

38. A liquid of specific gravity 0.7 is flowing through a venturimeter having inlet diameter 15 cm and throat diameter of 8 cm. The liquid differential manometer shows a reading of 21 cm. Calculate the difference of pressure head.  
(Specific gravity of Hg is 13.6)  
(A) 285 cm (B) 387 cm  
(C) 435 cm (D) 400 cm
39. If a fluid jet discharging from a 30 mm diameter orifice has a 25 mm diameter at its vena-contracta then its coefficient of contraction will be  
(A) 1.44 (B) 0.75  
(C) 0.69 (D) 1.15
40. Thread accuracy can be checked by \_\_\_\_\_ gauge.  
(A) Ring (B) Plug  
(C) Both (A) and (B) (D) Vernier height
41. Fine grain size wheel is used for \_\_\_\_\_ grinding  
(A) Rough (B) Ordinary  
(C) Un-even (D) Finishing
42. To remove the drill or sleeve from drill machine spindle, the tool used is called \_\_\_\_\_.  
(A) Drill sleeve (B) Drill drift  
(C) Centre drill (D) Counter shank
43. In brazing, the melting point of the filler metal ranges from 620°C to 800°C and it is used in instrument making. The method is  
(A) Torch and Dip brazing  
(B) Dip or Induction brazing  
(C) Silver brazing  
(D) Induction and Torch brazing
44. For round hole punch in sheet by machine is called  
(A) blanking  
(B) marking and dividing  
(C) straightening  
(D) denting and dividing
45. The tools for metal cutting like files etc. are made of \_\_\_\_\_ steel.  
(A) High carbon  
(B) Medium carbon and Low carbon  
(C) High carbon and Medium carbon  
(D) High speed
46. A plate 100 mm wide and 10 mm thick is welded to another plate by means of a double parallel fillet weld. The welding is done along the width of the plate. The plates are subjected to a force of 75 kN. The maximum strength of the joint in tension and shear stress is 80 MPa and 60 MPa respectively. The length of the weld without adding the length for starting and stoppage will approximately be :  
(A) 35.2 mm (B) 44.2 mm  
(C) 88.4 mm (D) > 90.0 mm
47. The welding process which employs an exothermal chemical reaction for the purpose of developing a high temperature is  
(A) Friction welding  
(B) Electro-slag welding  
(C) Thermit welding  
(D) Laser welding
48. The casting defect which is produced because of displacement of the sand by the liquid metal at the wall regions due to hydrostatic pressure is known as:  
(A) Mould shift and Scab  
(B) Swell  
(C) Scab, Runout and Drop  
(D) More than one of the above
49. The operation of milling two sides of a work piece simultaneously is called  
(A) Square milling  
(B) Straddle milling  
(C) Gang milling and climb milling  
(D) End milling
50. In a vapour absorption refrigeration system, heating, cooling and refrigeration takes place at the temperature of 90°C, 15°C and -5°C respectively. The Maximum C.O.P. of the system will be :  
(A) 3.21 (B) 2.30  
(C) 2.02 (D) 2.77

51. In a vapour compression refrigeration system, the effect of sub cooling the vapour before expansion by throttling

- (A) Decreases the work requirement by compressor
- (B) Increases the work requirement by compressor
- (C) Decreases the refrigerating effect
- (D) Increases the refrigerating effect

52. Comparing Vapour compression refrigeration system (VCRS) with vapour absorption refrigeration system (VARS), the Compressor of the former (VCRS) is replaced with

- (A) An absorber, a generator, a liquid pump and a pressure reducing valve
- (B) A generator, an evaporator, a liquid pump and an expansion valve
- (C) A generator, a liquid pump, an expansion valve and a pressure reducing valve
- (D) An absorber, an evaporator, a liquid pump and an expansion valve

53. The capacity of refrigerating machine is expressed as \_\_\_\_\_

- (A) Inside volume of cabinet
- (B) Lowest temperature attained
- (C) Gross weight of machine in tons
- (D) Rate of abstraction of heat from the space being cooled

