

090/2016

Maximum : 100 marks

Time : 1 hour and 15 minutes

1. A fan may be considered as a pump, because it :  
(A) looks like most other kind of pumps (B) circulate fluids, like other pumps  
(C) rotates (D) all of these
2. If  $N$  is the fan speed, then power of a fan is directly proportional to :  
(A)  $N$  (B)  $N^2$   
(C)  $N^3$  (D)  $N^4$
3. For rectangular ducts, the aspect ratio is equal to :  
(A) sum of longer and shorter sides (B) difference of longer and shorter sides  
(C) product of longer and shorter sides (D) ratio of longer and shorter sides
4. The alignment circle is marked on the psychrometric chart at :  
(A)  $20^\circ$  C DBT and 50% RH (B)  $26^\circ$  C DBT and 50% RH  
(C)  $20^\circ$  C DBT and 60% RH (D)  $26^\circ$  C DBT and 60% RH
5. When the temperature of the surroundings is higher than the temperature of the body, then the heat loss by convection from the body to the surroundings will be :  
(A) positive (B) negative  
(C) zero (D) none of these
6. In order to cool and dehumidify a stream of moist air, it must be passed over the coil at a temperature :  
(A) which lies between the dry bulb and wet bulb temperature of the incoming stream  
(B) which lies between the wet bulb and dew point temperature of the incoming stream  
(C) which is lower than the dew point temperature of the incoming stream  
(D) of adiabatic saturation of incoming stream
7. The velocity of stream at the exit of the nozzle is :  
(A) supersonic (B) sonic  
(C) sub-sonic (D) none of these

8. The pressure in a capillary tube decreases due to :
- (A) frictional resistance offered by the tube wall
  - (B) acceleration of refrigerant in the tube
  - (C) heat transfer from the tube
  - (D) both (A) and (B)
9. The freon group of refrigerants are :
- (A) halo-carbon refrigerants
  - (B) azeotrope refrigerants
  - (C) inorganic refrigerants
  - (D) hydro-carbon refrigerants
10. In electrolux refrigerator :
- (A) ammonia is absorbed in hydrogen
  - (B) ammonia is absorbed in water
  - (C) ammonia evaporates in hydrogen
  - (D) hydrogen evaporates in ammonia
11. A boot-strap air cooling system has :
- (A) one heat exchanger
  - (B) two heat exchangers
  - (C) three heat exchangers
  - (D) four heat exchangers
12. The subcooling is a process of cooling the refrigerant in vapour compression refrigeration system:
- (A) before compression
  - (B) after compression
  - (C) before throttling
  - (D) after throttling
13. Which of the following constituents of steel is softest and least strong?
- (A) austenite
  - (B) pearlite
  - (C) ferrite
  - (D) cementite
14. Which hardness method can be used to measure hardness of a single grain?
- (A) Rockwell
  - (B) Knoop
  - (C) Vickers
  - (D) Shore
15. The higher temperature of tempering :
- (A) the softer will be the product
  - (B) the tougher will be the product
  - (C) the harder will be the product
  - (D) the stronger will be the product
16. A key technique in the development of creative alternatives is the use of :
- (A) brain storming
  - (B) morphological
  - (C) synectics
  - (D) systemization

17. Reliability can be considered as :
- (A) the same as the factor of safety
  - (B) the probability of survival of a component
  - (C) the probability that the component will function without any maintenance
  - (D) the ability of a component to take overload
18. Group technology brings together and organises :
- (A) parts and simulation analysis
  - (B) automation and tool production
  - (C) common parts, problems and tasks
  - (D) None of these
19. Most of the large scale modern industry using automation adopt :
- (A) process layout
  - (B) product layout
  - (C) group layout
  - (D) fixed position layout
20. If the demand for an item is doubled and the ordering cost halved, the economic order quantity :
- (A) remains unchanged
  - (B) increases by a factor of 4
  - (C) is doubled
  - (D) is halved
21. Unity of command is violated under \_\_\_\_\_ organization.
- (A) line
  - (B) line and staff
  - (C) functional
  - (D) line as well as functional
22. A device used for lifting or lowering objects suspended from a hook at the end of retractable chains or cables is called :
- (A) hoist
  - (B) job crane
  - (C) portable elevator
  - (D) chain conveyer
23. Bin cards are used in keeping record of :
- (A) man power
  - (B) machine utilization
  - (C) material storage
  - (D) entry/exit time of workers
24. Simple harmonic motion
- (A) is another name for periodic motion
  - (B) is the motion of a point in a circle
  - (C) is a projection of the circular motion of a particle
  - (D) is a projection of the circular motion of a particle at constant speed on a diameter of the circle

