The time between the collision of two aircraft on a collision course is called_____
- a) Differential time **b) Tau**
 - c) Traffic Time d) Collision Time
- 143.What is the surveillance range of a general TCS system?
- a) 30 sec b) 20min
 - c) 2 min **d) 4 min**
144. Anti-collision system is also known as _____
- a) Collision Avoidance System b) Pre-crash System
 - c) Collision Mitigation system d) Forward collision warning system
 - e) All of the above**
145. In India, Autonomous Emergency Braking system (AEB) could become mandatory on new cars by_____
- a) 2020 b) 2024
 - c) 2022** d) 2026
146. A 2015 study based on European and Australasian data suggests the AEB can decrease rear end collisions by_____%
- a) 40%.
 - b) 38%**
 - c) 24%.**
 - d) 56%
147. What is adaptive cruise control?
- 1. Adaptive cruise control is a safety and comfort providing technology in automobile**
 2. Adaptive cruise control is automatic car driving technology
 3. Adaptive cruise control is fast car driving technology
 4. Adaptive cruise control is slow car driving technology
148. When was cruise control invented?
1. 1945
 - 2. 1948**
 3. 1952
 4. 1961
149. Purpose of inventing Adaptive cruise control?
- 1. To reduce accident**
 2. To increase efficiency of automobile
 3. To increase driving comfort
 4. To invent new driving technology
150. Demerits of Adaptive cruise control?
1. System may fail
 2. This system do not work on wet surface well
 3. Not effective in bad weather
 - 4. All of the above**

151. Major components of Adaptive cruise control?
1. Radar sensor
 2. ACC buttons on the steering wheel
 3. Multi-information display
 - 4. All of the above**
152. Where is the ACC system most effective?
- 1. In traffic conditions**
 2. High ways
 3. Hills
 4. Wet and slippery surface
153. The following is not a drum brake
- (A) External contracting brake
 - (B) Internal expanding brake
 - (C) Disc brake**
 - (D) All of the above
154. In disc brake, the disc is attached to the
- (A) wheel
 - (B) axle**
 - (C) suspension system
 - (D) none of the above
155. The mechanical brakes are operated by means of
- (A) levers
 - (B) bell cranks
 - (C) cams
 - (D) all of the above**
156. Hydraulic brakes function on the principle of
- (A) Law of conservation of momentum
 - (B) Law of conservation of energy
 - (C) Pascal's law**
 - (D) None of the above
157. Tandem master cylinder consists of
- (A) One cylinder and one reservoir
 - (B) Two cylinders and one reservoir
 - (C) One cylinder and two reservoirs
 - (D) Two cylinders and two reservoirs**
158. Electronic Stability Program is used to
- a) Assist in braking
 - b) Reducing loss of traction**
 - c) Use in ECU
 - d) for proper loading and unloading of weight in vehicle
159. When the Electronic Stability Program system intervenes?
- a) When it detects probable loss of steering control**
 - b) When tires start to skid
 - c) When sudden brakes are applied
 - d) All of the above
160. Electronic Stability control generally works when
- a) Steering is in over steering and under steering condition**
 - b) When collision has to be prevented

- c) Fuel is low
d) Roads are uneven
161. Electronic Stability control can effect by
a) Dry road condition
b) Frozen road condition
c) both a and b
d) non of these
162. These are main components of Electronic Stability control system
a) Speed Sensor
b) Steering angle measurement angle
c) Yaw-rate sensor
d) All of the above
- 163.----- is a feature that alerts a driver to an imminent crash and helps them use the maximum braking capacity of the car.
a) **AEB**
b) Air Bag
c) Vehicles
d) Electronic Stability control
164. The loads supported by an automobile frame are.....
a) Weight of the body and Passengers.
b) Torque from engine and Transmission.
c) Sudden Impact from Collision
d) All of the above.
165. What area of car is designed to deform in a collision ?
a) **Crumple zone**
b) Interior zone
c) Doors
d) Rear end
166. The energy absorb by brake is always kinetic.
a) No, potential
b) Kinetic or potential
c) Potential
d) Strain Energy
167. Hand brake is applicable to
(A) only front wheels
(B) only rear wheels
(C) both front and rear wheels
(D) all of the above

Chapter 2: Process Engineering

2.1 Process Boilers

- 1] A boiler is a device used to create steam by applying _____ to water
a) Light energy
b) **heat energy**
c) Wind energy
d) mechanical energy
- 2] Process boiler is a type of boiler with a capacity of _____ Buts per hour

- a) 200,000
 - b) **300,000**
 - c) 400,000
 - d) 50,000
- 3]_____is the most widely used media in distribution of heat over distance in industries
- a) **Steam**
 - b) light
 - c) Springs
 - c) water
- 4] The temperature and pressure in saturated stem has_____relationship
- a) Direct
 - b) **indirect**
 - c) Neither of above
 - d) both a and b
- 5] What should be the temperature of feed water?
- a) 12^o c
 - b) 80^oc
 - c) **50^oc**
 - d) none of above
- 6] For caring the heat efficiently the steam must be_____
- a) dry
 - b) wet
 - c) **saturated**
 - d) none of above
- 9] What happens when air dissolves in condensate?
- a) non corrosive
 - b) temperature of air increases
 - c) **corrosive**
 - d) none of above
- 7]_____is used to release condensate in pipe work
- a) steam trap
 - b) **valves**
 - c) power generators
 - d) none of above
8. Water tube boilers are those in which _____
- a) Flue gases pass through tubes and water around it
 - b) **Water passes through the tubes and flue gases around it**
 - c) Work is done during adiabatic expansion
 - d) Change is enthalpy
9. Fire tube boilers are those in which _____
- a) **Flue gases pass through tubes and water around it**
 - b) Water passes through the tubes and flue gases around it
 - c) Work is done during adiabatic expansion
 - d) Change is enthalpy
- 10.Size of boiler tubes is specified by _____
- a) Mean diameter and thickness
 - b) Inside diameter and thickness
 - c) **Outside diameter and thickness**
 - d) Outside diameter and inside diameter
- 11.Cochran boiler is a _____
- a) Horizontal fire tube boiler
 - b) Horizontal water tube boiler
 - c) Vertical water tube type
 - d) **Vertical fire tube type**
- 12.Locomotive boiler has _____
- a) 137 fire tubes and 44 superheated tubes
 - b) 147 fire tubes and 34 superheated tubes
 - c) **157 fire tubes and 24 superheated tubes**
 - d) 167 fire tubes and 14 superheated tubes
- 13.Water tube boilers produces steam at a_____ pressure than that of fire tube boilers.
- a) **Higher**
 - b) Lower
 - c) Same
 - d) None of the above
- 14.The biggest loss in the boiler is _____

- a) Moisture in fuel
 - b) Dry flue gases**
 - c) Steam formation
 - d) Unburnt carbon
15. The draught in locomotive boilers is produced by a _____
- a) Chimney
 - b) Centrifugal fan
 - c) Steam jet**
 - d) All of the above
16. The draught may be produced by a _____
- a) Chimney
 - b) Mechanical fan
 - c) Steam jet
 - d) All of the above**
17. The efficiency of the plant _____ with the mechanical draught
- a) Increases**
 - b) Decreases
 - c) Remain constant
 - d) None of the above
18. Which of the following boiler is best suited to meet the fluctuating demand of steam.....
- A] Locomotive boiler.**
 - B] Lancashire boiler
 - C] Cornish boiler
 - D] Babcock and Wilcox boiler
19. Which of the following is a water tube boiler.....
- A] Locomotive boiler
 - B] Lancashire boiler
 - C] Cornish boiler
 - D] Babcock and Wilcox boiler**
20. The economiser is used in boilers to.....
- A] Increase thermal efficiency of boiler**
 - B] Economise on fuel
 - C] Extract heat from the exhaust the gases
 - D] Increase flue gas temperature
21. An economiser in a boiler.....
- A] Increases steam pressure.
 - B] Increases steam flow
 - C] Decreases fuel consumption**
 - D] Decreases steam pressure
22. In a condensation process, _____ to _____
- A] Gas, Solid
 - B] Gas, Liquid**
 - C] Liquid, Gas
 - D] Liquid, Solid
23. When vapour is compressed isothermally the _____ changes.
- A] Volume.**
 - B] Pressure
 - C] Temperature
 - D] None of the mentioned
24. Condensation starts _____ point.