54. The throttling operation in a refrigeration cycle is carried out in \_\_\_\_\_

- (A) Evaporator
- (B) Discharge valve
- (C) Capillary tube
- (D) Expansion valve and Discharge valve

55. In Actual practice, for four stroke engine the outlet valve gets open

- (A) Just before the completion of compression stroke
- (B) Just after the completion of compression stroke
- (C) Just after the completion of suction stroke
- (D) Just before the completion of power stroke

56. Which of the following refrigerant is having highest toxicity and no flammability?

- (A) Freon-12 and Carbon dioxide
- (B) Ammonia
- (C) Sulphur dioxide
- (D) More than one of the above

57. Steam turbines work on \_\_\_\_\_

- (A) Otto cycle
- (B) Dual cycle and Otto cycle
- (C) Rankine cycle
- (D) None of the above

58. The volumetric efficiency of a compressor

- (A) Increases with decrease in compression ratio
- (B) Decreases with decrease in compression ratio
- (C) Increases with increase in compression ratio
- (D) Decrease with increase in compression ratio

59. If the flow of air through the compressor is perpendicular to its axis, then it is a \_\_\_\_\_

- (A) Reciprocating compressor
- (B) Centrifugal compressor
- (C) Turbo compressor
- (D) Axial flow compressor

60. Which among the following is not a property of the system?

- (A) Pressure and internal energy
- (B) Internal energy
- (C) Work
- (D) Pressure and thermal conductivity

61. Heat transferred during a reversible Isobaric process is equal to :

- (A) Change in enthalpy
- (B) Change in internal energy
- (C) Change in entropy and internal energy
- (D) Work transfer

62. Which of the following process is associated with diesel cycle?

- (A) Constant volume and Adiabatic process
- (B) Constant pressure and Constant volume
- (C) Isothermal process
- (D) More than one of the above



63. Which of the following is not the essential part of a simple carburettor :  
 (A) Float chamber and spark plug  
 (B) Discharge nozzle and Fuel strainer  
 (C) Venturi tube and Filtering device  
 (D) Spark plug
64. The inner surface of a 400 mm thick brick wall of a furnace is kept at  $707^{\circ}\text{C}$  and it is found that the outer surface temperature is 460 Kelvin. Assuming that the conductivity is  $0.75 \text{ W/m K}$ , the heat loss per square metre of wall area will be:  
 (A) 725 W (B) 975 W  
 (C) 1050 W (D) 900 W
65. What mixture is to be used for cruising power range, in a petrol engine requires?  
 (A) lean mixture  
 (B) rich mixture  
 (C) chemically correct  
 (D) none of these
66. At critical point the latent heat of vaporization is :  
 (A) Maximum or minimum  
 (B) Infinity  
 (C) Dependent on temperature only  
 (D) Zero
67. In a Carnot cycle, with temperature of low temperature body being fixed, as the temperature of high temperature body is allowed to vary then :  
 (A) Efficiency of carnot cycle increases with increase in temperature  
 (B) Efficiency of carnot cycle increases with decrease in temperature  
 (C) Efficiency of carnot cycle may increase or decrease with increase in temperature  
 (D) Efficiency of carnot cycle does not depend on temperature
68. The number of valves in a two stroke petrol engine is  
 (A) zero (B) four  
 (C) two (D) one or three
69. The component of battery ignition system in which voltage is increased to much higher value from battery voltage is called  
 (A) Condenser (B) Ignition coil  
 (C) Distributor (D) Ballast resistor
70. The angle between the direction of the follower motion and a normal to the pitch curve is called  
 (A) Base angle and critical angle  
 (B) Prime angle and cam angle  
 (C) Pitch angle or base angle  
 (D) Pressure angle
71. Possible method of failure of forked end in Knuckle joint is  
 (A) Failure in tension only  
 (B) Failure may take place by shear and tension only  
 (C) Failure may take place by crushing and shear only  
 (D) Failure may take place by tension, shear or crushing
72. Point of contraflexure is a point, at which  
 (A) bending moment is minimum  
 (B) bending moment changes sign  
 (C) shear force changes sign  
 (D) both (A) and (C)
73. In Bridge construction, which type of layout is more suitable  
 (A) Product layout and Process layout  
 (B) Combined layout  
 (C) Fixed position layout  
 (D) More than one of the above
74. For a knife edge follower  
 (A) Prime circle and Pitch circle are same  
 (B) Prime circle and Base circle are same  
 (C) Prime circle is less than Base circle  
 (D) Prime circle is greater than Base circle
75. Which of the following governors is spring loaded  
 (A) Pickering Governor and Proell Governor  
 (B) Watt Governor and Porter Governor  
 (C) Hartnell governor and Watt Governor  
 (D) Hartnell governor and Pickering Governor

