BALASORE COLLEGE OF ENGINEERING AND TECHNOLOGY, BALASORE

ETD MCQ QUESTIONS

1. **Which of the following variablescontrols the physical properties of a perfect gas**

- (a) pressure
- (b) temperature
- (c) volume
- (d) all of the above
- (e) atomic mass.

Answer : d

2. **The unit of temperature in S.I. unitsis**

- (a) Centigrade
- (b) Celsius
- (c) Fahrenheit
- (d) Kelvin
- (e) Rankine.

Answer : d

3. **Which of the following laws is applicable for the behavior of a perfect gas**

- (a) Boyle's law
- (b) Charles'law
- (c) Gay-Lussac law
- (d) all of the above
- (e) Joule's law.

- **Answer : d**

4. **The condition of perfect vacuum, i.e., absolute zero pressure can be attained at**

- (a) a temperature of – 273.16°C
- (b) a temperature of 0°C
- (c) a temperature of 273 °K
- (d) a negative pressure and 0°Ctemperature
- (e) can't be attained.

Answer : a

5. **Specific heat of air at constantpressure is equal to**

- (a) 0.17
- (b) 0.21
- (c) 0.24
- (d) 1.0
- (e) 1.41

Answer : c

6. Zeroth law of thermodynamics

- (a) deals with conversion of massand energy
- (b) deals with reversibility and irreversibility of process
- (c) states that if two systems are both in equilibrium with a third system, they are in thermal equilibrium witheach other
- (d) deals with heat engines
- (e) does not exist.

Answer : c

7. If a gas vapour is allowed to expand through a very minute aperture, then such a process is known as

- (a) free expansion
- (b) hyperbolic expansion
- (c) adiabatic expansion
- (d) parabolic expansion
- (e) throttling.

Answer : e

8. If a fluid expands suddenly into vacuum through an orifice of largedimension, then such a process is called

- (a) free expansion
- (b) hyperbolic expansion
- (c) adiabatic expansion
- (d) parabolic expansion
- (e) throttling.

Answer : a

9. Which of the following processes are thermodynamically reversible

- (a) throttling
- (b) free expansion
- (c) constant volume and constantpressure
- (d) hyperbolic and $pV = C$
- (e) isothermal and adiabatic.

Answer : e

10. In order that a cycle be reversible,following must be satisfied

- (a) free expansion or friction resisted expansion/compression process should not be encountered
- (b) when heat is being absorbed, temperature of hot source and working sub¬stance should be same
- (c) when beat is being rejected, temperature of cold source and working sub-stance should be same
- (d) all of the above
- (e) none of the above.

Answer : d

11. Which of the following processes is irreversible process

- (a) isothermal
- (b) adiabatic
- (c) throttling
- (d) all of the above
- (e) none of the above.

Answer : c

12. For reversible adiabatic process, change in entropy is

- (a) maximum
- (b) minimum
- (c) zero
- (d) unpredictable
- (e) negative

Answer : c

13. Entropy change depends on

- (a) heat transfer
- (b) mass transfer
- (c) change of temperature
- (d) thermodynamic state
- (e) change of pressure and volume.

Answer : a

14. In an isothermal process, the internal energy

- (a) increases
- (b) decreases
- (c) remains constant
- (d) first increases and then decreases
- (e) first decreases and then increases.

Answer : c

15. Change in enthalpy in a closed system is equal to heat transferred if the reversible process takes place at constant

- (a) pressure
- (b) temperature
- (c) volume
- (d) internal energy
- (e) entropy.

Answer : a

16. Change in internal energy in a closed system is equal to heat transferred if the reversible process takes place at constant

- (a) pressure
- (b) temperature
- (c) volume
- (d) internal energy
- (e) entropy.

Answer : c

17. Measurement of temperature isbased on

- (a) thermodynamic properties
- (b) zeroth law of thermodynamics
- (c) first law of thermodynamics
- (d) second law of thermodynamics
- (e) joule's law.

