MACHANICAL

1. For a reversible adiabatic process, the change in entropy is
(a) Maximum (b) Minimum(c) Zero(d) None of the above

ANSWER: (c)

2. The entropy of an isolated system increases during a
(a) Reversible process (b) Irreversible process
(c) Ideal process (d) Polytropic process

ANSWER: (b)

3. The efficiency of a Ranking cycle
(a) Increases with decreasing temperature of heat rejection.
(b) Decreases with decreasing temperature of heat rejection
(c) Decreases with increasing temperature of heat rejection
(d) None of the above

ANSWER: (a)

4. Rankin cycle efficiency for a power plant is 29%. The Carnot cycle efficiency will be
(a) Less(b) More(c) Equal(d) None of the above

ANSWER: (b)

5. Efficiency of the Carnot cycle can be increased by

(a) Increasing the highest temperature

(b) Decreasing the lowest temperature

(c) Decreasing the highest temperature

(d) Both (a) and (b) above

ANSWER: (d)

6. Air standard efficiency of Stirling cycle as compared to Carnot cycle is

(a) Less

(b) More

(c) Same

(d) None of the above

ANSWER: (a)

7. In actual practice, the Carnot cycle cannot be realized because
(a) Very high pressure developed in the cylinder

(b) High volume ratios in the cylinder

(c) Both (a) and (b) above

(d) None of the above

ANSWER: (c)

8. Otto cycle consists of sets of processes

(a) Adiabatic and constant volume

(b) Adiabatic and constant pressure

(c) Isothermal and constant pressure

(d) Isothermal and constant volume

ANSWER: (a)

9. Entropy of the universe tends to

(a) Maximum

(b) Minimum

(c) Zero

(d) None of the above.

ANSWER: (a)

10. Entropy of water at 0° C is assumed to be

(a) 0 (b) 1 (c) -1 (d) None of the above

ANSWER: (a)

 11. The Carnot cycle consists of two adiabatic processes and

(a) Two isothermal processes

(b) Two constant pressure processes

(c) Two constant volume processes

(d) One constant pressure processes

ANSWER: (a)

12. Carnot cycle has maximum efficiency for

(a) Petrol engine

(b) Diesel engine

(c) Reversible engine

(d) Irreversible engine

ANSWER: (c)

13. Number of processes in a Rakine cycle are

(a) 3

(b) 4

(c) 5

(d) 6

ANSWER: (c)

14. A Stirling cycle consists of

(a) Two adiabatic and two isothermal processes

(b) Two adiabatic and two constant pressure processes

(c) Two isothermal and two constant volume processes

(d) Two isothermal and two constant pressure Processes

ANSWER: (c)

15. If other factors are constant, with increase in the temperature of source, the efficiency of cannot engine

(a) Increases

(b) Decreases

(c) Remains same

(d) Depend on temperature ratio

ANSWER: (a)

16. If other factors are constant, with increase in the temperature of sink, the efficiency of Carnot engine

(a) Increases
(b) Decreases

(c) Remains same

(d) None of the above.

ANSWER: (b)

17. Carnot engine is irreversible due to

(a) Friction between moving parts

(b) Losses from working fluid in transit

(c) High speed

(d) Both (a) and (b) above

ANSWER: (d)

18. Otto cycle is a theoretical cycle, on which

(a) Only petrol engine run

(b) Only diesel engine run

(c) Only gas engines run

(d) Petrol and gas engine runs

ANSWER: (d)

19. Compression ratio is

(a) Total volume/swept volume

(b) Swept volume/total volume

(c) Swept volume/clearance volume

(d) Total volume/clearance volume.

ANSWER: (d)

20. Diesel cycle consists of
(a) Two adiabatic and two constant volume processes

(b) Two adiabatic and two constant pressure processes

(c) Two adiabatic, one constant pressure and one constant volume processes

(d) Two isothermal, one constant pressure and one constant volume processes

ANSWER: (c)

21. For the same compression ratio, the efficiency

Of diesel cycle as compared to otto cycle is

(a) Less

(b) More

(c) Equal

(d) None of the above

ANSWER: (a)

22. The compression ratio for diesel engine is

(a) 3 to 6

(b) 5 to 8

(c) 15 to 20

(d) 20 to 30

ANSWER: (c)

23. In Carnot cycle, heat is rejected at constant

(a) Volume

(b) Pressure

(c) Temperature

(d) Entropy

ANSWER: (c)

24. The areal of p-V diagram for a Carnot cycle represents

(a) Heat supplied

(b) Heat rejected

(c) Work done

(d) Temperature drop
ANSWER: (c)

25. In Carnot cycle, the algebraic sum of the entropy changes for the cycle is

(a) Positive

(b) Negative

(c) Zero

(d) None of the above

ANSWER: (c)
26 An open system is one in which
(*a*) heat and work cross the boundary of the system, but the mass of the working substance does not
(*b*) mass of working substance crosses the boundary of the system but the heat and work do not
(*c*) both the heat and work as well as mass of the working substances cross the boundary of the system

(*d*) neither the heat and work nor the mass of the working substances cross the boundary of the system.
ANSWER: (c)

27 . An isolated system
(*a*) is a specified region where transfer of energy and/or mass take place
(*b*) is a region of constant mass and only energy is allowed to cross the boundaries
(*c*) cannot transfer either energy or mass to or from the surroundings
(*d*) is one in which mass within the system is not necessarily constant
(*e*) none of the above.
ANSWER: (c)

28. In an extensive property of a thermodynamic system
(*a*) extensive heat is transferred (*b*) extensive work is done
(*c*) extensive energy is utilised (*d*) all of the above
(*e*) none of the above.
ANSWER: (e)

29. Which of the following is an intensive property of a thermodynamic system ?
(*a*) Volume (*b*) Temperature
(*c*) Mass (*d*) Energy.
ANSWER: (b)

