COMBINED COMPETITIVE (PRELIMINARY) EXAMINATION, 2012

Serial No. [   ]

MECHANICAL ENGINEERING
Code No. 14

A

Time Allowed : Two Hours

Maximum Marks : 300

INSTRUCTIONS

1. IMMEDIATELY AFTER THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS TEST BOOKLET DOES NOT HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS, ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET.

2. ENCODE CLEARLY THE TEST BOOKLET SERIES **A, B, C OR D** AS THE CASE MAY BE IN THE APPROPRIATE PLACE IN THE RESPONSE SHEET.

3. You have to enter your Roll Number on this Test Booklet in the Box provided alongside. *DO NOT* write *anything else* on the Test Booklet.

   Your Roll No.
   _____

4. This Booklet contains 120 items (questions). Each item comprises *four* responses (answers). You will select *one* response which you want to mark on the Response Sheet. In case you feel that there is more than one correct response, mark the response which you consider the best. In any case, choose ONLY ONE response for each item.

5. In case you find any discrepancy in this test booklet in any question(s) or the Responses, a written representation explaining the details of such alleged discrepancy, be submitted within three days, indicating the Question No(s) and the Test Booklet Series, in which the discrepancy is alleged. Representation not received within time shall not be entertained at all.

6. You have to mark all your responses ONLY on the separate Response Sheet provided. *See directions in the Response Sheet.*

7. All items carry equal marks. Attempt ALL items. Your total marks will depend only on the number of correct responses marked by you in the Response Sheet.

8. Before you proceed to mark in the Response Sheet the response to various items in the Test Booklet, you have to fill in some particulars in the Response Sheet as per instructions sent to you with your Admit Card and Instructions.

9. While writing Centre, Subject and Roll No. on the top of the Response Sheet in appropriate boxes use **"ONLY BALL POINT PEN".**

10. After you have completed filling in all your responses on the Response Sheet and the examination has concluded, you should hand over to the Invigilator only the Response Sheet. You are permitted to take away with you the Test Booklet.

ROUGH WORK

1. Moment of a force about a point is :
   (A) Same as Couple
   (B) Same as Torque
   (C) Magnitude of Force multiplied by perpendicular distance from the point of Force
   (D) Same as moment of couple

2. In case of cocurrent coplanar forces the condition for equilibrium is :
   (A) $\Sigma\,H = 0,\ \Sigma\,V = 0,\ \Sigma\,M = 0$ (B) $\Sigma\,H = 0,\ \Sigma\,V = 0$
   (C) $\Sigma\,H = 0,\ \Sigma\,M = 0$ (D) $\Sigma\,V = 0,\ \Sigma\,M = 0$

3. The resultant of forces P = –2i – 3j and Q = 3i – 4j will lie in which quadrant ?
   (A) First   (B) Second
   (C) Third   (D) Fourth

4. A body is acted upon by a number of coplanar, non-concurrent forces, it may :
   (A) rotate about itself without moving
   (B) be completely at rest
   (C) moving in one direction and rotating about itself
   (D) None of the above

5. Two skew shafts can be connected by _____ gears.
   (A) straight spur   (B) spiral bevel
   (C) cross helical   (D) straight bevel

6. The mass moment of inertia of rectangular plate of mass M and sides a and b about an axis perpendicular to plate through it is :

   (A) $\dfrac{M}{6}\left(a^2 + b^2\right)$ (B) $\dfrac{Ma^2}{4} + \dfrac{Mb^2}{12}$

   (C) $\dfrac{M}{12}(a^2 + b^2)$ (D) $\dfrac{bd^3}{12}$

7. Two forces are at an angle of 120º. If the bigger force is 40 N and the resultant to smaller Force ratio is $\sqrt{3}$, then the smaller force will be :
   (A) 20 N   (B) 40 N
   (C) 80 Kg   (D) None of the above

8. From gravitational law the weight W of an 80 kg in spacecraft travelling in a circular orbit 280 km above earth is :
(A) 728 N
(B) 804·8 N
(C) 646 N
(D) None of above