Answer : b

18. Carnot cycle has maximumefficiency for

- (a) reversible engine
- (b) irreversible engine
- (c) new engine
- (d) petrol engine
- (e) diesel engine.

Answer : a

19. Carnot cycle efficiency dependsupon

- (a) properties of the medium/substance used
- (b) condition of engine
- (c) working condition
- (d) temperature range ofoperation
- (e) effectiveness of insulating material around the engine.

Answer : d

20. If a system after undergoing a series of processes, returns to the initial state then

- (a) process is thermodynamicallyin equilibrium
- (b) process is executed in closedsystem cycle
- (c) its entropy will change due toirreversibility
- (d) sum of heat and work transferwill be zero
- (e) no work will be done by thesystem.

Answer : d

21. An actual engine is to be designed having same efficiency as the Carnot cycle. Such a proposition is

- (a) feasible
- (b) impossible
- (c) possible
- (d) possible, but with lot of sophistications
- (e) desirable.

Answer : d

22. Water contained in a beaker can be made to boil by passing steam through it

- (a) at atmospheric pressure
- (b) at a pressure below the firuosphejric pressure
- (c) at a pressure greater thanatmospheric pressure
- (d) any pressure
- (e) not possible.

Answer : c

23. The energy of molecular motion appears as

- (a) heat
- (b) potential energy
- (c) surface tension
- (d) friction
- (e) increase in pressure.

Answer : a

24. The unit'of universal gas constant is

- (a) watts/°K
- (b) dynes/°C
- (c) ergscm/°K
- (d)erg/°K
- (e) none of the above.

25. The first law of thermodynamicsis the law of

- (a) conservation of mass
- (b) conservation of energy
- (c) conservation of momentum
- (d) conservation of heat
- (e) conservation of temperature.

Answer : b

26. Kelvin Planck's law deals with

- (a) conservation of heat
- (b) conservation of work
- (c) conversion of heat into work
- (d) conversion fo work into heat
- (e) conservation of mass.

Answer : c

27. A perpetual motion machine is

- (a) a thermodynamic machine
- (b) a non-thermodynamic machine
- (c) a hypothetical machine
- (d) a hypothetical machine whoseopera-tion would violate the laws ofthermodynamics
- (e) an inefficient machine.

Answer : d

28. Which of the following is anirreversible cycle

- (a) carnot
- (b) Stirling
- (c) ericsson
- (d) all of the above
- (e) none of the above.

Answer : e

29. Thermal power plant works on

- (a) Carnot cycle
- (b) Joule cycle
- (d) Rankine cycle
- (d) Otto cycle
- (e) Brayton cycle.

Answer : c

30. Otto cycle consists of followingfour processes

- (a) two isothermals and two isentropics
- (b) two isentropics and two constant volumes
- (c) two isentropics, one constantvolume and one constant pressure
- (d) two isentropics and two constant pres-sures

(e) none of the above

31. For same compression ratio andfor same heat added

- (a) Otto cycle is more efficientthan Diesel cycle

- (b) Diesel cycle is more efficientthan Otto cycle
- (c) efficiency depends on otherfactors
- (d) both Otto and Diesel cyclesare equally efficient
- (e) none of the above.

Answer : a

32. The efficiency of a Carnot enginedepends on

- (a) working substance
- (b) design of engine
- (c) size of engine
- (d) type of fuel fired
- (e) temperatures of source andsink.

Answer : e

33. The efficiency of Carnot cycle ismaximum for

- (a) gas engine
- (b) well lubricated engine
- (c) petrol engine
- (d) steam engine
- (e) reversible engine.

Answer : e

34. Brayton cycle consists' offollowing four processes

- (a) two isothermals and two isentropics
- (b) two isentropics and two constant volumes
- (c) two isentropics, one constantvolume and one constant pressure
- (d) two isentropics and two constant pres-sures
- (e) none of the above.

Answer : d

35. Reversed joule cycle is called

- (a) Carnot cycle
- (b) Rankine cycle
- (c) Brayton cycle
- (d) Bell Coleman cycle
- (e) Dual cycle.