76. When a part is subjected to a constant stress at high temperature for a long period of time, it will undergo a slow and permanent deformation is called  
 (A) Fatigue or plasticity  
 (B) Creep  
 (C) Resilience  
 (D) Toughness or ductility
77. Which of the following is not the assumption of Euler's theory?  
 (A) The direct stress is very small compared with the bending stress corresponding to the buckling condition.  
 (B) The column is initially straight and of uniform lateral dimension  
 (C) The material of the column is perfectly homogeneous and isotropic  
 (D) None of the above
78. Brake fade is  
 (A) loss of co-efficient of friction  
 (B) loss of hydraulic fluid  
 (C) Loss of pedal  
 (D) gain of co-efficient of friction
79. Normally the clutch is mounted between the :  
 (A) gear box and propeller shaft  
 (B) engine and gear box  
 (C) rear axle and differential  
 (D) propeller shaft and rear axle
80. The efficiency of an Otto cycle is 50% and  $\gamma = 1.25$ . The value of compression ratio will be :  
 (A) 16 (B) 8  
 (C) 4 (D) None of the above
81. An alloy has a modulus of Elasticity of 135 GPa and modulus of rigidity of 45 GPa. The value of Poisson's ratio ( $\mu$ ) is :  
 (A) 0.33 (B) 0.50  
 (C) 0.25 (D) 0.62
82. In a simply supported beam, if there is a uniformly distributed load between two points, then the bending moment between these two points varies following a \_\_\_\_  
 (A) cubic law  
 (B) parabolic law  
 (C) linear law  
 (D) bending moment will not vary at all
83. A sample of air is having 25°C Dry Bulb Temperature (DBT), relative humidity 35% at barometric pressure of 760 mm of Hg and saturation pressure of vapour is 0.028 bar. The vapour pressure will be:  
 (A) 0.0098 bar (B) 0.0520 bar  
 (C) 0.0289 bar (D) 11.320 bar
84. The efficiency of a Rankine cycle  
 (A) increases with decrease in temperature of heat rejection  
 (B) is independent of temperature of heat rejection and exhaust pressure  
 (C) increases with increase in exhaust pressure  
 (D) decreases with increase in temperature of heat rejection
85. The duplex feed pump for a steam boiler belongs to the category of \_\_\_\_  
 (A) gear pump  
 (B) jet pump  
 (C) reciprocating pump  
 (D) None of the above
86. Select the wrong statements :  
 (A) Iso-octane fuel has an octane rating of 100.  
 (B) The ignition quality of a petrol engine fuel is expressed as Cetane number  
 (C) In spark ignition engines, knocking can be reduced by retarding the spark advance  
 (D) Knocking tendency in a SI engine reduces with increasing engine speed
87. Which of the following material is used for the insulating body of a spark plug?  
 (A) Silica and Dolomite  
 (B) Glass and mica  
 (C) Sintered alumina  
 (D) Porcelain and Glass
88. The primary function of lubrication in an automobile engine is to  
 (A) Reduce friction between moving parts  
 (B) Remove heat from the cylinder and bearings  
 (C) Provide cushions to the moving parts against shocks and vibrations  
 (D) Avoid leakage of charge by providing effective sealing



89. Select the correct statements :

- (A) Paraffins in petrol have the general formula  $C_nH_{2n+2}$
- (B) Ethanol is often called the fuel of future
- (C) In a petrol engine, the tendency of detonation increases with Supercharging
- (D) Bituminous coal is the best quality of coal and contains over 85 percent carbon.