- A] **Dew point**
 B] Bubble point
 C] Triple point
 D] None of the mentioned
25. When gas changes to liquid through the process of condensation, the temperature
 A] Increases.
 B] Decreases
 C] **Remains constant.**
 D] None of the mentioned
26. When vapour is cooled at constant total system volume, the _____ changes.
 A] Volume.
 B] **Pressure**
 C] Temperature.
 D] None of the mentioned
27. Which of the following boiler is best suited to meet the fluctuating demand of steam.....
 A **locomotive boiler.** B Lancashire boiler
 C Cornish boiler D Babcock and wilcox boiler
28. Boiler efficiency is a measure of how effectively _____ energy in fuel is converted into heat energy in steam going to the turbines
 A **Chemical energy** B Heat energy
 C Thermal energy D All of the above
10. A _____ incorporates a firebox or furnace in order to burn the fuel and generate heat.
 A Steam B **Boiler**
 C Hydrogen D None
29. The water tubes in a simple vertical boiler are _____
 a. Horizontal
 b. Vertical
 c. **Inclined**
 d. All of the above
30. The diameter of fine tubes in Cochran boiler is of order of _____
 a. 2cm
 b. **6cm**
 c. 8cm
 d. 15cm
31. The diameter of internal flue tubes of a Lancashire boiler is about _____ that of it's shell
 a. One fourth
 b. One third
 c. **Two fifth**
 d. One half
32. Thermal of well-maintained boiler will be of the order _____
 a. 30%
 b. 55%
 c. **90%**
 d. 45%
33. What is the temperature at which the steam boiler are
 Capable to withstand
 a. 200°C
 b. 280°C
 c. **540°C**

d. 358°C

34. Where are steam boilers used in the industries
- a) heating requirement for facility
 - b) steam for batching
 - c) steam for processing
 - d) all of the above**
35. Which of the following is not a part of a boiler
- a) burner the combination
 - b) chamber
 - c) water reservoir**
 - d) None above
36. The heat in the boiler is used for making _____
- a) steam**
 - b) condensing process
 - c) ice
 - d) none of these
37. How many cooling towers are there near a reactor
- a) 1
 - b) 4**
 - c) 5
 - d) 2
38. Cooling Towers vary from size of 40 metres to
- a) 400**
 - b) 120
 - c) 450
 - d) 560
39. What is the main component in a boiler
- a) steam**
 - b) heat
 - c) pressure condenser
 - d) combination
40. Which cooling Towers use a process similar to the one found in small evaporation active cooling units
- a) hyperbolic**
 - b) Tower
 - c) condensate loop
 - d) none of these
41. What is the reason to service a cooling tower?
- a) to ensure proper air flow
 - b) to clean the tubes
 - c) to inspect the water pump
 - d) all of these**
42. A _____ is a type of heat exchange system where water is heated to its' boiling point via combustion of a fuel blown through a tube submerged in water.
- a. Condensate loop
 - b. Hyperbolic cooling tower
 - c. Steam boiler**
 - d. All of above

43. The heat produced in this system is then rejected into the system as _____
- Steam**
 - Boiler
 - Both a & b
 - None
44. A _____ incorporates a firebox or furnace in order to burn the fuel and _____ heat.
- Boiler, generate**
 - Heat, boiler
 - Steam, pressure
 - None
45. A boiler is an enclosed vessel that provides a means for _____ and _____ heat to water until it becomes hot water or steam.
- Generate, boiler
 - Condenser, loop
 - Combustion, transfers**
 - All of above
46. Steam produced in a boiler can be used for a variety of purposes including space heating, drying and _____
- Sterilization
 - Humidification
 - Power generation
 - All of above**
47. The _____ system includes anywhere that the steam condenses to form liquid water.
- Loop
 - Power
 - Liquid
 - Condensate**
48. The back pressure created by lift is approximately _____PSIG for every 2 feet of condensate lift.
- 1 PSIG**
 - 3PSIG
 - 1PSGI
 - 3PSGI
49. Condensate is the liquid formed when steam passes from the _____ to the _____state.
- Vapor, solid
 - Solid, liquid
 - Vapor, liquid**
 - None
50. A _____ incorporates a firebox or furnace in order to burn the fuel and generate heat.
- Steam
 - **Boiler**
 - Hydrogen
 - None
51. The generated heat is transferred to water to make _____ the process of boiling.
- **Steam**
 - Boiler
 - Both
 - None

52. Steam is regularly used for propulsion (as a driving force) in applications such as _____ turbines.
- Gas turbine
 - **Steam turbine**
 - Water turbine
53. Steam Boilers is used in _____ industries
- Heating Requirement for Facility.
 - Steam for Batching.
 - Steam for Processing.
 - **All of the above**
54. Industrial boilers are closed vessels that use a fuel source or electricity to generate _____ for industrial purposes.
- Fuel
 - Food
 - **Steam**
55. Basic Parts of a Boiler.
- Burner,
 - the combustion chamber,
 - the heat exchanger
 - **All of the above**
56. Boiler water pH refers to a quantitative figure that expresses the acidity or alkalinity of boiler water. Ideally it should be between
- **8.5 to 9.5**
 - 7.5 to 8.5
 - 9.5 to 10.5
57. Steam Properties and Qualities:
- they are capable of dividing and renewing themselves for long periods
 - they are unspecialized
 - they can give rise to specialized cell types.
 - **All of above**
58. On mollier chart ,free expansion or throttling process from High pressure to atmosphere is represented by
- **Horizontal straight line**
 - Vertical straight line
 - Straight inclined line
 - Curved line
59. What is the function of boiler?
- To burn the fuel in a confined closed system
With the supply of air
 - To generate steam in varying pressure
 - **To generate steam at constant pressure**
 - To produce flue gases by burning fuel at a given pressure
60. What is the temperature at which the steam boiler are capable to withstand
- 200°C
 - 280°C
 - **540°C**
 - 358°C
61. What increase as steam pressure increase inside a boiler
- Force

- **Density**
 - Rate of steam conversion
 - Viscosity
62. In what is water in high pressure boiler circulated through?
- Conduits
 - Cove
 - Channel
 - **Tubes**
63. Why single boiler unit per turbine is equipped commonly?
- **For better turbine control**
 - To reduce the cost
 - For overcoming losses of power
 - To improve the efficiency
64. Cornish boiler is an example of which types of boiler?
- **Fire tube boiler**
 - Water tube boiler
 - Vertical tube boiler
 - Extremally fired boiler
65. Which of these is a stationary boiler?
- Locomotive boiler
 - Marine boiler
 - Mobile boiler
 - **Babcock Wilcox boiler**
66. What is the steam pressure limit of natural circulation Boiler?
- 650 bar
 - **180 bar**
 - 400 bar
 - 550 bar
67. A device known as a _____ is used to release condensate from the pipework whilst preventing the steam from escaping from the system.
- a. **Steam traps**
 - b. Steam pipes
 - c. Boiler nose
 - d. Release valve
68. Which of these is a 'fissile fuel'?
- a. **Thorium**
 - b. Carbon
 - c. Potassium
 - d. Graphite
69. What kind of energy output is obtained from a 'Steam Power Plant'?
- a. Heat energy
 - b. Sound energy
 - c. **Electricity**
 - d. Thermal energy
70. Water that is fed back to the boiler by the pump is called?
- a. Absorber
 - b. Absolute
 - c. Compressor
 - d. **Condensate**