Answer : c

36. Which of the following cycles isnot a reversible cycle

- (a) Carnot
- (b) Ericsson

- (c) Stirling
- (d) Joule
- (e) none of the above.

Answer : e

37. The efficiency of Diesei cycle with decrease in cut off

- (a) increases
- (b) decreases
- (c) remains unaffected
- (d) first increases and then decreases
- (e) first decreases and then increases.

Answer : a

38. The cycle in which heat is supplied at constant volume and rejected at constant pressure is known as

- (a) Dual combustion cycle
- (b) Diesel cycle
- (c) Atkinson cycle
- (d) Rankine cycle
- (e) Stirling cycle.

Answer : c

39. Which of the following cycles has maximum efficiency

- (a) Rankine
- (b) Stirling
- (c) Carnot
- (d) Brayton
- (e) Joule.

Answer : c

40. Stirling and Ericsson cycles are

- A. reversible cycles
- B. irreversible cycles
- C. semi-reversible cycles
- D. quasi-static cycles

Answer: A

41. When cut-off ratio is _____ the efficiency of Diesel cycle approaches to Otto cycle efficiency.

- A. zero
- B. 1/5

- C. 4/5
- D. 1

Answer: A

42. The fuel mostly used in steamboilers is

- A. brown coal
- B. peat
- C. coking bituminous coal
- D. non-coking bituminous coal

Answer: D

43. The efficiency of Joule cycle is

- A. greater than Carnot cycle
- B. less than Carnot cycle
- C. equal to Carnot cycle
- D. none of these

Answer: B

44. The measurement of a thermodynamic property known as temperature is based on

- A. Zeroth law of thermodynamics
- B. First law of thermodynamics
- C. Second law of thermodynamics
- D. none of these

Answer: A

45. I kgf/cm2 is equal to

- (a) 760 mm Hg
- (b) zero mm Hg
- (c) 735.6 mm Hg
- (d) 1 mm Hg
- (e) l00 mm Hg.

Answer : c

46. Which of the following cycles isnot a reversible cycle

- (a) Carnot
- (b) Ericsson
- (c) Stirling
- (d) Joule
- (e) none of the above.

Answer : e

47. An adiabatic process is one in which

- A.no heat enters or leaves thegas
- B.the temperature of the gaschanges
- C.the change in internal energy isequal to the mechanical workdone
- D.all of the above

Answer: D

48. Which of the following gas is mostly used in town for street anddomestic lighting and heating?

- A. Producer gas
- B. Coal gas
- C. Mond gas
- D. Coke oven gas

Answer: B

49. A mixture of gas expands from 0.03 m3 to 0.06 m3 at a constant pressure of 1 MPa and absorbs 84 kJ of heat during the process. The change in internal energy of themixture is

- A. 30 kJ
- B. 54 kJ
- C. 84 kJ
- D. 114 kJ

50. The gas constant (R) is equal to the__of two specific heats.

- A. sum
- B. difference
- C. product
- D. ratio

Answer: B

51. The unit of length in S.I. units is

- (a) meter
- (b) centimeter
- (c) kilometer
- (d) millimeter.

Answer : a

52. The unit of time in S.I. units is

- (a) second
- (b) minute
- (c) hour
- (d) day
- (e) year.

Answer : a

53. The unit of energy in S.I. units is

- (a) watt
- (b) joule
- (c) joule/s
- (d) joule/m
- (e) joule m.

Answer : b

54. Kinetic energy of the molecules interms of absolute temperature (T) is proportional to

- (a) T
- (b) j
- (c) J2
- (d) Vr
- (e) 1/Vr.

Answer : a

55. Superheated vapour behaves

- (a) exactly as gas
- (b) as steam
- (c) as ordinary vapour
- (d) approximately as a gas
- (e) as average of gas and vapour.

Answer : d

56. No liquid can exist as liquid at

- (a) – 273 °K
- (b) vacuum
- (c) zero pressure
- (d) centre of earth
- (e) in space.