9. A 50 kg homogeneous smooth sphere rests on the 30º incline at A and bears against the smooth vertical wall B. The contact force at A and B are :
(A) $F_A = 566$ N, $F_B = 283$ N
(B) $F_A = 283$ N, $F_B = 566$ N
(C) $F_A = 566$ N, $F_B = 180$ N
(D) $F_A = 180$ N, $F_B = 283$ N

10. A uniform of length 3·6 m between support has a mass of 50 kg per meter of length. If a mass of 300 kg is placed at 2·4 m from left end support A, the reactions at supports A and B are :
(A) $A_y = 2840$ N, $B_y = 1850$ N
(B) $A_y = 1864$ N, $B_y = 2840$ N
(C) $A_y = 1850$ N, $B_y = 2840$ N
(D) None of above

11. The tension in the cable supporting a lift :
(A) is less when moving upward
(B) is less when moving downward
(C) is more when moving downward
(D) is more when moving upwards

12. A body of mass m moving with constant velocity hits another body of the same mass at rest and sticks to it. The velocity combined masses after collision is :

(A) $\dfrac{V}{4}$
(B) V

(C) 2 V
(D) $\dfrac{V}{2}$

13. The inherent property of a body which offers resistance to change is :
(A) weight
(B) mass
(C) momentum
(D) inertia

14. A block of mass m attached to a spring of stiffness K is pushed to the right side-away from support with velocity v when the spring is unstretched. The maximum extension of spring x is :

(A) $\sqrt{\dfrac{K}{2m}} \cdot \upsilon$
(B) $b = \sqrt{\dfrac{m}{K}} \, \upsilon$

(C) $\dfrac{K}{m} \cdot \upsilon$
(D) $d = \sqrt{\dfrac{K}{m}} \cdot \upsilon$

15. A truck of 6 ton mass is moving on a level terrain at a speed of 80 kmph, when brakes are applied. The braking force is of constant magnitude of 4 N/ton. The distance travelled before coming to rest is :
    (A) 69 m   (B) 71·62 m
    (C) 61·72 m   (D) 72·61 m

16. The pressure angle between a pair of mating gears is :
    (A) Common tangent at p.c.d. and arc of contact
    (B) Common tangent at p.c.d. and common tangent on base circle
    (C) Ratio of arc of contact & path of contact
    (D) None of above

17. The dimensions of power are :
    (A) ML^2T^2 (B) MLT^3
    (C) ML^2T^3 (D) ML^2T^{-3}

18. Which of the following is a scalar quantity ?
    (A) energy   (B) momentum
    (C) torque   (D) impulse

19. A ball is dropped from a height of 9 m on a horizontal floor. If it rebounds to a height of 4 m after striking the floor, the coefficient of restitution between the ball & the floor is :

    $\dfrac{2\,\omega}{\pi}$

    (A) $\dfrac{1}{4}$ (B) $\dfrac{2}{3}$

    (C) $\dfrac{3}{2}$ (D) $\dfrac{4}{3}$

20. In a Simple Harmonic Motion the time period T is given by :

    (A) $\dfrac{2\pi}{\omega}$ (B) $2\pi\,\omega$

    (C) $\dfrac{2\pi}{\omega^2}$ (D)

21. When a body slides down on inclined surface the acceleration of the body is given by :
    (A) g   (B) g sin θ
    (C) g cos θ   (D) g tan θ

22. The link or element must be :
    (A) rigid body   (B) resistant body
    (C) both (a) & (b) above   (D) None of the above

23. When two elements have surface contact when relative motion takes place and surface of one element slides over the surface of other, the pair formed is known as :
(A) higher pair
(B) lower pair
(C) force-closed pair
(D) turning pair

24. A kinematic chain requires minimum of :
(A) 2 links and 2 turning pair
(B) 3 links and 3 turning pair
(C) 4 links and 4 turning pair
(D) None of above

25. The time period of a compound pendulum is equal to :

(A) $2\pi \sqrt{\dfrac{gh}{K^2 + h^2}}$

(B) $2\pi \sqrt{\dfrac{K^2 + h^2}{gh}}$

(C) $\dfrac{1}{2\pi} \sqrt{\dfrac{K^2 + h^2}{gh}}$

(D) $\dfrac{1}{2\pi} \sqrt{\dfrac{gh}{K^2 + h^2}}$

where K is radius of gyration about an axes through C.G. and h is the distance of its C.G. from the axis of suspension.