71. Which of these is an output of a 'Furnace'?
- Fuel gas
 - Cool Air
 - Flue gases**
 - Water Vapor
72. The product of efficiency & heat transferred to the working fluid is?
- Net temperature change
 - Net work done**
 - Net enthalpy change
 - None of the mentioned
73. Rankine cycle efficiency in a good steam power station may be in the range between.....
- 15% - 20%
 - 35% - 40%**
 - 50% - 60%
 - 90% - 95%
74. The following is the correct order of energy conversion in thermal power plants
- Chemical energy – Mechanical energy – Electrical energy**
 - Mechanical energy – Chemical energy – Electrical energy
 - Wind energy – Mechanical energy – Electrical energy
 - Heat energy – Electrical energy – Mechanical energy.
75. Feed water usually at..... °C temperature.
- 70
 - 120
 - 1000
 - 80**
76. If the water level inside the boiler were not carefully control cased...
- explosion
 - overheat and fail
 - both a) & b)**
 - None of above
77. when steam is condensate volume is drastically.....
- reduces**
 - increase
 - both a) & b)
 - None of above
78. Following image shows part of.....



- compressor
 - separator**
 - steam tube
 - boiler shell
79. Direct relation between..... &.....of saturated steam, the amount of energy input to process easy to control.
- volume, pressure
 - volume, temperature
 - temperature, pressure**
 - None of above
- 80..... is excellent carrier of heat

- a) Water
c) solid
- b) steam**
d) None of above

81. A steam and condensate system represents a _____ loop.
- Discontinuous
 - **Continuous**
 - None of the above
 - All of the above
82. Once the condensate reaches the _____, it becomes available to the boiler for recycling.
- Condenser
 - Turbine
 - **Boiler**
 - Generator
83. A boiler or steam generator is a device used to create steam by applying heat energy to _____.
- **Water**
 - Petrol
 - Oil
 - All of the above
84. Which of the following is not a type of boiler?
- Fire tube boiler
 - Water tube boiler
 - Cast iron boiler
 - **Hot water boiler**
85. Which of the following is the combustion accessory of a boiler?
- Fuel oil system
 - Gas system
 - Coal system
 - **All of the above**
86. Find the wrong statement.
- Boiler is used to produce electricity in the energy business.
 - Boiler is used to produce steam for generating electricity.
 - **Boiler can pressurize the water and can also evaporate it.**
 - All are wrong.
87. When the bubbles of steam are produced?
- **Once the water reaches saturation temperature**
 - Once the water starts evaporating
 - Once the temperature decreases
 - None of the above
88. If steam is pressurized _____
- It occupies more space
 - **It occupies less space**
 - Both are correct
 - None of the above
89. Combustion air positive shut-off shall be provided on all newly installed _____
- a. Grant boilers
 - b. Process boilers**
 - c. Worcester boilers

- d. All of the above
90. Process boilers with capacity of 2.5 MMBtu/h and above are also referred as _
- Natural draft boilers**
 - Atmospheric boilers
 - Both a. And b.
 - None of the above
91. A flue damper and a vent damper are two examples of _____
- Combustion air positive shut off devices**
 - Combustion air negative shut off devices
 - Both a. & b.
 - None of the above
92. For process boilers , combustion air fans must meet the following requirements ____
- The fan motor shall be driven by a variable speed drive
 - The fan motor shall include controls that limit the fan motor demand to no more than 30 %.
 - Both a. & b.**
 - None of the above
93. Use of _____ is prohibited in process boilers.
- Use of a common gas
 - combustion air control linkage
 - jack shaft
 - All of the above**
94. Oxygen trim control strategy ____
- continuously measures the oxygen content in the flue gas
 - adjusts the combustion air flow
 - Continually tuning the air-fuel mixture.
 - All of above**
95. It is easy to detect and monitor excess air
- As oxygen not used for combustion is heated and discharged with the exhaust gases.**
 - Oxygen is discharged without heating
 - Both a. & b.
 - None of above
96. Detecting and monitoring carbon monoxide assures the air/fuel ratio is not too rich as
- The excess air is trimmed**
 - Excess air is let out
 - Both a. & b.
 - None of above
97. Based on the exhaust gas analysis, a controller maintains stoichiometric combustion ____
- by commanding a servo motor to adjust the combustion air damper
 - By commanding servo motor to adjust the fuel supply valve.
 - Both a. & b.**
 - None of the above.
98. Combustion is the ideal air/fuel ratio where
- the mixing proportion is correct,
 - the fuel is completely burned
 - the oxygen is entirely consumed
 - All of the above**
99. Green coal, in order to be burnt, must be
- (A) Heated sufficiently

(B) Burnt in excess air

(C) Heated to its ignition point

(D) Burnt as powder

100. A safety valve usually employed with stationary boilers is

(A) Lever safety valve

(B) Dead weight safety valve

(C) High steam and low water safety valve

(D) All of these

101. The relative heat absorption for successively added equal areas of boiler convection heating surfaces_____

(A) Increases

(B) Decreases

(C) Remain unaffected

(D) First increases and then decreases

102. The pressure of steam in the engine cylinder at the beginning of the stroke is _____ the boiler pressure.

(A) Equal to

(B) Less than

(C) Higher than

(D) None of these

103. Adiabatic process is

(A) Essentially an isentropic process is_____

(B) Non-heat transfer process

(C) Reversible process

(D) Constant temperature process

104. Presence of moisture in fuel oil would

(A) Keep the burner tips cool

(B) Aid in proper combustion

(C) Because sputtering, possibly extinguishing flame

(D) Clean the nozzles

105. In a steam condenser, the partial pressure of steam and air are 0.06 bar and 0.007 bar respectively. The condenser pressure is

(A) 0.007 bar

(B) 0.053 bar

(C) 0.06 bar

(D) 0.067 bar

106. Find false statement about effect of sulphur in fuel?

(A) It has heating value

(B) It helps in electrostatic precipitation of ash in flue gases

(C) It leads to corrosion of air heaters, ducting, etc. if flue gas exit temperature is low

(D) It erodes furnace walls

107. The isentropic enthalpy drop in moving blade is two-third of the isentropic enthalpy drop in fixed blades of a turbine. The degree of reaction will be

(A) 0.4

(B) 0.56

(C) 0.67

(D) 1.67

108. A turbine is said to have an axial discharge when the steam leaves the blade tip at _____ to the direction of the blade motion.
- (A) 60°
 - (B) 90°**
 - (C) 180°
 - (D) 270°
109. Which of the following is not a result of the excess of impurity in boiler-feed.
- a) Scale and sludge formation
 - b) Decomposition**
 - c) Corrosion, priming and foaming
 - d) Caustic embrittlement
110. If the precipitate formed is soft, loose and slimy, these are _____ and if the precipitate is hard and adhering on the inner wall, it is called _____
- a) Sludges, scale**
 - b) Scale, sludges
 - c) Sludges, rodent
 - d) Scale, rodent
111. Which of the following option is incorrect about the sludges?
- a) Sludges are soft, loose and slimy precipitate
 - b) They are non-adherent deposits and can be easily removed
 - c) Formed generally at heated portions of the boiler**
 - d) Can be removed by blow down operation
112. The propulsion of water into steam drum by extremely rapid, almost explosive boiling of water at the heating surface is called _____
- a) Foaming**
 - b) Priming**
 - c) Corrosion
 - d) Caustic embrittlement
113. The phenomenon during which the boiler material becomes brittle due to accumulation of caustic substances is known as _____
- a) Foaming
 - b) Priming
 - c) Corrosion
 - d) Caustic embrittlement**
114. Foaming is caused by the formation of _____
- a) Acids
 - b) Alcohols
 - c) Oils and alkalis**
 - d) Ketones
115. Boiler is a enclosed vessel that provides
- a) Expansion
 - b) Ignition
 - c) Combustion**
 - d) None of the above
116. High pressure boilers operate at
1. Lower than 15 psig
 2. **Higher than 15 psig**
 3. 15 psig

