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° C DBT and 50% RH
   (B) 26° C DBT and 50% RH
   (C) 20° C DBT and 60% RH
   (D) 26° 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 conveyor

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 kgf/cm^2

(B) 10^4 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^2
(B) 212.55 kgf/cm^2
(C) 225.65 kgf/cm^2
(D) 245.55 kgf/cm^2

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

62. Which of the following is not a casting defect?
(A) Hot tear
(B) Blow hole
(C) Scab
(D) Decarburization

63. Grey cast iron is best welded by :
(A) TIG
(B) Arc welding
(C) Oxy-acetylene welding
(D) Submerged arc welding

64. Value of coefficient of friction in hot forming is :
(A) 0.4
(B) 0.5
(C) 0.6
(D) 0.7

65. Slag inclusion in casting is a :
(A) surface defects
(B) internal defect
(C) crack
(D) notch

66. Wax pattern is used in :
(A) die casting
(B) shell moulding
(C) investment casting
(D) plaster boards.

67. In drawing operation, the metal flows due to :
(A) ductility
(B) work hardening
(C) plasticity
(D) shearing

68. In compound dies :
(A) two or more cutting operations can be performed simultaneously
(B) cutting and formation operations are combined and carried out in single operation
(C) work piece moves from one station to other with separate operation performed at each section
(D) all of the above

69. The usual ratio of forward and return stroke in shaper is :
(A) 2 : 1
(B) 1 : 2
(C) 2 : 3
(D) 3 : 2

70. Chip breakers are provided on cutting tools :
(A) for safety of operator
(B) to minimize heat generation
(C) permit short segmented chips
(D) increase tool life

71. The power factor of a purely inductive circuit is :
(A) lagging
(B) leading
(C) zero
(D) unity

72. When the supply voltage for an induction motor is reduced, which of the following will increase?
(A) full load current
(B) percentage of slip
(C) maximum temperature rise on full load
(D) all of the above

73. Transformer ratings are usually expressed in terms of :
(A) kWh
(B) kVA
(C) volts
(D) kW

74. The rotor of the alternator has :
(A) two slip rings
(B) no slip rings
(C) four slip rings
(D) none of the above

75. A single phase capacitor start motor will take starting current nearly :
(A) twice the full load current
(B) same as full load current
(C) three times the full load current
(D) none of the above

76. Dielectric is must in :
(A) EDM process
(B) ECM process
(C) Ultrasonic machining
(D) Ion beam machining

77. Which of the following doping will produce p-type semiconductors :
(A) germanium with phosphorous
(B) germanium with indium
(C) silicon with indium
(D) none of the above

78. A thermionic cathode is heated to :
(A) attract electrons
(B) emit electrons
(C) remain electrons
(D) none of the above

79. A zener diode is operated with :
(A) forward bias
(B) reverse bias
(C) both (A) and (B)
(D) none of the above

80. An oscillator circuit is mainly :
(A) AC to DC converter
(B) DC to DC converter
(C) DC to AC converter
(D) None of the above

81. Nana Sahib led the Ist War of Indian Independence (1857) from :
(A) Jhansi
(B) Lucknow
(C) Meerut
(D) Kanpur

82. *Amrita Bazar Patrika* that played an important role in the national freedom struggle movement was published in :

(A) Hindi
(B) Assamese
(C) English
(D) Urdu

83. What is the proportion of Hindus and Muslims in the Indian population as per the Socio Economic and Caste Census findings released in 2015?

(A) 80 : 14
(B) 82 : 13
(C) 81 : 14
(D) 78 : 13

84. Who was the Prime Minister of England When India attained independence in 1947?

(A) Harold Wilson
(B) Winston Churchill
(C) Clement Attlee
(D) Neville Chamberlain

85. *Garibi Hatao* was a slogan of :

(A) Vinobha Bhave
(B) Indira Gandhi
(C) Morarji Desai
(D) Anna Hazare

86. One of the following is not Nobel laureate. Identify the person :

(A) Kailash Satyarthi
(B) Mother Teresa
(C) Jayaprakash Narayan
(D) Rabindranath Tagore

87. Name the Kerala based bank that completed 70 years of operation in 2015?

(A) Federal Bank
(B) Catholic Syrian Bank
(C) South Indian Bank
(D) State Bank of Travancore

88. Name the Leader of the Opposition in the Lok Sabha :

(A) Mallikarjun Kharge
(B) Sonia Gandhi
(C) Rahul Gandhi
(D) Gulab Nabi Azad

89. Which of the following city will host 2020 Olympic Games?

(A) Jakarta
(B) Tokyo
(C) Seoul
(D) Singapore

90. *Santhara* is a religious practice among the :

(A) *Parsis*
(B) Bohra Muslims
(C) Konkani Christians
(D) Jains

91. Who was the first president of *Sree Dharma Paripalana Yogam* founded in 1903?

(A) Kumaran Asan
(B) Dr. P. Palpu
(C) R. Sankar
(D) Narayana Guru

92. *Sadhu Jana Paripalana Sangham* was founded by :
(A) Ayyankali
(B) Pandit Karuppan
(C) Sahodaran Ayyappan
(D) Nataraja Guru

93. Who among the following tried to organize Dalit Christian communities?
(A) Kumara Guru
(B) Chavara Kuriakose
(C) Joseph Parakkat
(D) Mar Evanios

94. Who was the founder and publisher of *Swadeshabhimani*?
(A) A. Balakrishna Pillai
(B) Vakkam Abdul Khader Moulavi
(C) K. Ramakrishna Pillai
(D) Murkkoth Kumaran

95. *Kanneerum Kinavum* is a book authored by :
(A) VKN
(B) Lalithambika Antharjanam
(C) V.K. Bhattathiripad
(D) Dr. Palpu

96. *The Last Mughal* is a book written by :
(A) K. Sachidanandan
(B) William Dalrymple
(C) Robin Jeffrey
(D) Larry Collins and Dominique LaPierre

97. *NITI Aayog* replaced :
(A) Planning Commission
(B) National Integration Council
(C) Law Commission of India
(D) State Reorganisation Commission

98. Telengana became ———— State of India.
(A) 27
(B) 28
(C) 29
(D) 30

99. Irom Sharmila who has been fasting since 2000 demanding the withdrawal of the Armed Forces (Special Powers) Act hails from :
(A) Manipur
(B) Nagaland
(C) Meghalaya
(D) Mizoram

100. Name the social activist and former Vice Chancellor of Kannada University who was shot dead in 2015 in Karnataka for promoting rational thinking :
(A) Narendra Dabholkar
(B) Prabir Ghosh
(C) Govind Pansare
(D) M.M. Kulbarghi