26. A harmonic motion is expressed as

$$x = 1 \cdot 25 \, \rho_{in} \left(15\pi t - \dfrac{x}{3} \right)$$

where x is in meters. The frequency of motion would be :
(A) 1·25 Hz
(B) 15 Hz
(C) 15 π Hz
(D) 7·5 Hz

27. A vibrating mass under the condition of resonance has phase angle (i.e. angle between displacement vector and disturbing force vector) as :

(A) 0°

(B) $\dfrac{\pi}{4}$

(C)

(D) π

28. A circular disc of moment of inertia J is attached to lower end of elastic vertical shaft which is fixed at other end. If the mass of shaft is small and K is the torsional stiffness of shaft, the natural frequency of torsional vibration is :

(A)

(B) $\omega_n = \sqrt{\dfrac{K}{g}}$

(C) $\omega_n = \sqrt{\dfrac{J}{K}}$

(D) $\omega_n = 2\pi \sqrt{\dfrac{J}{K}}$

29. A simply supported beam of length L between supports is loaded at the center of beam with a mass M. The natural frequency in Hz would be :

(A) $\dfrac{1}{2\pi}\sqrt{\dfrac{48\,EI}{ML^3}}$

(B) $2\pi\sqrt{\dfrac{48\,EI}{ML^3}}$

(C) $\dfrac{1}{2\pi}\sqrt{\dfrac{16\,EI}{ML^3}}$

(D) $\dfrac{1}{\pi}\sqrt{\dfrac{48\,EI}{ML^3}}$

30. In a Hartnell governor if the stiffness of spring is increased, the governor will :
(A) Become more sensitive
(B) Becomes less sensitive
(C) Starts Hunting
(D) Become isochronous

31. The number nodes in a shaft carrying two rotors at two ends will be :
(A) Zero
(B) One
(C) Two
(D) None of above

32. Modulus of rigidity is given by :

(A) $\dfrac{\text{stress}}{\text{strain}}$

(B) $\dfrac{\text{compressive stress}}{\text{compressive strain}}$

(C) $\dfrac{\text{shear stress}}{\text{shear strain}}$

(D) None

$\dfrac{PE}{A\,l}$

33. A tensile load 'P' acts on a length l and area of cross-section A. The change in length would be

(A) $\dfrac{P}{l\,AE}$

(B)

(C) $\dfrac{P\,l}{AE}$

(D) $\dfrac{A\,l}{PE}$

34. A cantilever beam of length 'l' carries a uniformly distributed load over the whole length. The bending moment diagram will be :
(A) Parabola with maximum ordinate at the centre
(B) Parabola with maximum ordinate at cantilever end
(C) Triangle with maximum ordinate at free end
(D) Triangle with maximum ordinate at cantilever end

35. A simply supported beam carries a uniformly distributed load of W Newton unit length over the whole length 'l'. The shear force at the centre is :

(A) $\dfrac{w\,\ell}{2}$

(B) $\dfrac{w\,\ell^2}{8}$

(C) $\dfrac{w\,\ell}{4}$

(D) Zero

36. A solid circular shaft of diameter D carries an axial load W. If the same load is applied axially to a hollow cylinder shaft of inner diameter as $\dfrac{D}{2}$, the ratio of stress in solid shaft to that of hollow shaft would be :

(A) $\dfrac{1}{2}$

(B) $\dfrac{1}{4}$

(C) $\dfrac{4}{3}$

(D) $\dfrac{3}{4}$

37. The expression EI $\dfrac{d^3y}{dx^3}$ at section of member represent :

(A) Shearing force

(B) Rate of loading

(C) Bending moment

(D) Slope

38. When a shaft is subjected to torsion, the relation between maximum shear stress f_s, modulus of rigidity G of the shaft and the angle of twist θ is given by :

(A) $\dfrac{G\,\theta}{f_s} = \dfrac{R}{L}$

(B)

(C)

(D)

where L is length of shaft and R is the radius of shaft.