4. None of above
117. Boiler works from application of which type of energies
 1. Fuel combustion
 2. Electricity
 3. Nuclear energy
 4. **All of above**
118. Combustion of which fuels from following is source of heat for boiler
 1. Wood
 2. Coal
 3. Oil
 4. **All of above**
119. Boilers are used in places like
 1. Domestic heating
 2. Commercial heating
 3. Industrial heating application
 4. **All of above**
120. Type of Lamont boiler is _____
 - a. **Forced circulation**
 - b. Natural circulation
 - c. Over-through
 - d. Positive forced circulation
121. What is called as the heart of the Lamont boiler?
 - a. Water drum
 - b. **Centrifugal pump**
 - c. Furnace
 - d. Blower
122. Through what is feed water from hot-well is passed through, before entering steam and water drum in Lamont boiler?
 - a. Evaporator tubes
 - b. **Economizer**
 - c. Distributor header
 - d. Circulating pump
123. In what form are the boiler tube arrange in Lamont boiler ?
 - a. Parallel in vertical
 - b. Inclined vertically
 - c. **Parallel in horizontal**
 - d. Horizontally inclined
124. Through which does the even circulation of water is possible in Lamont boiler ?
 - a. **Nozzles**
 - b. Water trough
 - c. Feed pump
 - d. Hose
125. What is the pressure range between which Lamont boiler operator ?
 - a. 80-120 bar
 - b. **120-160 bar**
 - c. 180-360 bar
 - d. 450-560 bar
126. In which year was Lamont boiler invented?
 - a. 1905
 - b. 1910
 - c. 1920

d. 1925

127. What type of steam is generated by evaporator tube of Lamont boiler ?
- a. **Saturated steam**
 - b. Unsaturated steam
 - c. Superheated steam
 - d. Flash steam
128. Where is water steam separator drum located in Lamont boiler ?
- a. Inside of the boiler
 - b. Right above the furnace
 - c. Before the feed water pump
 - d. Outside the boiler**
129. What is the main disadvantage of Lamont boiler ?
- a. Less flexible in design
 - b. Low heat transfer rate
 - c. Formation of bubbles**
 - d. Low steam generation capacity

1.2 Introduction to ultra-supercritical boiler

130. A supercritical boiler is one that operates above the pressure and temperature of following values
- a) 100 kg/cm² and 540°C
 - b) 1 kg/cm² and 100°C
 - c) 218 kg/cm² abs and 373°C**
 - d) 218 kg/cm² abs and 540°C
131. Steam is generated in a _____ boiler at a pressure above the critical point.
- a) Simple
 - b) once through
 - c) Superficial**
 - d) thrice through
132. Apart from feed heating, what should a plant have to obtain a gain in thermal efficiency?
- a) Lubrication
 - b) Differential heating
 - c) Reheating cycles**
 - d) Regenerative cycles
133. What is the critical point of steam generation in a “once through” boiler?
- a) 221.5 bar
 - b) 221.4 bar
 - c) 221.3 bar
 - d) 221.2 bar**
134. In a typical layout of a 215MW reheat power plant, the feed in the boiler is at?
- a) 280 degree Centigrade
 - b) 230 degree Centigrade
 - c) 238 degree Centigrade**
 - d) 250 degree Centigrade
135. The input to the low pressure feed water heater is from?
- a) Drain heater
 - b) Drain cooler**
 - c) Drain pipe
 - d) None of the mentioned
136. In which year was Benson boiler was invented?

- a) 1918
- b) 1920
- c) 1921
- d) 1922**

137. What type of boiler is a Benson boiler?

- a) Super critical boiler**
- b) Fire tube boiler
- c) Natural circulation boiler
- d) Over-through boiler

138. What is the capacity of Benson boiler?

- a) 180 tonnes/hr & above
- b) 150 tonnes/hr & above**
- c) 250 tonnes/hr & above
- d) 300 tonnes/hr & above

139. What is the major disadvantage of the Benson boilers?

- a) Boiler is big in size
- b) Has large storage capacity
- c) Deposition of salts**
- d) Bubble formation

140. The increment in thermal efficiency compared to the corresponding Subcritical cycle is gained at the expense of?

- a) compactness of the plant
- b) simplicity of the plant
- c) complexity of the plant**
- d) expense of the plant

141. The input to the low pressure feedwater heater is from?

- a) Drain heater
- b) Drain cooler**
- c) Drain pipe
- d) None of the mentioned

142. Supercritical boiler generate ___ to ___ pressure.

- a) 22Mpa to 25Mpa**
- b) 28Mpa to 20Mpa
- c) 23Mpa to 27Mpa
- d) 25Mpa to 28Mpa

143. supercritical boiler are use of.....

- A. Thermal power.
- B. Electric power**
- C. Solar power.
- D. Steam power

144. Which type of boiler is used critical pressure.....

- A. Benson boiler.**
- B. Water tube boiler.
- C. Fire tube.
- D. Steam boiler

145. Who patent design for boiler.

- A. Mark Benson.**
- B. Mark Zuckerberg
- C. Newton.
- D. C.N. Rao

145. Which of the following needs to be incorporated to prevent the low pressure turbine exhaust wetness from being excessive?

- a) Double regeneration
- b) Double carbonization
- c) Double reheat**
- d) Double cooling

146. A ultra-super critical boiler operates at.....

- a) **Ultra-Supercritical pressure**
- b) Thermal pressure
- c) Critical pressure
- d) Atmospheric pressure

147. _____ terms are used to describe supercritical and ultra-supercritical coal generation by the coal industry.

- (a) **High- efficiency and low -emissions**
- (b) Low-efficiency and high- emissions
- (c) High-efficiency and high- emissions
- (d) Low-efficiency and low-emissions

148. In 1922, _____ was granted a patent for a boiler designed to convert at high pressure.

- (a) **Mark Benson**
- (b) James Watt
- (c) Alexander Graham Bell
- (d) Archimedes

150. What was the main concern behind Benson's concept ?

- (a) **Safety**
- (b) power generation
- (c) conversation of energy
- (d) (All of the above)

151. The subcritical temperature is _____.

-) a. Up to 809 F and 221.2 bar
-) **b (Up to 705F and 221. 2bar)**
-) c. (Up to 900 F and 344.3 bar
-) d. (Up to 605F and 216. 3bar

152. Ultra-supercritical temperature is up to _____.

- a)). **1,400 °F**
-) b .(2,000 °F
-) c .(1,600 °F
-) d .(1,800 °F

153. Which of these is not a type of steam generator depending upon the kind of applications?

-) a) utility steam generators
-) b) marine steam generators
-) **c) agricultural steam generators**
-) d) industrial steam generators