30. Which of the following is the extensive property of a thermodynamic system ?
(*a*) Pressure (*b*) Volume
(*c*) Temperature (*d*) Density.
ANSWER: (b)

31. When two bodies are in thermal equilibrium with a third body they are also in thermal equilibrium with
each other. This statement is called
(a) Zeroth law of thermodyamics (b) First law of thermodynamics
(c) Second law of thermodynamics (d) Kelvin Planck's law.
ANSWER: (a)

32. The temperature at which the volume of a gas becomes zero is called
(a) absolute scale of temperature (b) absolute zero temperature
(c) absolute temperature (d) none of the above
ANSWER: (b)
.
33. The value of one bar (in SI units) is equal to
(a) 100 N/m^2 (b) 1000 N/m^2
(c) $1 \times 104 \text{ N/m}^2$ (d) $1 \times 105 \text{ N/m}^2$
(e) $1 \times 106 \text{ N/m}^2$.
ANSWER: (d)

34. The absolute zero pressure will be
(a) when molecular momentum of the system becomes zero
(b) at sea level (c) at the temperature of – 273 K
(d) under vacuum conditions (e) at the centre of the earth.
ANSWER: (a)

35. Absolute zero temperature is taken as
(a) – 273°C (b) 273°C
(c) 237°C (d) – 373°C.
ANSWER: (a)

36. Which of the following is correct ?
(a) Absolute pressure = gauge pressure + atmospheric pressure
(b) Gauge pressure = absolute pressure + atmospheric pressure
(c) Atmospheric pressure = absolute pressure + gauge pressure
(d) Absolute pressure = gauge pressure – atmospheric pressure.
ANSWER: (a)

37. The latent heat of vapourisation at critical point is
(a) less than zero (b) greater than zero
(c) equal to zero (d) none of the above.

ANS:C

38. Choose the correct answer :

 (a) Specific volume of water decreases on freezing

(b) Boiling point of water decreases with increasing pressure

(c) Specific volume of CO_2 increases on freezing

(d) Freezing temperature of water decreases with increasing pressure.

ANS: (d)

39. Choose the correct answer :

(a) The slope of vapourisation curve is always negative

(b) The slope of vapourisation curve is always positive

(c) The slope of sublimation curve in negative for all pure substances

(d) The slope of fusion curve is positive for all pure substances.

ANS:A

20. With the increase in pressure

(a) boiling point of water increases and enthalpy of evaporation increases

(b) boiling point of water increases and enthalpy of evaporation decreases

(c) boiling point of water decreases and enthalpy of evaporation increases.

ANS:B

21. Choose the correct answer :
(a) Critical point involves equilibrium of solid and vapour phases
(b) Critical point involves equilibrium of solid and liquid phases
(c) Critical point involves equilibrium of solid, liquid and vapour phases
(d) Triple point involves equilibrium of solid, liquid and vapour phases.

ANS: D

24. Dryness fraction of steam is defined as

(a) mass of water vapour in suspension/(mass of water vapour in suspension + mass of dry steam)

(b) mass of dry steam/mass of water vapour in suspension

(c) mass of dry steam/(mass of dry steam + mass of water vapour in suspension)

(d) mass of water vapour in suspension/mass of dry steam.

ANS:C

25. The specific volume of water when heated at 0°C

(a) first increases and then decreases (b) first decreases and then increases

(c) increases steadily

ANS: B

MECHANICAL ENGINEERING

Basic Concepts of Thermodynamics

1. A definite area or space where some thermodynamic process takes place is known as

(a) thermodynamic system   (b) thermodynamic cycle

(c) thermodynamic process   (d) thermodynamic law.

2. An open system is one in which

(a) heat and work cross the boundary of the system, but the mass of the working substance does not

(b) mass of working substance crosses the boundary of the system but the heat and work do not

(c) both the heat and work as well as mass of the working substances cross the boundary of the system

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(c) Mass   (d) Energy.

6. Which of the following is the extensive property of a thermodynamic system ?

(a) Pressure   (b) Volume

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each other. This statement is called

(a) Zeroth law of thermodynamics   (b) First law of thermodynamics

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(c) absolute temperature   (d) none of the above.

9. The value of one bar (in SI units) is equal to

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(d) under vacuum conditions   (e) at the centre of the earth.

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(c) 237°C   (d) – 373°C.

12. Which of the following is correct ?

(a) Absolute pressure = gauge pressure + atmospheric pressure

(b) Gauge pressure = absolute pressure + atmospheric pressure

(c) Atmospheric pressure = absolute pressure + gauge pressure

(d) Absolute pressure = gauge pressure – atmospheric pressure.

13. The unit of energy in SI units is

(a) Joule (J)   (b) Joule metre (Jm)

(c) Watt (W)   (d) Joule/metre (J/m).

14. One watt is equal to

(a) 1 Nm/s   (b) 1 N/min

(c) 10 N/s   (d) 100 Nm/s

(e) 100 Nm/m.

15. One joule (J) is equal to

(a) 1 Nm   (b) kNm

(d) 10 Nm/s   (d) 10 kNm/s.

16. The amount of heat required to raise the temperature of 1 kg of water through 1°C is called

(a) specific heat at constant volume   (b) specific heat at constant pressure

(c) kilo calorie   (d) none of the above.

17. The heating and expanding of a gas is called

(a) thermodynamic system   (b) thermodynamic cycle

(c) thermodynamic process   (d) thermodynamic law.

18. A series of operations, which take place in a certain order and restore the initial condition is known as

(a) reversible cycle   (b) irreversible cycle

(c) thermodynamic cycle   (d) none of the above.

19. The condition for the reversibility of a cycle is

(a) the pressure and temperature of the working substance must not differ, appreciably, from those of the

surroundings at any stage in the process

(b) all the processes, taking place in the cycle of operation, must be extremely slow

(c) the working parts of the engine must be friction free

(d) there should be no loss of energy during the cycle of operation

(e) all of the above   (f) none of the above.