90. The power developed by a diesel engine is not increased by \_\_\_\_\_

- (A) Higher compression ratio
- (B) Fine atomisation of fuel
- (C) Excess supply of air
- (D) Supplying air at increased pressure

91. For the same compression ratio and heat input, the cycle in decreasing order of thermal efficiency are

- (A) Otto, dual, diesel
- (B) Diesel, otto, dual
- (C) diesel, dual, otto
- (D) Otto, diesel, dual

92. Which of the following statements is correct?

- (A) The minimum number of rings in a piston are four
- (B) automobile pistons are made from Steel forgings
- (C) Incomplete combustion of fuel is characterized by Exhaust with smoke
- (D) Temperature does not remain constant during Joule-Thomson expansion

93. Which of the following processes can approach reversibility?

- (A) Chemical reactions
- (B) Mixing of different substances
- (C) Action of brakes in stopping a vehicle
- (D) Controlled or restricted expansion or compression

94. Expansion of hot gases in an I.C. engine can be approximated to an \_\_\_\_\_

- (A) Adiabatic process
- (B) Isochoric process
- (C) Isothermal process or Isobaric process
- (D) None of the above

95. In a flat belt drive, the slip between the driver and belt is 2% and that between the belt and the follower is 4%. If the ratio of pulley diameters for the drive and follower is 1 : 1, then the velocity ratio of the drive is

- (A) 0.87
- (B) 0.77
- (C) 0.94
- (D) 0.98

96. For a Watt governor, 15 cm height corresponds to an angular speed of

- (A) 9.2 rad/sec
- (B) 8.1 rad/sec
- (C) 6.5 rad/sec
- (D) 7.0 rad/sec

97. For a hollow shaft of external and internal diameters 10 cm and 4 cm respectively, the torsional section modulus will be

- (A)  $219 \text{ cm}^3$
- (B)  $161 \text{ cm}^3$
- (C)  $191 \text{ cm}^3$
- (D)  $184 \text{ cm}^3$

98. The incorrect expression among the following is :

- (A)  $\Delta G_{\text{system}} = -T \Delta S_{\text{total}}$
- (B) In isothermal process  $W_{\text{reversible}} = -nRT \ln \frac{V_f}{V_i}$
- (C) Both (A) and (B)
- (D)  $\Delta G^\circ = -(\Delta H^\circ - T\Delta S^\circ)$

99. A Carnot engine operating between temperatures  $T_1$  and  $T_2$  has efficiency  $1/8$ . When  $T_2$  is lowered by 85 K, its efficiency increases to  $1/4$ . Then  $T_1$  and  $T_2$  are, respectively :

- (A) 680 K and 595 K
- (B) 340 K and 297.5 K
- (C) 640 K and 560 K
- (D) 540 K and 472.5 K

100. A pipe to carry the water from the reservoir to the turbine house is known as

- (A) Draft tube
- (B) Nozzle
- (C) Penstock
- (D) Tail race

101. The representation of an isentropic process on T-s diagram is done with the help of \_\_\_\_\_

- (A) Curved line
- (B) Vertical line
- (C) Horizontal line
- (D) Inclined line

102. Air standard efficiency of a diesel cycle does not depend upon

- (A) cut off ratio
- (B) ratio of specific heats
- (C) Adiabatic compression ratio
- (D) None of the above

103. In thermal power plant, \_\_\_\_\_ cycle is used.

- (A) Rankine (B) Ericsson  
(C) Brayton (D) Carnot

104. A simple Rankine cycle produces 37 MW of power, 48 MW of process heat and rejects 80 MW of heat to the surroundings. What is the utilization factor of this co-generation cycle neglecting the pump work?