154. The subcritical steam generators operate between a pressure ranges of?

-) a) 120-160 bar
-) b) 100-110 bar
-) **c) 130-180 bar**
-) d) 140- 200 bar

155. Industrial steam generators operate at a steam capacity of?

-) a) 1300 kg/s
-) b) 1000 kg/s
-) c) 500 kg/s
-) **d) 125 kg/s**

156. Ultra-super critical boiler uses steam with very high temperature up to

- a) 980°
- b) 620°**
- c) 550°

- d) 720°
157. A ultra-super critical boiler generates less emission per.....of power output.
- Kilowatt
 - Watt
 - Megawatt**
 - Metric horse power
158. A ultra-super critical boiler was developed in the US in
- 1950s**
 - 1970s
 - 1960s
 - 1940s
159. Philo unit 6 in ohio was built by
- Thomas Savery
 - Denis Papin
 - Thomas Edison
 - Babcock and Wilcox**
160. If has a future, then ultra-super critical boiler will be the key.
- Coal**
 - Fossil fuels
 - Natural gas
 - Oil
161. A ultra-super critical boiler technology is today the option of choice for most new..... fired power stations.
- Coal**
 - Natural gas
 - Biogas
 - Oil
162. In ultra-super critical boiler technology the units run at about efficiency.
- 40%
 - 50%
 - 55%
 - 45%**
163. Yuhuan has first 1000MW ultra-super critical pressure boiler.
- America
 - China**
 - India
 - Russia
164. Which type of generator is a type of boiler that at maximum critical pressure frequently used in the production of electric power.
- Supercritical boiler**
 - High pressure boiler
 - Low pressure boiler
 - None
165. Ultra supercritical boilers are mostly used in
- Petrochemical industries
 - Coal industries**
 - Textile industries
 - none
166. Supercritical is ___% efficient than subcritical boiler.
- 42-47**
 - 50-55
 - 32-38

- d. More than 60
167. Find false statement
- Tube of supercritical boilers are self-supporting
 - Corners are easy to form
 - Uniform heating of water takes place in supercritical boiler occurs**
 - All
168. State disadvantage of Supercritical boiler.
- Corrosion problem
 - Setting of material in feed lines can produce explosions
 - Leakage problem
 - All**
169. What type of boiler is supercritical boiler
- Drum type
 - Once through type**
 - Both
 - None
170. A ultra-supercritical steam generator operates at pressures above the critical pressure-
- 2400 psi
 - 1500 psi
 - 3200 psi**
 - 4600 psi
171. The point of ultra-supercritical steam generator is to save on coal to heat the water and reduce _____ emissions.
- Oxygen (O₂)
 - Water (H₂O)
 - Carbon dioxide (CO₂)**
 - Both 'a' and 'c'
172. Because less coal is consumed in this system, emissions of _____ and particulate and solid waste by products are reduced.
- Sulphur dioxide (SO₂)
 - Nitrogen oxide (NO_x)
 - Carbon dioxide (CO₂)
 - All of the above.**
173. Higher plant efficiency up to _____ over the entire load range.
- 30%-50%**
 - 20%-40%
 - 60%-90%
 - 50%-80%
174. The world's first boiler using supercritical technology was introduced by "B&W" in _____
- 1948
 - 1936
 - 1928
 - 1957**
175. The thermal efficiency of a Watt's Beam Engine is about?
- 50%
 - 100%
 - 5%
 - 2%**
176. Among which locomotive steam engines have the highest efficiency?
- 1 MW
 - 2 MW

- c) 30 MW
- d) 660 MW**

2.3 Hyperbolic Cooling towers

177. Which of the following is the simplest method of cooling the condenser water?

- A) Spray cooling pond**
- B) Cooling tower
- C) Indirect air cooling
- D) Hyperbolic cooling tower

178. Open cooling system is also called as _____

- A) parallel system
- B) once through system**
- C) air based system.
- D) non-reversible system

179. What type of cooling system is used in the large power plants?

- A) Cooling ponds
- B) Natural flow system
- C) Cooling towers.**
- D) Single deck system

180. Wet cooling towers (or open circuit cooling towers) operate on the principle of

- A) Condensation.
- B) Evaporative cooling**
- C) Both of the above
- D) None of the above

181. How does outside air enter into the wet cooling system?

- A) Air vents
- B) Louvers.**
- C) Tuyeres
- D) Vacuum

182. How is water circulated throughout the dry cooling tower system?

- A) Finned tubes.**
- B) Metal pipes
- C) Porous tubes.
- D) Swirling tubes

183. Why is exhaust steam coming out of turbine is admitted to a steam header?

- A) To increase the pressure.
- B) To decrease the velocity
- C) To decrease the pressure drop.**
- D) To control the pollution

184. How is air produced in mechanical draught cooling tower?

- A) Air Tuyeres.
- B) Propeller fans**
- C) Air blowers.
- D) Louvre

185. Hyperbolic cooling towers generally used in the

- a) Steel industry
- b) Fertilizer industry

- c) Alumina industry
d) Power industry
186. Design of hyperbolic cooling tower standard for all _____ cooling tower
 a) Mechanical draft
b) Natural draft
 c) Both a & b
 d) Neither a & b
187. Beams of hyperbolic cooling towers are made up of
 a) Tungsten
 b) Iron
c) Stainless steel
 d) Brass
188. Natural draft in hyperbolic cooling towers reduces _____ of fans
 a) Damage
 b) Efficiency
c) Cost
 d) Speed
189. Hyperbolic design allows for use of _____ without sacrificing structural integrity
a) Minimum material
 b) Maximum material
 c) High quality material
 d) Low quality material
190. Following is not the advantage of hyperbolic design
 a) Less maintenance cost
b) Less initial cost
 c) Less noise
 d) All of the above
191. Following is advantage of hyperbolic design
 a) Less initial cost
b) Less noise
 c) Less vibration
 d) All above
192. Hyperbolic cooling towers used in
 a) Coal-fired power plant
 b) Nuclear plants
 c) Thermal power plant
d) All of these
193. Natural draft in hyperbolic cooling tower is used for production of
 a) Fertilizer
 b) Steel
 c) Chemical
d) Electrical energy
194. When vapour is cooled at constant total system volume, the _____ changes.
 A Volume. **B PRESSURE**
 C Temperature. D None of the mentioned.
195. Approximately about _____ of cooling in cooling tower is through
 The sensible cooling
 A 5% **B 80%**

- C 20% D 40%
196. Condensation starts at _____ point.
 A **Dew** B Bubble
 C Triple D none of the mentioned
197. In which type of cooling system are nozzle arranged on different elevation?
 A Single deck system B **Double deck system**
 C Natural flow system D Direct flow system
198. The exhaust steam coming out of turbine is admitted to a steam header to
 A **Increase the pressure** B decrease the pressure
 C decrease the pressure drop D control the pollution
199. Wet cooling towers operate on the principle of
- A Condensation. B **Evaporative Cooling**
 C Both of the above D None of the above
200. The open cooling is also called as?
 A Parallel system B **Once through system**
 C Air based system D Nonreversible system
201. .How does outside air enter into the wet cooling system?
 A Air vents B **Louvers.**
 C Tuyeres D Vacuum
202. Which one of the following the maximum effect on cooling tower performance
 A **Fill media** B Drift
 C Lourvers D Casing
203. How many number of spray nozzle does each module on spray pond cooling system contain?
 a. 1
 b. 2
 c. 3
 d. **4**
204. Which of the following is the simplest method of cooling the condenser water?
 a. **Spray cooling pond**
 b. Cooling tower
 c. Indirect air cooling
 d. Hyperbolic air cooling
205. In which type of cooling pond system are nozzles arranged on same elevation?
 a. **Single deck system**
 b. Double deck system
 c. Natural flow system
 d. Direct flow system
206. What are used in the direct flow system to transfer the pond batch uniting at intake?
 a. Separators
 b. Filters
 c. **Baffle walls**
 d. Porous pipes
207. What type of cooling system is used in the large power plants?
 a. Cooling ponds
 b. Natural flow system
 c. **Cooling towers**
 d. Single deck system
208. How is water circulated throughout the dry cooling tower system?
 a. **Finned tubes**
 b. Metal pipes