20. In an irreversible process, there is a

(a) loss of heat   (b) no loss of heat

(c) gain of heat   (d) no gain of heat.

21. The main cause of the irreversibility is

(a) mechanical and fluid friction   (b) unrestricted expansion

(c) heat transfer with a finite temperature difference

(d) all of the above   (e) none of the above.

22. According to kinetic theory of heat

(a) temperature should rise during boiling   (b) temperature should fall during freezing

(c) at low temperature all bodies are in solid state

(d) at absolute zero there is absolutely no vibration of molecules

(e) none of the above.

23. A system comprising a single phase is called a

(a) closed system   (b) open system

(c) isolated system   (d) homogeneous system

(e) heterogeneous system.

Answers

1. (a) **2.** (c) **3.** (c) **4.** (e) **5.** (b) **6.** (b) **7.** (a) **8.** (b) **9.** (d) **10.** (a) **11.** (a) **12.** (a) **13.** (a) **14.** (a) **15.** (a)

16. (c) **17.** (b) **18.** (c) **19.** (e) **20.** (a) **21.** (d) **22.** (d) **23.** (d).

Mechanical

1. A cycle consisting of one constant pressure, one constant volume and two isentropic processes is known as

A.   Carnot cycle

B.   Stirling cycle

C.   Otto cycle

D.   Diesel cycle

Ans: D

2. The amount of heat required to raise the temperature of the unit mass of gas through one degree at constant volume, is called

A.   specific heat at constant volume

B.   specific heat at constant pressure

C.   kilo Joule

D.   none of these

Ans:A

3. An adiabatic process is one in which

A.   no heat enters or leaves the gas

B.   the temperature of the gas changes

C.   the change in internal energy is equal to the mechanical workdone

D.   all of the above

Ans:D

4. The processes occurring in open system which permit the transfer of mass to and from the system, are known as

A.   flow processes

B.   non-flow processes

C.   adiabatic processes

D.   none of these

Ans:A

MULTIPLE CHOICE QUESTIONS

1. In a four stroke cycle, the minimum temperature inside the engine cylinder occurs at the

A.   beginning of suction stroke   B.   end of suction stroke

C.   beginning of exhaust stroke   D.   end of exhaust stroke

2. The exhaust valve in a four stroke cycle petrol engine

A.   opens at 50° before bottom dead centre and closes at 15° after top dead centre

B.   opens at bottom dead centre and closes at top dead centre

C.   opens at 50° after bottom dead centre and closes at 15° before top dead centre

D.   may open and close anywhere

3. .   The working cycle in case of four stroke engine is completed in following number of revolutions of crankshaft

(a)   1/2   (b)   1   (c)   2   (d)   4

4. .   Scavenging air in diesel engine means

(a)   air used for combustion sent under pressure   (b)   forced air for cooling cylinder

(c)   burnt air containing products of com-bastion

(d)   air used for forcing burnt gases out of engine's cylinder during the exhaust period

5. .   Supercharging is the process of

(a)   supplying the intake of an engine with air at a density greater than the density of the surrounding atmosphere

(b)   providing forced cooling air

(c)   injecting excess fuel for raising more load

(d)   supplying compressed air to remove combustion products fully

6. .   If the intake air temperature of I.C. engine increases, its efficiency will

(a)   increase   (b)   decrease   (c)   remain same   (d)   unpredictable

7. In a typical medium speed 4-stroke cycle diesel engine the inlet valve

(a)   opens at 20° before top dead center and closes at 35° after the bottom dead center

(b)   opens at top dead center and closes at bottom dead center

(c)   opens at 10° after top dead center and closes 20° before the bottom dead center

(d)   may open or close anywhere

8. .   The pressure and temperature at the end of compression stroke in a petrol engine are of the order of

(a)   4 - 6 kg/cm2 and 200 - 250°C   (b)   6 - 12 kg/cm2 and 250 - 350°C

(c)   12 - 20 kg/cm2 and 350 - 450°C   (d)   20 - 30 kg/cm2 and 450 - 500°C

9. .   Pick up the wrong statement

(a)   2-stroke engine can run in any direction

(b)   In 4-stroke engine, a power stroke is obtained in 4-strokes

(c)   thermal efficiency of 4-strokc engine is more due to positive scavenging

(d)   petrol engines occupy more space than diesel engines for same power output. Ans d

10. Combustion in compression ignition engines is

(a)   homogeneous   (b)   heterogeneous

(c)   both (a) and (b)   (d)   laminar

11 The fuel in diesel engine is normally injected at pressure of

(a) 5-10 kg/cm^2 (b) 20-25 kg/cm^2 (c) 60-80 kg/cm^2 (d) 90-130 kg/cm^2

12Crankcase explosion in I.C. engines usually occurs as

(a)   first a mild explosion followed by a bi explosion

(b)   first a big explosion followed by a mil explosion

(c)   both mild and big explosions occi simultaneously

(d)   never occurs

13. The air-fuel ratio of the petrol engine is controlled by

(a) fuel pump   (b) governor   (c) injector   (d) carburetor

14. At very low temperature, the melting and boiling temperatures become equal. This temperature is

(a) 373°K   (b) 273.16°K   (c) 303°K   (d) 0°K.