25. Routing decides
- (A) sequence in which order / work will be taken up
  - (B) sequence of operations to be followed
  - (C) how the machines can be properly loaded
  - (D) the stock control system
26. The moment of inertia of an area is always least with respect to :
- (A) centroidal axis
  - (B) vertical axis
  - (C) radius of gyration
  - (D) depends upon configuration of the area
27. All of the following statements are correct, except :
- (A) An event is a function of two or more activities
  - (B) An activity of the project is represented by a circle
  - (C) Slack may be positive, zero or negative
  - (D) CPM technique is useful to minimize the direct and indirect expenses
28. The standard length in a sine bar is measured :
- (A) between the centres of two rollers
  - (B) between inner circumference of two rollers
  - (C) between outer circumference of two rollers
  - (D) from edge to edge
29. One atmospheric pressure is not equivalent to :
- (A)  $1.013 \text{ kgf/cm}^2$
  - (B)  $10^4 \text{ N/m}^2$
  - (C) 760 mm of Hg
  - (D) 10.33 m of water column
30. A pitot - static tube measures :
- (A) undisturbed fluid pressure
  - (B) dynamic pressure of a moving stream
  - (C) pressure difference between two fluids
  - (D) difference between the dynamic and static pressure
31. Which one of the following is not a part of micrometer?
- (A) spindle
  - (B) anvil
  - (C) beam
  - (D) sleeve

32. Which of the following statements is not true?
- (A) The coefficient of performance of a refrigerator is generally greater than one
  - (B) The coefficient of performance of a heat pump equals the reciprocal of thermal efficiency of an engine working with in the same temperature limits
  - (C) The horse power per ton of refrigeration equals 4.75 times the coefficient of performance
  - (D) The refrigerating effect corresponding to one ton of refrigeration is nearly equal to 210 kJ/min
33. Solar energy can be directly used in
- (A) air refrigeration system
  - (B) jet refrigeration system
  - (C) vapour compression refrigeration system
  - (D) vapour absorption refrigeration system
34. Choose the false statement
- (A) thermal conductivity is always higher in the purest form of metal
  - (B) heat treatment causes considerable variation in thermal conductivity
  - (C) thermal conductivity of a damp material is considerably higher than the thermal conductivity of the dry material and water taken individually
  - (D) thermal conductivity decreases with increase in the density of the substance
35. Fins are usually provided to a heat exchanger surface in order to augment heat transfer by increasing the
- (A) heat transfer coefficient
  - (B) surface area
  - (C) turbulence level
  - (D) temperature difference
36. Transient conduction means
- (A) very little heat transfer
  - (B) heat transfer for a short time
  - (C) heat transfer with a very small temperature difference
  - (D) conduction when the temperature at a point varies with time
37. Isothermal efficiency of a compressor is defined as the ratio of
- (A) volume of free air delivered per stroke to the swept volume of the piston
  - (B) indicated power to shaft power of the motor of engine required to drive the compressor
  - (C) adiabatic power to the power required to drive the compressor
  - (D) isothermal work to the actual work required to compress the air for the same pressure ratio