- c. Porous tubes
 - d. Swifiting tubes
209. Which of the following gives out highest pollutants to the atmosphere
- 1 cooling tower
 - 2 water tower
 - 3 steam tower**
 - 4 fire tower
210. What come out from the the cooling tower of a nuclear power plant
- 1 smoke**
 - 2 cool air
 - 3 hot air
 - 4 none of theses
211. What are built to cool down the cooling water in a power plant
- 1 Towers**
 - 2 Cooling pond
 - 3 Air filter
 - 4 non of these
212. What are present depend on cooling tower building material as well
- 1 pollution**
 - 2 population
 - 3 dust
 - 4 none of these
213. Why is exhaust system coming out of the turbine is admitted to a steam header
- 1 to increase the pressure**
 - 2 to increase the velocity
 - 3 to decrease the pressure
 - 4 to increase the velocity
214. Which of the following is a fissile fuel
- 1 carbon
 - 2 potassium
 - 3 thorium**
 - 4 graphite
215. How is air produced in mechanical cooling tower
- 1 air fan
 - 2 propeller fans**
 - 3 air blowers
 - 4 propeller blowers
216. _____ cooling towers use a process similar to the one found in small evaporative cooling units.
- a. Hyperboloid**
 - b. Tower
 - c. Condensate loop
 - d. None
217. Hyperboloid cooling towers have become the design standard for all _____draft cooling towers because of their structural strength and minimum usage of material.
- a. Natural**
 - b. Induce

- c. Force
d. None
218. The hyperboloid shape also aids in accelerating the upward convective air flow, improving _____ efficiency.
- Heating
 - Warming
 - Cooling**
 - Cold
219. The _____ that are present depend on cooling tower building material, as well. Cooling towers are built of concrete, wood, plastic or metal.
- Heat
 - Pollutants**
 - Cold
 - All of Above
220. There are _____ main types of cooling towers that are defined by how water or air passes through them.
- One
 - Two
 - Three**
 - Four
221. A _____ is a specialized heat exchanger in which air and water are brought into direct contact with each other in order to reduce the water's temperature.
- Cooling tower**
 - Heating tower
 - Both
 - All are wrong
222. How can we increase the efficiency of a cooling tower?
- Save energy.
 - Reduce the amount of water being consumed.
 - Decrease the amount of chemicals required for water treatment.
 - All of above**
223. There are two huge cooling towers close to building site of reactor ___ and ___ of the Chernobyl Power Plant.
- 1&3
 - 4&5**
 - 2&5
 - 1&4
224. Cooling towers vary in size from small roof-top units to very large hyperboloid structures that can be up to _____ meters tall and _____ meters in diameter, or rectangular structures that can be over 40 meters tall and 80 meters long.
- 200&100**
 - 100&50
 - 200&50
 - 200 &150
225. How do you service a cooling tower?
- Ensure Proper Airflow.
 - Clean Your Tubes.
 - Inspect the Water Pump.

- **All of above**
226. The hyperboloid shape also aids in accelerating the upward convective air flow, improving _____ efficiency.
- Performance
 - **Cooling**
 - Heating
 - All of the above
227. _____ Cooling towers have become the design standard for all natural-draft cooling towers because of their structural strength and minimum usage of material.
- HCT
 - CCT
 - **Hyperboloid**
 - None
228. The pollutants that are present depend on _____ building material, as well.
- **Cooling tower**
 - Water tower
 - Steam tower
 - Fire tower
229. The presence of these pollutants can cause a series of problems. The main problems that are caused _____
- are fouling,
 - limestone formation,
 - corrosion and biological
 - **All of the above**
230. Most **cooling towers** are capacity rated at a "standard" **wet bulb temperature** of ___of
- 72°F
 - 52°F
 - **78°F**
 - 75°F
231. When sizing a cooling tower the highest anticipate _____ should be used?
- Dry bulb
 - **Wet bulb**
 - Both dry and wet bulb
 - None of the above
232. In _____ cooling tower there is no direct contact between the water and Air.
- Dry type
 - Evaporative type
 - Once through
 - **All of the above**
233. In cooling tower ,higher temperature _____ corrosion potential
- Decrease
 - **Increase**
 - Temperature has no effect on corrosion
234. Which of the following faction affect the cooling tower performance?
- The range
 - Heat load
 - Wet bulb temperature
 - **All of the above**

235. In which system is Cooling of hot water is done on tray as step by?
- Mechanical draught cooling system
 - Hyperbolic cooling tower
 - Atmospheric cooling tower**
 - Wet cooling tower
236. How does the flow of air occur in natural draught cooling towers?
- Natural pressure head density between cold outside air and humid inside air**
 - Variation in pressure of both cold outside air and humid inside air
 - Due to the given air vents and vacuum ports
 - Because of difference in the volume of both the of airs
237. The first hyperboloid shaped cooling tower was introduced by the Dutch engineers Frederik van Iterson and Gerard Kuypers and built in
- 1918**
 - 1870
 - 1919
 - 1920
238. Hyperbolic cooling towers are made up of high height reinforcedstructure.
- plastic
 - alloy
 - metal
 - concrete**
239. The hyperbolic cooling towers are associated with and power plants.
- electrical, thermal
 - nuclear, electrical
 - thermal, nuclear**
 - none of above
240. Wind is the prime lateral load and its combination with self-weight of the tower shell can cause the buckling instability leading tofailure.
- polytropic
 - both a) & b)
 - catastrophic**
 - none of above
241. Cooling efficiency of a cooling tower is significantly affected under cross-wind condition and might decrease to..... in the range of moderate to high wind velocity condition.
- 50%
 - 75%**
 - 25%
 - 90%
242. The-induced response of cooling tower is the key factor to improve safety and to reduce tower crack.
- wind**
 - water
 - heat
 - steam
243. Wind load analysis can be performed following methods.
- experiments wind pressure coefficient
 - shape factors
 - wind-induced vibration coefficient
 - all of above**
244. Theused to improve the stability of the total structure HCT.
- concrete material
 - stiffening rings**
 - wind properties
 - functional structure
245. For achieving maximum buckling stability use.....parameters.
- location
 - dimensions
 - quantity
 - All of above**
246. Natural draft cooling towers are mainly used in the _____.
- Steel industry
 - Fertilizer industry
 - Alumina industry

- **Power stations**

247. A better indicators for cooling tower performance is _____.

- Wet bulb temperature
- Dry bulb temperature
- Range

- **Approach**

248. Cooling tower effectiveness is the ratio of _____.

- **Range/(range + approach)**
- Approach/(range + approach)
- Range/ Approach
- Approach/ Range

249. The cooling water reduces the water temperature close to _____.

- Dry bulb temperature
- **Ambient wet bulb temperature**
- Dew point temperature
- None of the above

250. The ratio of dissolved solids in circulating water to dissolved solids in makeup water is called.

- Liquid gas ratio
- **Cycle of concentration**
- Cooling tower effectiveness
- None of the above

251. Which one of the following is true to estimate the range of cooling tower?

- Range = Cooling water inlet temperature- wet bulb temperature
- Range = Cooling water outlet temperature- wet bulb temperature
- **Range = heat load in kcal per hour / water circulation in liters per hour**
- None of the above

252. Which one of the following fill material is more energy efficient for cooling towers in case of sea water cooling?

- Splash fill
- **Film fill**
- Low clog film fill
- None of the above

253. L/G ratio in a cooling tower is a ratio of _____.

- Length and girth
- Length and temperature gradient
- **Water flow rate and air mass flow rate**
- Air mass flow rate and water flow rate