- (A) 40.5% (B) 51.5%  
(C) 60.0% (D) 72.2%

105. Rankine cycle efficiency of a good Steam Power Plant may be in the range of \_\_\_\_\_?

- (A) 15 - 25% (B) 60 - 70%  
(C) 35 - 45% (D) 75 - 90%

106. What is the actual turbine inlet temperature in Rankine cycle?

- (A) 420 °C (B) 545 °C  
(C) 750 °C (D) 1450 °C

107. Match the following :

**Group - A**

**Group - B**

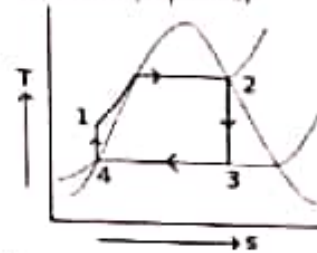
1. Pump (a) constant pressure heat rejection  
2. Boiler (b) reversible adiabatic expansion of steam  
3. Condenser (c) constant pressure heat addition  
(d) reversible adiabatic compression

- (A) 1 - (b), 2 - (c), 3 - (d)  
(B) 1 - (d), 2 - (c), 3 - (a)  
(C) 1 - (d), 2 - (a), 3 - (b)  
(D) None of the above

108. Rankine cycle comprises of \_\_\_\_\_

- (A) two isentropic processes and two constant pressure processes  
(B) two isentropic processes and two constant volume processes  
(C) two isothermal processes and two constant pressure processes  
(D) two constant volume processes and two constant pressure processes

109. In the T-s diagram of vapour power cycle, what is the condition of steam at the starting of turbine expansion? (at point 2)



- (A) wet with dryness fraction 0.8  
(B) dry saturated  
(C) superheated  
(D) None of the above

110. How is the capacity of vapour power plant expressed?

- (A) in terms of steam rate  
(B) in terms of work output  
(C) in terms of heat rate  
(D) None of the above

111. If the compression ratio in I.C. engine increases, then its thermal efficiency will \_\_\_\_\_

- (A) increase  
(B) decrease  
(C) remain same  
(D) increase and decrease

112. Which of the following is compressed in diesel engine?

- (A) Fuel  
(B) Air and lubricating oil  
(C) Air and fuel  
(D) Air

113. The fuel in diesel engine is normally injected at pressure of \_\_\_\_\_

- (A) 90-130 kg/cm<sup>2</sup> (B) 60-80 kg/cm<sup>2</sup>  
(C) 30-45 kg/cm<sup>2</sup> (D) None of the above

114. A saturation state is a state from which a change of phase may occur

- (A) without a change of pressure or temperature  
(B) with a change of pressure or temperature  
(C) both (A) and (B)  
(D) none of the above

115. Which of the following exists in a P-V diagram for water?

- (A) saturated solid line
- (B) saturated liquid lines
- (C) saturated vapour line
- (D) more than one of the above

116. The equation which forms the basis of the Mollier diagram is \_\_\_\_\_

- (A)  $Tds = -dh + vdp$
- (B)  $Tds = dh + vdp$
- (C)  $Tds = dh - vdp$
- (D) None of the above

117. Calculate the dryness fraction of steam which has 25 kg of water in suspension with 60 kg of steam.

- (A) 0.99
- (B) 0.96
- (C) 0.93
- (D) 0.85

✓ 118. Throttling calorimeter is a device can use to measure the quality of \_\_\_\_\_

- (A) super-heated steam
- (B) wet steam
- (C) dry steam
- (D) none of the above

✓ 119. The properties of water are arranged in the steam tables as a functions of \_\_\_\_\_

- (A) pressure
- (B) pressure and temperature
- (C) temperature
- (D) None of the above

✓ 120. Saturated liquid or the saturated vapour has how many independent variables?

- (A) three
- (B) one
- (C) two
- (D) none of the above