38. Suggest the device commonly preferred for supercharging I.C. engines
- (A) piston compressor
  - (B) roots blowers
  - (C) axial flow compressor
  - (D) sliding vane type compressor
39. Critical pressure for steam is
- (A) 185.85 kgf/cm<sup>2</sup>
  - (B) 212.55 kgf/cm<sup>2</sup>
  - (C) 225.65 kgf/cm<sup>2</sup>
  - (D) 245.55 kgf/cm<sup>2</sup>
40. Vapour is a
- (A) pure substance
  - (B) perfect gas
  - (C) mixed phase of liquid and gas
  - (D) substance homogeneous and invariable in chemical composition
41. Which of the following statements is not true with respect to Mollier-diagram?
- (A) The inclination of constant pressure lines equals the absolute temperature
  - (B) The constant pressure lines bend slightly downward in the super heated region
  - (C) The expansion process through a turbine is represented by a vertical line parallel to the ordinate
  - (D) The diagram helps to readily find out the total heat content of a steam of specified pressure and quality
42. During \_\_\_\_\_ a solid changes directly to the gaseous form without ever being a liquid.
- (A) condensation
  - (B) evaporation
  - (C) sublimation
  - (D) crystallisation
43. Highest useful compression ratio is the compression ratio at which the engine
- (A) gives maximum power output
  - (B) can operate without detonation
  - (C) consumes minimum fuel for a particular power output
  - (D) maintains operating pressures and temperatures within prescribed limits
44. Scavenging air means
- (A) air sent under compression
  - (B) air used for forcing the burnt gases out of the cylinder during the exhaust period
  - (C) forced air for cooling the engine cylinder
  - (D) burnt air containing combustion products

45. Which pair of gears usually has high friction losses?  
(A) Spur gears (B) Bevel gears  
(C) Helical gears (D) Worm and worm wheels
46. Which is not the effect of detonation?  
(A) high operating temperature (B) loss in efficiency and power output  
(C) loud and pulsating noise (D) high local stresses
47. A thermodynamic system refers to :  
(A) any defined region in space  
(B) a specified mass in fluid flow  
(C) a specified region of constant volume  
(D) a prescribed and identifiable quantity of matter
48. Identify the wrong statement :  
(A) the laws of thermodynamics cannot be derived mathematically  
(B) the quantity of matter constituting a system remains constant  
(C) the kinetic and potential energies possessed by a system can be converted into heat  
(D) the system and its surroundings taken together constitute an isolated system
49. Poise is the unit of :  
(A) density (B) velocity gradient  
(C) kinematic viscosity (D) dynamic viscosity
50. Capillary action is due to :  
(A) adhesion of liquid particles to a surface  
(B) cohesion of liquid particles  
(C) cohesion and adhesion  
(D) surface tension
51. Bernoulli's equation is applicable between any two points in :  
(A) rotational flow of an incompressible fluid  
(B) irrotational flow of compressible or incompressible fluid  
(C) steady rotational flow of an incompressible fluid  
(D) steady, irrotational flow of an incompressible fluid

52. A Pelton wheel is ideally suited for :  
(A) high head and low discharge (B) high head and high discharge  
(C) low head and low discharge (D) medium head and medium discharge
53. With compression of closed coiled helical spring, the wire gets subjected to :  
(A) tension (B) compression  
(C) shear (D) a combination of shear and tension
54. Size of the gear is generally specified by :  
(A) pitch circle diameter (B) working depth  
(C) module (D) tooth thickness
55. Which is closest to the purest form of iron?  
(A) cast iron (B) wrought iron  
(C) grey iron (D) mild steel
56. A universal joint is an example of :  
(A) lower pair (B) higher pair  
(C) rolling pair (D) sliding pair
57. Bulk modulus is measured in terms of :  
(A) N/m (B)  $N/m^2$   
(C) Nm/s (D)  $Ns/m^2$
58. Percentage elongation during tensile test is indicative of :  
(A) creep (B) malleability  
(C) ductility (D) elasticity of the metal
59. The charpy test is conducted to measure :  
(A) toughness (B) creep strength  
(C) fatigue strength (D) elastic strength of a material
60. A twist drill is a :  
(A) front cutting tool (B) side cutting tool  
(C) end cutting tool (D) front and side cutting tool
61. Large and heavy castings are made by :  
(A) green sand moulding (B) dry sand moulding  
(C) pressure moulding (D) machine moulding