15. The latent heat of steam at pressures greater than atmospheric in comparison to latent heat at atmospheric pressure is

(a)   less   (b)   more   (c)   equal   (d)   may be less or more depending on temperature

16.   One kg of steam sample contains 0.8 kg dry steam; it's dryness fraction is

(a) 0.2   (b) 0.8   (c) 1.0   (d) 0.6

17. While steam expands in turbines, theoretically the entropy

(a) remains constant   (b) increases   (c) decreases   (d) behaves unpredictably

18. Cochran boiler is a

(a) horizontal fire-tube boiler   (b) horizontal water-tube boiler

(c) veritcal water-tube boiler   (d) vertical fire tube boiler

19. Lancashire 'boiler is a

(a) stationary fire tube boiler   (b) stationary water tube boiler

(c) water tube boiler with natural/forced circulation   (d) mobile fire tube boiler

20.   The basic purpose of drum in boiler is to

(a) serve as storage of steam   (b) serve as storage of feed water for water wall

(c) remove salts from water   (d) separate steam from water

 21. Axial flow compressor resembles

(a) centrifugal pump   (b) reciprocating pump

(c) turbine   (d) sliding vane compressor

 22 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°

23. The critical pressure ratio for initially wet steam is

A. 0.546   B. 0.577   C. 0.582   D. 0.601

 24. The impulse reaction turbine has its driving force

A. as an impulsive force   B. as a reaction force

C. partly as an impulsive force and partly as a reaction force   D. none of the above

 25. Thermal equilibrium means that the flow of steam is

A. isothermal   B. isentropic   C. hyperbolic   D. polytropic

26.The ratio of the workdone on the blades to the energy supplied to the blades, is called

A.   blading efficiency   B.   nozzle efficiency

C.   gross or stage efficiency   D.   mechanical efficiency

27. The action of steam in a steam turbine is

A.   static   B.   dynamic   C.   static and dynamic   D.   neither static nor dynamic

28. Multi-stage steam turbines are of the

A.   velocity compounded type   B.   reaction type   C.   pressure compounded type

D.   all of these

29. In reaction turbines, the axial thrust is due to

A.   pressure drop across the rotor   B.   change in axial velocity

C.   both (a) and (b)   D.   none of these

30.   Steam turbines are used for

A.   large marine propulsion   B.   electric power generation

C.   direct drive of fans, compressors, pumps   D.   all of these

1 a 2a 3c 4d 5a 6b 7a 8b 9d 10b 11d 12a 13d 14b 15a 16b 17b 18d 19a 20d 21c 22a 23c 24c 25b 26a 27b 28 d 29c 30d

1. Internal gears can be made by

A.   hobbing

B.   shaping with pinion cutter

C.   shaping with rack cutter

D.   milling stroke   ANS:B

2. Drilling is an example of

A.   orthogonal cutting

B.   oblique cutting

C.   simple cutting

D.   uniform cutting   ANS:B

3. The work or surface speed for cylindrical grinding varies from

A.   5 to 10 m/min

B.   10 to 20 m/min

C.   20 to 30 m/min

D.   40 to 60 m/min   ANS:C

4.The method of grinding used to produce a straight or tapered surface on a workpiece, is

A.   internal cylindrical grinding

B.   form grinding

C.   external cylindrical grinding

D.   surface grinding   ANS:C

5.In up milling, the thickness of chip is

A.   minimum at the beginning of the cut and maximum at the end of the cut

B.   maximum at the beginning of the cut and minimum at the end of the cut

C.   uniform throughout the cut

D.   none of these   ANS:A

6. Lapping is an operation of

A.   making a cone-shaped enlargement of the end of a hole

B.   smoothing and squaring the surface around a hole

C.   sizing and finishing a small diameter hole

D.   producing a hole by removing metal along the circumference of a hollow cutting tool

ANS: C

7. Which of the following operations can be performed with milling cutters?

A.   cutting key ways on shafts

B.   cutting external screw threads

C.   cutting teeth of spur gears

D.   all of these   ANS: D

8. .   Surface grinding is done to produce

A.   tapered surface

B.   flat surface

C.   internal cylindrical holes

D.   all of these   ANS: B

9. Cutting fluids are used to

A.   cool the tool

B.   improve surface finish

C.   cool the workpiece

D.   all of these   ANS: D

10. An open belt drive is used when

A.   shafts are arranged parallel and rotate in the opposite directions

B.   shafts are arranged parallel and rotate in the same directions

C.   shafts are arranged at right angles and rotate in one definite direction

D.   driven shaft is to be started or stopped whenever desired without interferring with the driving shaft

ANS: B

11 The size of a gear is usually specified by

A.   pressure angle

B.   pitch circle diameter

C.   circular pitch

D.   diametral pitch   ANS: B

12 .In worm gears, the angle between the tangent to the pitch helix and an element of the cylinder, is known as

A.   helix angle

B.   pressure angle

C.   pitch lead angle

D.   none of these   ANS:A

13 Which one of the following methods produces gear by generating process

a. Hobbing

b. Casting

c. Punching

d. Milling   ANS:A

14. A projection weld is a type of:

A.   Resistance weld

B.   Arc weld

C.   Gas weld

D.   Fillet weld   A

15. Which of the following is one of the basic types of welded joints:

A.   T-joint

B.   Rear joint

C.   Angle joint

D.   Groove joint   ANS:A

16.Use of flux during soldering is done to

[A].   increase flidity of solder by lowering its melting temperature.

[B].   prevent oxide formation.

[C]. wash away surplus solder.