254. Normally the guaranteed best approach a cooling tower can achieve is _____.

- 5°C
- 12°C
- 8°C
- **2.8°C**

255. Hyperbolic cooling towers have become design standard for all natural draft towers because

- a. Their structural strength

- b. Minimum usage of material.
 - c. Improving cooling efficiency
 - d. All of the above.**
256. Common applications of Cooling towers include
- a. Cooling the circulating water used in oil refineries
 - b. petrochemical and other chemical plants
 - c. thermal power stations
 - d. All of the above.**
257. The hyperboloid cooling towers are often associated ____
- a. with nuclear power plants
 - b. Used in some coal-fired plants
 - c. In some large chemical and other industrial plants.
 - d. All of the above.**
258. _____ type of cooling towers are structurally strong.
- a. Counter flow towers
 - b. Hyperbolic towers**
 - c. Cross flow towers
 - d. None of the above
259. Which type of cooling towers operate through a chimney or stack ____
- a. Cross flow
 - b. Counter flow
 - c. Hyperbolic**
 - d. All of above
260. Hyperbolic cooling towers are also referred as
- a. Natural draft towers
 - b. Cross flow towers
 - c. Hyperboloid towers**
 - d. None of the above
261. _____ type of cooling towers are used with nuclear power plants.
- a. Cross flow
 - b. Natural draft
 - c. Hyperbolic**
 - d. None of above
262. Improved cooling efficiency and minimum usage of material are the key features of _____
- a. Natural draft cooling towers
 - b. Cross flow towers
 - c. Hyperbolic cooling**
 - d. All of above
263. The first hyperbolic cooling tower was built in...
- a. 1916
 - b. 1917
 - c. 1918**
 - d. 1919
264. Thermal efficiencies up to.....have been observed in hybrid cooling towers
- a. 92**
 - b. 82
 - c. 72
 - d. 62
265. In which system is Cooling of hot water is done on tray as step by?

- a. Mechanical draught cooling system
- b. Hyperbolic cooling tower
- c. Atmospheric cooling tower**
- d. Wet cooling tower

266. Which of the following is the simplest method of cooling the condenser water?

- **Spray cooling pond**
- Cooling tower
- Indirect air cooling
- Hyperbolic cooling tower

267. Natural Draft or Hyperbolic towers have been used for

- **Large Capacity of water**
- Small Capacity of Water
- High Efficiency
- Low capital cost

268. Why is exhaust steam coming out of turbine is admitted to a steam header?

- a) To increase the pressure
- b) To decrease the velocity
- c) To decrease the pressure drop**
- d) To control the pollution

269. In which system is Cooling of hot water is done on tray as step by?

- a) Mechanical draught cooling system
- b) Hyperbolic cooling tower
- c) Atmospheric cooling tower**
- d) Wet cooling tower

270.. How does the flow of air occur in natural draught cooling towers?

- a) Natural pressure head density between cold outside air and humid inside air**
- b) Variation in pressure of both cold outside air and humid inside air
- c) Due to the given air vents and vacuum ports
- d) Because of difference in the volume of both the of airs

271. How is air produced in mechanical draught cooling tower?

- a) Air Tuyeres
- b) Propeller fans**
- c) Air blowers
- d) Louvre

272. Why is induced draught considered better than the forced draught?

- a) Because power requirement is high for forced draught**
- b) Maintenance of induced draught fan is costlier
- c) Forced draught is less efficient
- d) Forced draught produces less amount of speed of air

273. Natural draft cooling tower are mainly used in

- a) Steel Industry
- b) Alumina industry
- c) Fertilizer industry
- d) Power station**

274. Cooling tower effectiveness is the ratio of

- a) Range/(Range + approach)**
- b) Approach/(range + approach)
- c) Range /(range - approach)

- d) Approach/ (range - approach)
275. Which one of the following is true to estimate the range of cooling tower?
- Range = cooling water inlet temperature – wet bulb temperature
 - Range = cooling water outlet temperature – wet bulb temperature
 - Range = heat load in kcal per hour / water circulation in lines per hour**
 - None of the above
276. The ratio of dissolved solids in circulating water to the dissolved solids in makeup water is called
- Liquid gas ratio
 - Cycle of concentration**
 - Cooling tower effectiveness
 - None of the above
278. Cooling tower is a _____ device
- Heat absorption
 - heat rejection**
 - Both a and b
 - neither a nor b
279. In natural draft cooling tower the air flow is obtained by _____
- Difference in air pressure**
 - difference in air temperature
 - Difference in air speed
 - none of the above
280. In the natural draft cooling tower _____ is not required
- Fan**
 - tower
 - Nozzle
 - none of the above
281. Which among the following are the components of natural draft cooling tower
- Supply basin
 - reinforced concrete**
 - Hot water distribution
 - none of the above
282. Water lost in form of liquid droplet is called as _____
- Drift**
 - water loss
 - Water evaporation
 - none of the above
283. The effect that takes place which results in cooling action is
- Condensing
 - Heating
 - Cooling
 - Evaporating**
284. How many times year cooling water must be cleaned
- Once a year
 - Thrice a year
 - Twice a year**
 - Four times a year
285. How many times chlorination must be carried out for cooling towers
- Twice a year**
 - Once a year
 - Thrice a year
 - None of above
286. Cooling towers operate through a _____ process that efficiently cools the already cycled water to be reused.
- Heat exchange
 - Heat expand
 - Heat transfer**
 - None of above
287. In hyperboloid cooling towers the material is filled at
- Tower's bottom

2. **Tower's top**
 3. Near tower
 4. None of above
288. Pollution caused by cooling tower includes
1. Fouling
 2. Limestone formation
 3. Corrosion
 4. **All of above**

2.4 Waste Heat Recovery-Process Industry

289. Out of the following which one is not unconventional source of energy?
- (A) Tidal power
 - (B) Geothermal energy
 - (C) Nuclear energy**
 - (D) Wind power.
290. Pulverized coal is
- (A) Coal free from ash
 - (B) Non-smoking coal
 - (C) Coal which burns for long time
 - (D) Coal broken into fine particles.**
291. Heating value of coal is approximately in power plant
- (A) 1000-2000 kcal / kg
 - (B) 2000-4000 kcal / kg
 - (C) 5000-6500 kcal / kg**
 - (D) 9000-10,500 kcal / kg.
292. Water gas is a mixture of
- (A) CO₂ and O₂
 - (B) O₂ and H₂
 - (C) H₂, N₂ and O₂
 - (D) CO, N₂ and H₂.**
293. Coal used in power plant is also known as
- (A) Steam coal**
 - (B) Charcoal
 - (C) Coke
 - (D) Soft coal.
294. Which of the following is considered as superior quality of coal?
- (A) Bituminous coal**
 - (B) Peat
 - (C) Lignite
 - (D) Coke.
295. In a power plant, coal is carried from storage place to boilers generally by means of
- (A) Bucket
 - (B) V-belts**
 - (C) Trolleys
 - (D) Manually.
296. Live storage of coal in a power plant means