Answer : c

57. Characteristic gas constant ofa gas is equal to

- (a) C/Cv
- (b) Cv/Cp
- (c) Cp – Cv
- (d) Cp + Cv
- (e) Cp x Cv

Answer : c

58. The behaviour of gases can be fully determined by

- (a) 1 law
- (b) 2 laws
- (c) 3 laws
- (d) 4 laws

Answer : d

59. Boyle's law i.e. pV = constantis applicable to gases under

- (a) all ranges of pressures
- (b) only small range of pressures
- (c) high range of pressures
- (d) steady change of pressures
- (e) atmospheric conditions.

Answer : b

60. Gases have

- (a) only one value of specific heat
- (b) two values of specific heat
- (c) three values of specific heat
- (d) no value of specific heat
- (e) under some conditions one value and sometimes two values of specific heat.

Answer : b

61. According to which law, all perfect gases change in volume by l/273th of their original volume at 0°C for every 1°C change in temperature when pressure remains constant

- (a) Joule's law
- (b) Boyle's law
- (c) Regnault's law
- (d) Gay-Lussac law
- (e) Charles' law.

Answer : e

62. If a gas is heated against a pressure, keeping the volume constant, then work done will be equal to

- (a) + v
- (b) – ve
- (c) zero
- (d) pressure x volume
- (e) any where between zero andinfinity.

Answer : c

63. To convert volumetric analysis to gravimetric analysis, the relative volume of each constituent of the fluegases is

- (a) divided by its molecular weight
- (b) multiplied by its molecularweight
- (c) multiplied by its density
- (d) multiplied by its specific weight
- (e) divided by its specific weight.

Answer : b

64. On weight basis, air contains following parts of oxygen

- (a) 21
- (b) 23
- (c) 25
- (d) 73
- (e) 79.

Answer : b

65. Which of the following is the property of a system

- (a) pressure and temperature
- (b) internal energy
- (c) volume and density
- (d) enthalpy and entropy
- (e) all of the above.

Answer : e

66. Which of the following is notthe intensive property

- (a) pressure
- (b) temperature
- (c) density
- (d) heat
- (e) specific volume.

Answer : d

67. A perfect gas at 27°C is heated at constant pressure till its volume isdouble. The final temperature is

- (a) 54°C
- (b) 327°C
- (c) 108°C
- (d) 654°C
- (e) 600°C

Answer : b

68. The value of n = 1 in the polytropic process indicates it to be

- (a) reversible process
- (b) isothermal process
- (c) adiabatic process
- (d) irreversible process
- (e) free expansion process.

Answer : b

69. Solids and liquids have

- (a) one value of specific heat (ft)two values of specific heat
- (c) three values of specific heat
- (d) no value of specific heat
- (e) one value under someconditions and two values under otherconditions.

Answer : a

70. The behaviour of gases can be fully determined by

- (a) 1 law
- (b) 2 laws
- (c) 3 laws
- (d) 4 laws

Answer : d

71. Boyle's law i.e. pV = constantis applicable to gases under

- (a) all ranges of pressures
- (b) only small range of pressures
- (c) high range of pressures
- (d) steady change of pressures
- (e) atmospheric conditions.

Answer : b

72. Gases have

- (a) only one value of specific heat
- (b) two values of specific heat
- (c) three values of specific heat
- (d) no value of specific heat
- (e) under some conditions one value and sometimes two values of specific heat.

Answer : b

73. On weight basis, air contains following parts of oxygen

- (a) 21
- (b) 23
- (c) 25

- (d) 73
- (e) 79.

Answer : b

74. Which of the following is the property of a system

- (a) pressure and temperature
- (b) internal energy
- (c) volume and density
- (d) enthalpy and entropy
- (e) all of the above.

Answer : e

75. A perfect gas at 27°C is heated at constant pressure till its volume isdouble. The final temperature is

- (a) 54°C
- (b) 327°C
- (c) 108°C
- (d) 654°C
- (e) 600°C

Answer : b