39. In metal cutting operation continuous chips are produced while machining :

(A) brittle material

(B) ductile material

(C) hard material

(D) soft material

40. In metal cutting operation chips are formed due to :

(A) Linear deformation

(B) Shear deformation

(C) Linear translation

(D) None

41. The average cutting speed for machining cast iron by a high speed steel tool is :
    (A) 10 m/min   (B) 22 m/min
    (C) 30 m/min   (D) 300 m/min

42. The relationship between tool life 'T' and cutting speed 'V' in m/min is given as :
    (A) $V^n T = C$ (B) $V T^n = C$

    (C) $\dfrac{V^n}{T} = C$ (D) $\dfrac{T^n}{V} = 0$

    where C is constant and 'n' is an exponent depending upon tool and workpiece.

43. Tool Signature :
    (A) is a natural method of tool identification
    (B) is a numerical method of tool identification
    (C) represents tool life
    (D) none of the above

44. Operation of cutting holes in sheet by a press is known as :
    (A) drilling   (B) shearing
    (C) extrusion   (D) none of above

45. Cold chisel are made by :
    (A) rolling   (B) forging
    (C) piercing   (D) drawing

46. Forging of steel is done at a temperature of :
    (A) 400ºC   (B) 800ºC
    (C) 1000ºC   (D) 1300ºC

47. Seam welding is used for metal sheets having thickness in the range of :
    (A) 0·025 to 3 mm   (B) 3 to 6 mm
    (C) 6 to 10 mm   (D) more than 10 mm

48. Which of the following defect in castings is caused by the molten metal ?
    (A) Scab   (B) Swell
    (C) Shrinkage   (D) Blow Holes

49. In wirecut EDM the electrode is :
    (A) a thin wire   (B) a thin sheet
    (C) a copper bar   (D) a tungsten plate

50. Which of the following is a single point cutting tool ?
   (A) Milling cutter
   (B) Hacksaw blade
   (C) Grinding wheel
   (D) Parting tool

51. Which type of gear can be manufactured by extrusion process ?
   (A) Bevel Gears
   (B) Harring bon Gear
   (C) Helical Gear
   (D) Spur Gear

52. Internal Gears and splines used in automobile industry are manufactured by :
   (A) Casting
   (B) Milling
   (C) Broaching
   (D) Gear shaping

53. Gears made by sand casting are used in :
   (A) Automobile
   (B) Machine tools
   (C) Diesel locomotives
   (D) Concrete mixers

54. The process which takes place below recrystallisation temperature, is known as :
   (A) hot working process
   (B) cold working process
   (C) casting process
   (D) none of above

55. Slag inclusion in casting is a :
   (A) Surface defect
   (B) Internal defect
   (C) Superficial defect
   (D) None

56. Time study is done by means of :
   (A) Stop watch
   (B) Time study sheet
   (C) Planning chart
   (D) Both (A) and (B) above

57. Time standards developed by time study can be used for :
   (A) plan layout
   (B) budgetary control
   (C) equipment selection
   (D) wages & incentives

58. Graphic representation of the separable steps of each pertinent body member of the individual is known as :
   (A) Bar chart
   (B) SIMO chart
   (C) Gantt chart
   (D) None

59. Layout suitable for automobile manufacturing unit is
   (A) process layout   (B) product layout
   (C) combination layout   (D) all above

60. Objective of work measurement is to :
   (A) plan and schedule the production
   (B) formulate proper incentive scheme
   (C) estimate the selling price and delivery date
   (D) all above