[D]. full up the joint gap   ANS:B

17 Ceramic tools are fixed to tool body by

[A]. soldering   [B].brazing

[C]. welding   [D]. clamping   ANS: B

18. The cold chisels are made by

A. drawing   B. rolling

C. piercing   D. forging   ANS:D

19 Metal patterns are used for

A. small castings

B. large castings

C. complicated castings

D. large scale production of castings   ANS:B

20. The purpose of a riser is to

A. deliver molten metal into the mould cavity

B. act as a reservoir for the molten metal

C. feed the molten metal to the casting in order to compensate for the shrinkage

D. deliver the molten metal from pouring basin to gate

ANS: C

21. Cores are used to

A. form internal cavities in the casting

B. improve mould surface

C. form a part of a green sand mould

D. all of these   ANS:D

22 The operation of cutting a cylindrical hole in a sheet of metal by the punch and die is called

A.   shearing   B.   piercing

C.   punching   D.   blanking   ANS:C

23. In skew bevel gearing, the axes of shafts are

A.   intersecting and the teeth are curved

B.   non-intersecting and non-parallel and the teeth are curved

C.   non-intersecting and non-parallel and the teeth are straight

D.   none of the above   ANS: C

24. When a belt drive is transmitting maximum power,

A.   effective tension is equal to centrifugal tension

B.   effective tension is half of centrifugal tension

C.   driving tension on slack side is equal to centrifugal tension

D.   driving tension on tight side is twice the centrifugal tension   ANS:D

25. Gears are casted by

A.   sand mould casting

B.   slush casting

C.   permanent mould casting

D.   centrifugal casting   ANS: C

26. The gears are termed as medium velocity gears, if their peripheral velocity is

A.   1-3 m/s

B.   3-15 m/s

C.   15-30 m/s

D.   30-50 m/s   ANS: B

27. The groove angle of the pulley for rope drive is usually

A.   20°   B.   35°

C.   45°   D.   60°   ANS:C

28. The coefficient of friction between the belt and pulley depends upon the

A.   material of belt and pulley

B.   slip of belt

C.   speed of belt

D.   all of these   ANS:D

29. The operation of cutting of a flat sheet to the desired shape is called

A.   shearing   B.   piercing

C.   punching   D.   blanking   ANS:D

30.Extrusion

A.   is extensively used for making bolts and nuts

B.   is used for reducing the diameter of round bars and tubes by rotating dies which open and close rapidly on the work

C.   is used to improve fatigue resistance of the metal by setting up compressive stresses in its surface

D.   consists of pressing the metal inside a chamber to force it out by high pressure through an orifice which is shaped to provide the desired form of the finished part

ANS:D

MULTIPLE CHOICE QUESTIONS

===

1.   The standard value of atmospheric pressure taken at sea level is
        a. 1. 013 bar   b. 760 mm of Hg

        c. 1013 x 10^2 N/m^2 d. all of these

2.   In a parsons reaction turbine the degree of reaction is

        A) $\dfrac{4}{5}$ B) $\dfrac{2}{3}$

        C) $\dfrac{1}{2}$ D) $\dfrac{1}{4}$

3.   In a velocity compounded impulse turbine, while steam flows through the

        second row of moving blades

        A) The velocity remains constant
        B) The velocity reduces
        C) The velocity increases
        D) Both velocity as well as pressure increases

4.   The reading of the pressure gauge fitted on a vessel is 25 bar. The atmospheric pressure
        is 1.03 bar and the value of 'g' is 9.81 m/s^2. The absolute pressure in the vessel is
        a. 23.97 bar   b. 25 bar

        c. 26.03 bar   d. 34.81 bar

5.   The process in a Rankine are
        A) Two isothemal and two isentropic
        B) Two isothemal and two isentropic
        C) Two isothemal and two polytropic
        D) None of the above

6.   In case of pressure compounded impulse turbine, for the steam while flowing through
        the nozzle of second stage.
        E) Pressure and velocity both increase
        F) Pressure and velocity both decreases

G) Pressure increases while velocity decreases

H) Pressure drops while velocity increases.

7. The heat and mechanical work are mutually convertible. This statement was established by

    a. Boyle   b. Charles c. Joule   D. None of these

8. The dryness fraction of steam within a turbine is usually not allowed to fall below

A) Unity   B) 0.99   C) 0.90   D) 0 .45

9. Which of the following statement is correct?

    a. The heat and work are boundary phenomeana

    b. The heat and work represent the energy crossing the boundary of the system

    c. The heat and work are path functions

    d. All of the above

10. Rateau turbine is a

A) Velocity compounded impulse turbine

B) Velocity compounded reaction turbine

C) Pressure compounded reaction turbine

D) Pressure compounded impulse turbine

11 The measurement of a thermodynamics 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

12. Steam leaves the steam nozzle at

A) Low pressure and low velocity   B) Low pressure and high velocity

C) Hire pressure and low velocity   D) High pressure and high velocity

13 The heat flows from a cold body to a hot body with the aid of an external source. This statement is given by

a. Kelvin   b. Joule   c. Clausious   d. Gay - Lussac

14. Which of the following is not needed in case of magneto ignition?

A) distributor   B) Coil   C) Spark plug   D) Battery

15.   The term scavenging is generally associated with

A) Vertical engine   B) Multi-cylinder engines

C) Two stroke engines   D) Air cooled engines

16.   Relation between c_p and c_v is given by

a. $\dfrac{c_v}{c_p} = R$ b. $c_p - c_v = R$ c. $c_v = \dfrac{R}{(r-1)}$ d. all of these

17.   In a petrol engine as the speed increases

A) the spark intensity has to be increased

B) the spark intensity has to be reduced

C) The spark has to be advanced

D) The spark has to be retarded

18.   A camshaft is not provided in case of

A) Vertical engines   B) High speed engines

C) Two stroke engines   D) Multicyliner engines

19   When a gas is heated, change takes place in

a. pressure   b. volume   c. temperature   d. all of these

20.   Solid injection in diesel engines implies

A) Use of solid fuels   C) Supply of fuel in the form of solid
B) Injecting fuel without air   D)Injecting fuel and air simultaneously

21. The efficiency of a diesel cycle increases with
A) increase in cut off

B) decrease in cut off

C) decrease in depression ratio

D) none of the above

22. Which of the following is the intensive property of a thermodynamic system?

a. Volume   b. Temperature   c. Mass   d. Energy

23. When the circulation of water, in a boiler, is by convection currents which are set up during the heating of water, then the boiler is known as

a. internally fired boiler   b. externally fired boiler

c. natural circulation boiler   d. forced circulation boiler

24. A device used to put off fire in the furnace of the boiler when the level of water in the boiler falls to an unsafe limit, is called

a. blow off cock   b. stop valve   c. super heater   d. none of these

25. The function of a distributor in a coil ignition system of IC engines is

a. to distribute spark   b. to distribute power

c. to distribute current   d. to time the spark

26. When the expansion or compression takes place according to the law $pv^n = C$, the process is known as

a. isothermal process   b. adiabatic process

c. hyperbolic process   d. polytropic process

27. The property of a working substance which increases or decreases as the heat is supplied or removed in a reversible manner, is known as

a. enthalpy   b. internal energy   c. entropy   d. external energy

28. The condition for an irreversible cyclic process is

a. $\oint \dfrac{\delta Q}{T} = 0$ b. $\oint \dfrac{\delta Q}{T} < 0$ c. $\oint \dfrac{\delta Q}{T} > 0$ d. none of these