- (A) Coal ready for combustion
 (B) Preheated coal
(C) storage of coal sufficient to meet 24 hour demand of the plant
 (D) Coal in transit.
297. Pressure of steam in condenser is
 (A) Atmospheric pressure
 (B) More than atmospheric pressure
 (C) Slightly less than atmospheric pressure
(D) much less than atmospheric pressure.
298. Equipment used for pulverizing the coal is known as
(A) Ball mill
 (B) Hopper
 (C) Burner
 (D) Stoker
299. Major advantage of waste heat recovery in industry is:
 a) Reduction in pollution b) increase in efficiency
c) Both a & b d) none of the above
300. Heat recovery equipment will be most effective when the temperature of flue gas is:
 a) 250oC b) 200 oC **c) 400 oC** d) 280 oC
301. The waste gases coming out from gas turbine exhausts are of the order of:
a) 370-540 b) 450 – 700 c) 700-800 d) 250-440
302. Recuperated is used mainly as a waste heat recovery system in a _____.
 a) Boiler **b) Billet Reheating Furnace**
 c) Compressor d) None of the above
303. Recuperated will be more efficient if the flow path of hot and cold fluids is in:
 a) Co-current mode **b) Counter current mode**
 c) Cross current mode d) Cone of the above
304. The major limitation of metallic recuperated is -----
 a) Limitation of handling COx, NOx etc.
b) Limitation of reduced life for handling temperature more than 1000 oC
 c) Manufacturing difficulty of the required design
 d) None of the above
305. Ceramic recuperators can withstand temperatures up to:
 a) 600 oC **b) 1300 oC** c) 1700oC d) 950oC
307. Air preheater is not used as a waste heat recovery system in a _____.
 a) Boiler b) billet Reheating Furnace
 c) Heat treatment furnace **d) compressor**
308. Typical waste gases temperature from glass melting furnace
a) 1000-1550 oC b) 800-950 oC c) 650–750 oC d) 760-815 oC
309. Regenerator is widely used in:
 a) Reheating Furnaces b) heat treatment furnaces
 c) Baking Ovens **d) glass melting furnaces**
310. In a low to medium temperature waste heat recovery system which of the device is most suitable
 a) Economiser
b) Heat wheels
 c) air preheater
 d) Recuperator
311. Recovery of heat from dryer exhaust air is a typical application of:

- a) Waste heat recovery boiler
 - b) Heat pump
 - c) Heat wheel**
 - d) Economizer
312. Capillary wick is a part of
- a) heat pump
 - b) heat wheel
 - c) heat pipe**
 - d) regenerator
313. Economizer is provided to utilize the flue gas heat for ____
- a) preheating the boiler feed water**
 - b) preheating the stock
 - c) preheating the combustion air
 - d) preheating fuel
314. Recovery of waste heat from hot fluid to fluid is called:
- a) thermo compressor
 - b) waste heat recovery boiler
 - c) heat Pump**
 - d) economizer
315. Thermo-compressor is commonly used for
- a) compressing hot air
 - b) flash steam recovery**
 - c) distillation
 - d) reverse compression of CO₂
316. The exchanger typically used in the pressurizing section of a dairy plant is
- a) Plate heat exchanger**
 - b) Shell and tube exchanger
 - c) Run around coil exchanger
 - d) All of the above
317. Pick up the odd one out:
- b) Regenerator
 - c) Recuperator
 - d) Metallic recuperator
 - e) Economiser**
318. Energy recovery is typically via production of ____
- a) Gas
 - b) Heat
 - c) Light
 - d) Steam**
319. What is the maximum percent of energy recovered if the steam is condensed before reintroduced to system?
- a) 25
 - b) 35**
 - c) 45
 - d) 55
320. Which of the following industrial process uses waste as a fuel?
- a) Cement kilns**
 - b) Lead manufacturing
 - c) Acid manufacturing
 - d) Sulphur manufacturing
321. What is the combustion temperature range in cement kiln incineration?
- a) 1300-1600

b) 1350-1650

c) 1250-1450

d) 1235-1600

322. Non-volatile heavy metals in kiln are fixed into _____

a) Clinker's crystalline structure

b) Fumes

c) Solid lump

d) Slag

323. Which of the following waste types are not suitable for co-combustion in cement kilns?

a) Chlorine

b) Hydrogen

c) Calcium

d) Carbonate

324. A major advantage of waste heat recovery in industry is

a) Reduction in pollution

c) Increase efficiency

d) None of the above

325. Nellore to medium temperature waste heat recovery system the most suitable device is -----

a) Economizer

b) Heat wheels

c) Air preheater

d) Recuperate

d) Carbonate

326. Which of the following act regulates transportation of hazardous waste?

a) RCRA

b) CERCLA

c) NEPA

d) NPL

327. When was the first law regarding transportation of hazardous materials passed?

a) 1966

b) 1866

c) 1855

d) 1965

328. Which of the following statute made transportation of hazardous materials illegal?

a) 1869

b) 1870

c) 1871

d) 1872

329. Which of the following act improves regulatory and enforcement activities?

a) HMTA

b) DOT

c) ICC

d) NPL

330. A waste heat recovery system in industrial process has been key to reduce Consumption.

a) Coal

b) Fuel

c) Biogas

d) Oil

331. Heat loss can be classified into

- a) High temperature
 - b) Low temperature
 - c) Medium temperature
 - d) All of the above**
332. Heat recovery provides valuable energy sources and consumption.
- a) Reduce energy**
 - b) Increase energy
 - c) Increase fuel
 - d) Reduce fuel
333. Techniques of waste heat recovery
- a) Direct contact condensation
 - b) Indirect contact condensation
 - c) Transport membrane condensation
 - d) All of the above**
334. One of the key areas for energy saving in existing systems is waste heat recovery.
- a) Potential**
 - b) Kinetic
 - c) Thermal
 - d) Electrical
335. The biggest point sources of waste heat originate from production.
- a) Steel or Brass
 - b) Copper or Glass
 - c) Steel or Glass**
 - d) Steel or Copper
336. The system is suitable to recover heat from temperature exhaust gases .
- a) Medium-low
 - b) Medium-high**
 - c) High-low
 - d) High
337. The waste heat energy could be used to produce
- a) Cool air**
 - b) Hot air
 - c) Exhaust gas
 - d) All of the above
338. A waste heat recovery unit is an energy recovery heat exchanger that transfers heat from process outputs at
- a) High temperature**
 - b) Medium temperature
 - c) Low temperature
 - d) Both a & b
339. A waste heat recovery unit (WHRU) is an_____ that transfers heat from process outputs at high temperature to another part of the process for some purpose, usually increased efficiency.
- a. Energy recovery heat exchanger**
 - b. Energy recovery heat diffuser
 - c. Both 'a' and 'b'
 - d. None of the above
340. The waste heat recovery unit (WHRU) is a tool involved in _____.
- a. Regeneration
 - b. Cogeneration**
 - c. Both 'a' and 'b'
 - d. None of the above

341. Using an organic fluid that boils at a low temperature means that energy could be regenerated from waste fluids is known as _____.

- a. Heat exchanger
- b. Heat remover
- c. Heat pumps**
- d. Heat absorber

342. Traditionally, waste heat of low temperature range _____ has not been used for electricity generation despite efforts by ORC companies, mainly because the Carnot efficiency is rather low.

- a. 0-250 °C
- b. 0-150 °C
- c. 0-200 °C
- d. 0-120 °C**

343. What are the benefits or the advantages of waste heat recovery units (WHRU)?

- a. Reduced Pollution
- b. Reduced equipment sizes
- c. Reduced auxiliary energy consumption.
- d. All of the above**

344. A high temperature waste heat recovery unit consists of recovering waste heat at temperatures greater than _____.

- a. 200 °C
- b. 500 °C
- c. 300 °C
- d. 400 °C**

345. Types of waste heat exchanger are:

- a. Regenerative and recuperative burners
- b. Economizers
- c. Waste heat boilers
- d. All of the above**

346. Calculate the recoverable waste heat (Q, in kCal/hour) from flue gases using the following parameters: V (flow rate of the substance) 2000 m³/hr r (density of the flue gas): 0.9 kg/m³ Cp (specific heat of the substance): 0.20 kCal/kg oC DT (temperature difference): 120 oC h (recovery factor): 50%

- a. 21600**
- b. 43200
- c. 25600
- d. 34000

347. In industrial operations fluids with temperature less than _____ are set as the limit for waste heat recovery because of the risk of condensation of corrosive liquids

- a. 80C
- b. 100C**
- c. 120C
- d. 200C