61. Break even analysis consist of :
   (A) fixed expense   (B) variable cost
   (C) sales revenue   (D) all above

62. Direct cost of a project constitutes
   (A) cost of material   (B) wages of labour
   (C) both (A) and (B)   (D) none

63. A continuous production of products of same design on a line of machines arranged according to the required sequence of operation is known as :
   (A) flow production   (B) mass production
   (C) line production   (D) continuous production

64. The unit cost in case of batch production as compared to jobbing production is :
   (A) High   (B) Low
   (C) Same   (D) None

65. Jobs going behind schedule are conveniently shown in
   (A) bar chart   (B) Gantt chart
   (C) travel chart   (D) pi chart

66. Mathematical technique used for finding the best use of limited resources of concern in an optimum manner, is known as :
   (A) queuing theory   (B) Linear programming
   (C) value analysis   (D) game theory

67. Queuing theory is used for
   (A) job-shop scheduling   (B) inventory problems
   (C) traffic congestion studies   (D) all above

68. For a closed system the difference between heat added to the system and work done by the system is equal to change in :
(A) temperature (B) internal energy
(C) enthalpy (D) entropy

69. Specific heat is the amount of heat required to raise the temperature :
(A) by unit degree of a substance (B) by unit degree of unit mass
(C) by 10^2 degree of unit mass (D) none

70. When two bodies are in thermal equilibrium with a third body, they are also in thermal equilibrium with each other. This statement is :
(A) Zeroth law of thermodynamics (B) First law of thermodynamics
(C) Second law of thermodynamics (D) None of the above

71. According to kinetic theory of gases, at absolute zero :
(A) specific heat of molecules reduces to zero
(B) kinetic energy of molecules reduces to zero
(C) volume of gas reduces to zero
(D) pressure of gas reduces to zero

72. Equal volume of all gases at same temperature and pressure contain equal number of molecules. This is according to :
(A) Charle's law (B) Avogadro law
(C) Joule's law (D) Gay Lussac law

73. In isothermal expansion, work done by a gas depends on :
(A) atomicity of gas only (B) expansion ratio only
(C) adiabatic index (D) both (A) and (B) above

74. When a perfect gas is expanded through an aperture of minute dimensions, the process is :
(A) isothermal (B) adiabatic
(C) isentropic (D) throttling

75. If v_1 is the volume at beginning and v_2 is volume at the end of expansion, then the expansion ratio 'r' is given by :

(A) $\dfrac{v_1}{v_2}$

(B) $\dfrac{v_2}{v_1}$

(C) $\dfrac{v_1 + v_2}{v_1}$

(D)

76. The 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

77. Compression ratio of a petrol engine is :
(A) 3 to 6   (B) 5 to 8
(C) 15 to 20   (D) 20 to 30

78. The efficiency of a Rankine cycle :
(A) increases with decreasing temperature of heat rejection

$\dfrac{v_1 + v_2}{v_1 - v_2}$

(B) decreases with decreasing temperature of heat rejection
(C) decreases with increasing temperature of heat rejection
(D) none

79. The Reynolds number for pipe flow is given by :

(A)

(B) $\dfrac{VD\,\mu}{\delta}$

(C) $\dfrac{VD\,\rho}{\mu}$

(D) $\dfrac{VD}{\mu}$

80. The mercury water manometer indicates a gauge difference of 400 mm. The difference of pressure measured in meters of water is :
(A) 0·4   (B) 0·8
(C) 10·8   (D) 5·44

81. Steady flow occurs when :
    (A) The pressure does not change along the flow
    (B) The velocity does not change
    (C) There is no obstruction on the path of flow
    (D) Conditions do not change with time

82. The continuity equation in ideal fluid flow :
    (A) States that the net rate of inflow into any small volume must be zero
    (B) States that energy is constant every where in the fluid
    (C) States that energy remains constant along stream line
    (D) Applies to irrotational flow