29. The efficiency of Carnot cycle depends upon

a. temperature limits   b. pressure ratio

c. volume compression ratio d. cutt-off ration and compression ratio

30.   The exhaust valve in a four stroke cycle petrol engine

a. opens at 50° before bottom dead centre and closes at 15° after top dead centre

b. opens at bottom dead centre and closes at top dead centre

c. opens at 50° after bottom dead centre and closes at 15° before top dead centre

d. may open and close anywhere

31.   In a coil ignition system of petrol engines, a condenser is connected across the contact-breaker in order to

a. prevent sparking across the gap between the points

b. cause more rapid break of the primary current, giving a higher voltage in the secondary circuit

c. both (a) and (b)   c. none of these

32.   Otto cycle is also known as

a. constant pressure cycle   b. constant volume cycle

c. constant temperature cycle   d. constant temperature and pressure cycles

33.   When the gas is heated at constant volume, the heat supplied

a. increases the internal energy of the gas   b. increases the enthalpy of the gas

c. does some external work during expansion   d. all of these

34.   The specific heat of a gas at constant pressure

a.   is equal to the specific heat at constant volume

b.   is two times the specific heat at constant volume

c.   is always greater than the specific heat at constant volume

d.   none of the above.

35.   The change of enthalpy (dH) is equal to heat in interchange Q in case of

a.   non-flow constant volume process

b.   non-flow constant pressure process

c.   non-flow isothermal process

d.   none of the above

36.   Work done in expansions is equal to heat supplied in case of

a.   non-flow constant volume process

b.   non-flow constant pressure process

c.   non-flow isothermal process

d.   none of the above.

37.   Choose the wrong statement

a.   displacement work is equal to pdV

b.   intensive properties are independent of mass

c.   an isolated system permits the passage of energy only

d.   the specific heat of a gas at constant pressure is always greater than specific heat at   constant volume.

38.   During expansion, for the same increase in volume, the pressure drop is

a.   less in adiabatic process as compared to isothermal process

b.   less in adiabatic process as compared to constant pressure process

c.   greater in adiabatic process as compared to isothermal process

d.   none of the above.

39.   Choose the correct statement

a. in free expansion, the work done = pdv

b. in free expansion, enthalpy of the fluid changes during the process

c. in adiabatic expansion, the heat is supplied or rejected to the surrounding

d. in free expansion, the external heat supplied is zero and external work done is also zero.

40. Unit of universal gas constant is

a. N m kg/oK   b. Nm/kg mol K

c. m/oK   d. kg-m/oK

41. Bar is the unit of

a. power   b. energy

c. pressure   d. entropy

42. Choose the correct statement

a. Entropy is an intensive property

b. Density is an extensive property

c. Density is an intensive property

d. Pressure is an extensive property.

43. The thermal efficiency of an engine, which is supplied heat at the rate of 15,000 N m/s and output of 4500W, is

a. 45%   b. 50%

c. 30%   d. 33%

44. A perpectual motion machine of the first kind defined as a machine which produces power without consuming any energy is

a. impossible according to second law of thermodynamics

b. impossible according to first law of thermodynamics

c. possible according to first law of thermodynamics

d.   possible according to second law of thermodynamics

45.   For atmospheric air, ratio C_p/C_V, is equal to

a.   0.171   b.   1.4

b.   1.20   d.   1.3

46.   According to Kelvin Planck statement a perpetual motion machine.

a.   of second kind is possible

b.   of first kind is possible

c.   of second kind is impossible

d.   of first kind is impossible

47.   In a Carnot cycle, heat is supplied at $227^{o}C$ and heat is rejected at 27oC,   the efficiency of the cycle   will be

a.   80%

b.   40%

c.   66.67%

d.   60%

48.   The Carnot cycle cannot be realized in actual practice due to

a.   very high pressure developed in the cylinder

b.   high volume ratios in the cylinder

c.   both (a) and (b)

d.   none of the above.

49.   The relationship between entropy, enthalpy and work is given by

a.   Tds = dH+ Vdp

b.   dH = Vdp – Tds

c.   Tds = dH − Vdp

d.   Vdp = $\dfrac{dH}{Tds}$

50.   The law that states that the absolute pressure of a given mass of a prefect gas varies inversely at its volume when the temperature remains constant is known as

a.   Charle's law

b.   Boyle'slaw

c.   Gay –Lussac law

d.   Avogadro's law.

51.   A gas follows the law $pV^n = C$ if the value of n = 1.3, the processes is   known as

a.   adiabatic

b.   isothermal

c.   isentropic

d.   polytropic

52.   At a temperature of 227^oC the heat supplied to an engine is 250 KJ per second. Heat rejected takes place at a constant temperature of 27^oC. If heat rejected is 200 KJ/sec. then applying clausius inequality, determine whether the process would be.

a.   irreversible   b.   reversible

c.   impossible   d.   none of the above

53.   Liquids have

a.   one specific heat

b.   two specific heats

c.   three specific heats

d.   none of the above

54.   In a four stroke engine, each cylinder has

(a) One valve   (b) Two valves   (c) Three valves

(d) Number of valves depends upon the engine design

55.   The firing order in case of four cylinder in-line engines is usually

(a) 1 – 2 - 4 – 3   (b) 1 – 3 – 4 - 2

(c) 1 – 3 – 2 – 4   (d) Either (b) or (c)