83. Which of the following is laminar flow ?
    (A) Rise of water in plants through roots
    (B) Movement of blood in the arteries of a human body
    (C) Flow of oil in measuring instruments
    (D) All above

84. The dimensions of dynamic viscosity are :
    (A) $ML^{-1} T^{-2}$ (B) MLT^{-2}
    (C) $ML^{-1} T^{-1}$ (D) $ML^{-1} T$

85. The Bernoulli's equation $\dfrac{V^2}{2g} + \dfrac{P}{\gamma} + Z =$ constant represent total energy per unit :

    (A) mass   (B) volume
    (C) weight   (D) specific weight

86. The loss of energy in commercial pipe fitting is denoted by loss coefficient 'K_L' which is expressed by :

    (A) $h_L = K_L \dfrac{V^2}{2g}$ (B) $h_L = K_L \dfrac{V^2}{g}$

    (C) $h_L = \dfrac{1}{K_L} \dfrac{V^2}{2g}$ (D) None

87. The boundary layer exists due to :
    (A) Surface Tension
    (B) Fluid density
    (C) Fluid viscosity
    (D) All above

88. The laminar boundary layer changes from Laminar to turbulent when plate Reynolds number approaches a value in the range :
    (A) 2×10^6 to 5×10^6
    (B) 2×10^8 to 8×10^8
    (C) 3×10^5 to 6×10^5
    (D) None of above

89. The discharge for a laminar flow through a pipe of diameter 40 mm having centre-line velocity of $1 \cdot 5$ m/s in m^3/s is :
    (A) $\dfrac{3\pi}{59}$
    (B)

    (C)
    (D)

90. In a Navier-Stoke equation the force considered is :
    (A) viscous force
    (B) pressure force
    (C) gravity force
    (D) all above

91. Transfer of heat from one body to another takes place :
    (A) when there is temperature difference between the bodies
    (B) both bodies must be in contact
    (C) both bodies must be solid
    (D) all above

92. According to Fourier's law, amount of heat flow Q through the body in unit time is equal to :

    (A)

    (B) $K \dfrac{dx}{dT}$

    (C) $KA \dfrac{dT}{dx}$

    (D) $KA \dfrac{dx}{dt}$; where K is coefficient of thermal conductivity, A is surface area of heat flow, $\dfrac{dT}{dx}$ is temperature gradient and dx is body thickness

93. Thermal conductivity of air at room temperature in KCal/m-hr-°C is approximately :
    (A) 0·051
    (B) 0·09
    (C) 0·10
    (D) 0·51

94. The ratio of heat flow $\dfrac{Q_A}{Q_B}$ from two walls of same thickness having thermal conductivity

    $K_A = 2\,K_B$ for the same temperature difference will be :
    (A) $\dfrac{1}{2}$
    (B) $\dfrac{1}{4}$
    (C) 2
    (D) 4

95. Pipes are isolated so that :
    (A) they may not break under pressure
    (B) there is minimum corrosion
    (C) they can withstand higher fluid pressure
    (D) heat loss from the surface is minimized

96. Steady state heat transfer occurs when :
    (A) the flow of heat is negligible
    (B) the flow of heat is uniform
    (C) the flow of heat is independent of time
    (D) the flow of heat is uniformly decreasing

97. Three metal walls of same cross-sectional area having thermal conductivity in the ratio 1 : 2 : 4 transfer heat at the rate of 15000 kcal/hr. For same thickness of wall, the temperature drop will be in the ratio :
    (A) 1 : 2 : 4
    (B) 4 : 2 : 1
    (C) $1 : \dfrac{1}{2} : \dfrac{1}{4}$
    (D) $\dfrac{1}{4} : \dfrac{1}{2} : 1$

98. The value of Prandtl number for air is of the order of :
    (A) 1000
    (B) 67
    (C) 9·7
    (D) 0·7

99. In heat exchanger design one transfer unit means :
    (A) condition when the change in temperature of one stream numerically equals the average driving force
    (B) The section of heat exchanger which will cause temperature drop of one degree centigrade
    (C) The equivelent length of tubes in case the heat exchange was for a temperature difference of 1°C
    (D) One fluid exchanging with another fluid of the same chemical composition

100. Which of the following power plant will give least running cost of the production of electric power ?
    (A) Steam power plant   (B) Diesel engine power plant
    (C) Gas turbine power plant   (D) Nuclear power plant

101. The carbon percentage in diesel oil is nearly :
    (A) 86%   (B) 74%
    (C) 66%   (D) 52%

102. Which plant has least pollution problem ?
    (A) Steam power plant   (B) Hydro-electric power plant
    (C) Gas turbine power plant   (D) Nuclear power plant

103. The generating station is to supply four regions of loads with peak demands of 10 MW, 15 MW, 20 MW and 30 MW. If the diversity factor is 1·5 the maximum demand on the station is :
    (A) 70 MW   (B) 60 MW
    (C) 50 MW   (D) 45 MW

104. Steam enters the steam nozzle at :
    (A) low pressure and low velocity   (B) high pressure and high velocity
    (C) high pressure and low velocity   (D) low pressure and high velocity

105. The expansion of steam in nozzle follows :
    (A) Rankine Cycle   (B) Carnot Cycle
    (C) Joule Cycle   (D) Stirling Cycle

106. Ratio of useful heat drop to the isentropic heat drop is known as :
   (A) boiler efficiency
   (B) nozzle efficiency
   (C) condenser efficiency
   (D) vacuum efficiency

107. The isentropic expansion of initially dry saturated steam through the nozzle may approximately be given by :
   (A) $PV = $ constant
   (B) $PV^{1.2} = $ constant
   (C) $PV^{1.135} = $ constant
   (D) $PV^{1.3} = $ constant

108. During idling a petrol engine requires :
   (A) lean mixture
   (B) rich mixture
   (C) chemically correct mixture
   (D) none of above

109. In spark ignition engine the possibility of knocking can be reduced by :
   (A) increasing compression ratio
   (B) decreasing compression ratio
   (C) increasing the coolant temperature
   (D) advancing the spark timing

110. Power plant having least running cost of production of electric power is :
   (A) Gas turbine power plant
   (B) Hydroelectric power plant
   (C) Nuclear power plant
   (D) Steam power plant

111. In S.I. unit one tonne of refrigeration is equal to :
   (A) 110 kJ/min
   (B) 210 kJ/min
   (C) 50 kJ/min
   (D) none

112. A refrigerant should have low :
   (A) boiling point
   (B) specific heat of liquid
   (C) specific volume of vapour
   (D) all above

113. Freon-12 has operating pressure about :
   (A) 2 kg/cm^2
   (B) 8 kg/cm^2
   (C) 15 kg/cm^2
   (D) 30 kg/cm^2

114. The domestic refrigerator has C.O.P. :
    (A) more than 1   (B) less than 1
    (C) equal to 1   (D) none

115. In a psychometric chart sensible heating or cooling is represented by :
    (A) a vertical line   (B) a horizontal line
    (C) a curved line   (D) an inclined line

116. During dehumidification process specific humidity :
    (A) increases   (B) decreases
    (C) remains same   (D) none

117. Lowest C.O.P. is of :
    (A) vapour compression cycle using dry compression
    (B) vapour compression cycle using wet compression
    (C) vapour compression cycle with superheated vapour
    (D) vapour absorption cycle

118. Mass of water vapour present in 1 m^3 of dry air is known as :
    (A) relative humidity   (B) absolute humidity
    (C) percentage humidity   (D) humidity ratio

119. A storage tank which receives refrigerant from evaporator and prevent from flowing into compressor is known as :
    (A) accumulator   (B) agitator
    (C) condenser   (D) balancer

120. C.O.P. of a vapour absorption system can be increased by using :
    (A) vapour compressor   (B) heat exchanger
    (C) both (a) & (b) above   (D) none

ROUGH WORK