56.   For balancing single cylinder engine a counter weight is added to

(a)Piston   (b) Connecting rod

(c)Crankshaft   (d) Gudgeon pin

57. The ' stroke ' of an engine is the

(a) Volume of the cylinder   (b) Length of the connecting rod

(c) Internal diameter of the cylinder   (d) Distance between TDC and BDC

58.   What is the material of connecting rod ?

(a) Mild steel   (b) Forged steel   (c) Tool steel   (d) Cast iron

59.   In internal combustion (I.C) engines, combustion of fuel takes place

(a) Outside the cylinder
(b) Inside the cylinder
(c) Not in the cylinder
(d) None of the above

60.   In an I.C engine the ratio of volume displaced by the piston per stroke to clearance volume in cylinder, is known as

(a) expansion ratio   (b) compression ratio

(c) combustion ratio   (d) none of the above

61. The impeller of a centrifugal pump may have
            a. volute casing   b. volute casing with guide blades

            c. vortex casing   d. any one of these

62. In a centrifugal pump, the regulating valve is provided on the

a. casing   b. delivery pipe

c. suction pipe   d. impeller

63. An air pre-heater is installed
        a. before the economizer   b. before the super-heater

        c. between the economizer and chimney   d. none of these

64. The C.O.P. of a Carnot refrigerator in winter will be.........as compared to C.O.P. in summer
        a. same   b. lower   c. higher

65. The metal is subjected to mechanical working for
        a. refining grain size

        b. reducing original block into desired shape

        c. controlling the direction of flow lines

        d. all of these

66.   The temperature at which the new grains are formed in the metal is called
        a. lower critical temperature b. upper critical temperature

        c. eutectic temperature   d.recrystallization temperature

67.   The electrodes used in spot welding have a tip of
        a. stainless steel   b. aluminium c. copper   d. brass

68. Which of the following pump is suitable for small discharge at high heads?
        a. Centrifugal pump   b. Axial flow pump

        c. Mixed flow pump   d. Reciprocating pump.

69. Head developed by a centrifugal pump is
        a. proportional to diameter of impeller

        b. proportional to speed of impeller

c. proportional to diameter and speed of impeller

d. none of the above.

70. . A two high rolling mill consists of two rolls which rotate
    a. at the same speed and in the same direction

`   b. at the same speed but in opposite direction

    c. at different speeds and in the same direction

    d. at different speeds and in the opposite direction

71. The absolute humidity is defined as
    a. the mass of water vapour present in 1 m3 of dry air

    b. the mass of water vapour present in 1 kg of dry air

    c. the ratio of the actual mass of water vapour in a unit mass of dry air to the mass of water vapour in the same mass of dry air when it is saturated at the same temperature and pressure

    d. the ratio of actual mass of water vapour in a given volume of moist air to the mass of water vapour in the same volume of saturated air at the same temperature and pressure

72. Which of the following welding process uses non-consumable electrodes?
    a. TIG welding   b. MIG welding

    c. Manual are welding   d. Submerged are welding

73. A refrigeration system
    a. removes heat from a low temperature body and delivers it to a   high temperature body

    b. removes heat from a high temperature body and delivers it to a low temperature body

    c. rejects energy to a low temperature body

    d. none of the above

74. One tonne of refrigeration (1TR) means that the heat removing capacity is
    a. 21 kJ/min   b. 210 kJ/min c. 420 kJ/min   d. 620 kJ/min

75. A mixture of dry air and water vapour, when the air has diffused the maximum amount of water vapour into it, is called

      a. dry air   b. moist air   c. saturated air   d.specific humidity

76. R-118 is

      a) CO_2 b)ammonia   c) water   d) CH_4

77. The absolute zero temperature is taken as

      a. $-273°C$ b. $273°C$ c. $-237°C$ d. $-237°C$

78. If the net positive suction head (NPSH) required for pump is not satisfied, then

      a. no flow will takes place   b. cavitation will be formed.

      c. efficiency will be low

      d. excessive power will be consumed.

79. Which of the following is correct?

      a. Absolute pressure   = Gauge pressure + Atmospheric pressure

      b. Gauge pressure   = Absolute pressure+Atmospheric pressure

      c. Atmospheric pressure   = Absolute pressure + Gauge pressure

      d. Absolute pressure   = Gauge pressure – Atmospheric pressure

80. Slip of a reciprocating pump is defined as the

      a. ratio of actual discharge to the theoretical discharge

      b. sum of actual discharge and the theoretical discharge

      c. difference of theoretical discharge and the actual discharge

      d. product of theoretical discharge and the actual discharge

81. The ratio of heat extracted in the refrigerator to the work done on the refrigerant is called

      a. coefficient of performance of refrigeration

      b. coefficient of performance of heat pump

      c. relative coefficient of performance

      d. refrigerating efficiency

82. R-290 is

    a) CO2   b)ammonia   c) water   d) CH4

83. In order to avoid cavitation in centrifugal pumps

    a. the suction pre. should be high

    b. the delivery pre. should be high.

    c. the suction pre. should be low

    d. the delivery pre should be low.

84. Which of the following pump is generally used to pump highly viscous fluid?

    a. centrifugal pump   b. reciprocating pump

    c)airliftpump   d. screw pump.

85. R – 12 is

    a. non-toxic and non-flammable

    b. of white colour and odourless

    c. extremely toxic and non-flammable

    d. colourless and odourless

86. According to moulding sand which one is the wrong statement

    a. It is inexpensive

    b. It can be used again and again

    c. It cannot makes a mould porous

    d. It maintains shape at very   high temperature

87. the distance measured on the circumference of the pitch circle from a point of one tooth to the corresponding point on the next tooth

    a) circular pitch b) diametral pitch c) pitch circle diameter d) none

88. the ratio of number of teeth to the pitch circle diameter in mm

    a) circular pitch   b) diametral pitch

    c) pitch circle diameter   d) module

89. the difference between the tooth space and the tooth thickness is called
a) tooth space difference b) back lash c) clearance d) none

90. the apex of the pitch cone is
a) cone distance b) back cone c) cone center d) addendum

91. the distance of the back of the boss from the cone center is called
a) crown height   b) mounting height

c) back cone distance d) cone distance

92. the linear distance through which a point one thread moves ahead in one revolution of the worm
a) pitch   b) axial pitch c) lead d) all of these

93. normal pitch (Pn) is equal to
a) Pn = Pa Cos θ b) Pn = Pa   c) Pn = Pa sin θ d) Pn = Pa/ Cos θ

where θ and Pa is the helix angle and axial pitch

94. the difference between D.B.T and DPT is called
a) dew point depression   b) dry bulb depression

c) wet bulb depression   d) none

95. curved lines in psychromretric chart is called
a) constant RH lines   b) constant wbt lines c) constant enthalpy lines

d) constant DBT lines

96. horizontal lines in psychromretric chart is called
a) constant RH lines   b) constant wbt lines

c) constant humidity ratio lines   d) constant DBT lines

97. vertical lines in psychromretric chart is called
a) constant RH lines   b) constant wbt lines

c) constant enthalpy lines   d) constant DBT lines

98. in saturated air the WBT is equal to

a) enthalpy b) DPT c) wet bulb depression d) none

99. cop of the vapour compression system for same refrigeration effect is

a)equal to vapour absorption system

b) greater than vapour absorption system

c) less than vapour absorption system

d) any of these

100. R-717 is

  a) CO2 b)ammonia c) water d) CH4

101. ……….. operation is used for enlarging hole

  a) boring b) punching c) lapping d) none

102. ------------operation is used for surface finishing

  a) boring b) punching c) lapping d) none

103. ------------operation is used for making key holes

  a) boring b) Broaching c) lapping d) none

104. centrifugal pump is worked on the principle of ……..

  a) forced vortex b) free vortex

  c) centripetal force d) centrifugal force

105. for avoiding eddy formation …………… casing is used

  a) volute casing b) vortex casing

  c) casing with guide blades d) none

106. the ratio of manometric head to the shaft power is called

  a) mechanical efficiency b) manometric efficiency

  c) overall efficiency d) none

107. power of pump is propotional to --------------

  a) N^3 b) N^2 c) $N^{\frac{1}{2}}$ d) N

108. when will the negative slip is occur, If ………………..

  a) cd = 1 b) cd < 1 c) cd > 1 d) cd = 0

109. the ratio in efficiency of centrifugal pump to reciprocating pump in same power is

  a) 1 b) less than 1 c) greater than 1 d) half

110. in belt drive for transmitting power at velocity of 25 m/s is called ……..
    a) light drive   b) heavy drive

    c) medium drive   d)small drive

111. the tension ratio of flat belt drive is
    a) $e^{\mu\theta}$ b) $e^{\mu\cos ec\theta}$ c) $e^{\theta\cos ec\eta}$ d) $e^{\cos ec\eta\theta}$

    where μ, θ is the friction coiffient and angle of contact

112. In a simple gear train, if the number of idle gears is even then   the motion of driven gear will
    (a) be opposite as that of driving gear

    (b) be same as that of driving gear

    (c) depend on the number of teeth of driving gear

    (d) none of the above.

113. In a simple gear train of four gear wheels, the first gear has 20   teeth, second gear 10 teeth, third gear 10 teeth and the forth gear 40 teeth. The speed ratio of fourth gear to first gear and   the direction are
    (a) ½ and same direction   (b) 2 and same direction

    (c) 2 and opposite direction   (d) ½ and opposite direction.

114. The velocity ratio of two pulleys connected by an open belt is
    (a) directly proportional to the square of their diameters

    (b) directly proportional to their diameters

    (c) inversely proportional to their diameters

    d) inversely proportional to the square of their diameter

115. Choose the correct statement.
    (a) In a crossed belt drive, the directions of rotations of two pulleys connected by it are opposite by it are opposite.

(b) In open belt drive, the directions of rotations of two pulleys connected by it are same

(c) The angle of contact in crossed belt drive is more than that in an open belt drive.

(d) All the above statement

116.   Because of slip of the belt, the velocity ratio of belt

(a) increases   (b) decreases (c) does not change

117.   V – belts can be used to connect two shafts up to
        (a) 2 m apart   (b) 3 m apart (c) 4 m apart (d) 6 m apart

118.   In the gating system the branch passage for the molten metal and which connect the runner and mould cavity is
        a. riser b. basin   c. sprue   d. gate

119.   In the die casting, which one is the wrong statement
                a. Equipment cost is less

                b. Rate of production is high

                c. Semi- skilled labour is enough

                d. Good surface finish can be obtained

120.   In brazing which one is the wrong statement
                a. faster process   b. give good appearance

                c. not suitable to join thick sheets

                d. strength of joint is less than soldering

MECHANICAL ANSWER KEY

1	D	16	B	31	A	46	C	61	D	76	C	91	B	106	C
2	C	17	C	32	B	47	B	62	C	77	C	92	C	107	A
3	B	18	C	33	A	48	D	63	C	78	B	93	A	108	C
4	C	19	D	34	C	49	C	64	C	79	A	94	A	109	C

5	D	20	B	35	B	50	B	65	B	80	C	95	C	110	B
6	D	21	B	36	C	51	D	66	D	81	B	96	C	111	A
7	C	22	B	37	C	52	A	67	B	82	D	97	D	112	A
8	C	23	C	38	C	53	A	68	D	83	A	98	B	113	D
9	D	24	D	39	D	54	B	69	C	84	D	99	B	114	C
10	D	25	A	40	B	55	D	70	B	85	A	100	B	115	D
11	A	26	D	41	C	56	C	71	A	86	C	101	A	116	B
12	B	27	C	42	C	57	D	72	D	87	A	102	C	117	A
13	C	28	B	43	C	58	B	73	A	88	B	103	B	118	D
14	D	29	A	44	B	59	B	74	B	89	B	104	A	119	A
15	C	30	A	45	B	60	D	75	C	90	C	105	B	120	D