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UBEL

Booklet Series **D**

Register Number

2011
MECHANICAL AND PRODUCTION ENGINEERING

Time Allowed : 3 Hours] **[Maximum Marks : 300**

Read the following instructions carefully before you begin to answer the questions.

IMPORTANT INSTRUCTIONS

1. This Booklet has a cover (this page) which should not be opened till the invigilator gives signal to open it at the commencement of the examination. As soon as the signal is received you should tear the right side of the booklet cover carefully to open the booklet. Then proceed to answer the questions.
2. This Question Booklet contains **200** questions.
3. Answer **all** questions.
4. **All** questions carry equal marks.
5. The Test Booklet is printed in *four* series *e.g.* [A] [B] [C] or [D] (See Top left side of this page). The candidate has to indicate in the space provided in the Answer Sheet the series of the booklet. For example, if the candidate gets [A] series booklet, he/she has to indicate in the side 2 of the Answer Sheet with Blue or Black Ink Ball point pen as follows :

[A] ■ [B] [C] [D]

6. You must write your Register Number in the space provided on the top right side of this page. Do not write anything else on the Question Booklet.
7. An Answer Sheet will be supplied to you separately by the Invigilator to mark the answers. You must write your Name, Register No. and other particulars on side 1 of the Answer Sheet provided, failing which your Answer Sheet will not be evaluated.
8. You will also encode your Register Number, Subject Code etc., with Blue or Black ink Ball point pen in the space provided on the side 2 of the Answer Sheet. If you do not encode properly or fail to encode the above information, your Answer Sheet will not be evaluated.
9. Each question comprises *four* responses (A), (B), (C) and (D). You are to select ONLY ONE correct response and mark in your Answer Sheet. In case you feel that there are more than one correct response, mark the response which you consider the best. In any case, choose ONLY ONE response for each question. Your total marks will depend on the number of correct responses marked by you in the Answer Sheet.
10. In the Answer Sheet there are **four** brackets [A] [B] [C] and [D] against each question. To answer the questions you are to mark with Ball point pen ONLY ONE bracket of your choice for each question. Select one response for each question in the Question Booklet and mark in the Answer Sheet. If you mark more than one answer for one question, the answer will be treated as wrong. *e.g.* If for any item, (B) is the correct answer, you have to mark as follows :

[A] ■ [C] [D]

11. You should not remove or tear off any sheet from this Question Booklet. You are not allowed to take this Question Booklet and the Answer Sheet out of the Examination Hall during the examination. After the examination is concluded, you must hand over your Answer Sheet to the Invigilator. You are allowed to take the Question Booklet with you only after the Examination is over.
12. Failure to comply with any of the above instructions will render you liable to such action or penalty as the Commission may decide at their discretion.
13. Do not tick-mark or mark the answers in the Question Booklet.
14. The last page of the Question Booklet can be used for Rough Work.

1. For ship vessel industry which of the following layouts is best suited ?

   A) Process layout B) Product layout

   C) Fixed position layout D) Plant layout.

2. The main disadvantage(s) of line organization is / are

   A) top level executives have to do excessive work

   B) structure is rigid

   C) communication delays occur

   D) all of these.

3. The chart which is not used in motion study is

   A) Simo chart B) Travel chart

   C) Two-hand chart D) Man-machine chart.

4. In the case of mass production

   A) highly skilled workers are needed

   B) unit costs are high

   C) the operations are capital-intensive

   D) the operations are labour-intensive.

5. Military type organisation is known as

   A) line organisation

   B) functional organisation

   C) line and staff organisation

   D) line, staff and functional organisation.

6. The decisions made by the top level management which affect the entire organisation are ..... decisions.

   A) programmed B) routine

   C) certainty D) non-programmed.

7. The short-term goals of supervisory level managers are called ..... goals.

A) operational B) tactical

C) strategic D) programme.

8. Productivity is given by

A) $\frac{\text{Input}}{\text{Output}}$ B) $\frac{\text{Output}}{\text{Input}}$

C) $\frac{\text{Efficiency}}{\text{Effectiveness}}$ D) Effectiveness × Efficiency.

9. The chronological sequence of required actions is called a

A) Rule B) Programme

C) Procedure D) Premise.

10. Theory *X* and Theory *Y* were developed by

A) Abraham Maslow B) Peter Drucker

C) Elton Mayo D) Douglas McGregor.

11. Which of the following types of gauge has gauging sections combined on one end ?

A) Combination gauge B) Limit gauge

C) Go and NoGo gauge D) Progressive gauge.

12. Constant measuring pressure in micrometer screw gauges is ensured by

A) locknut B) barrel and thimble

C) ratchet D) spanner.

13. It is desirable to handle the slip gauges with a cloth or chamois leather in order to

A) avoid injury to hands

B) protect the surfaces of slip gauges

C) insulate them from the heat of the hand

D) ensure that the varnish applied on gauges does not come out.

14. Eden-Rolt comparator is a popular instrument for the

A) calibration of slip gauges

B) absolute measurement of length of slip gauges

C) measurement of flatness

D) measurement of angles.

15. Money required for the purchase of stores, payment of wages etc. is known as

A) Block capital B) Reserved capital

C) Authorised capital D) Working capital.

16. In *A-B-C* control policy, maximum attention is given to

A) those items which consume money

B) those items which are not readily available

C) those items which consume more money

D) those items which are in more demand.

17. Emergency rush order can be pushed more effectively in

A) job production B) automatic production

C) continuous production D) intermittent production.

18. In time study rating factor is equal to (standard time = t_1, selected time = t_2 and percentage time on allowance = t_3)

A) $\frac{t_1}{t_2} \times \frac{100 - t_3}{100}$ B) $\frac{t_1}{t_2} \times \frac{10}{100 - t_3}$

C) $\frac{t_2}{t_1} \times \frac{100 - t_3}{100}$ D) $\frac{t_2}{t_1} \times \frac{100}{100 - t_3}$.

19. Work study is concerned with

A) improving present method and finding standard time

B) motivation of workers

C) improving production capability

D) improving production planning and control.

20. Work study comprises which of the following main techniques ?

A) Method study and work measurement

B) Method study and time study

C) Time study and work measurement

D) Method study and job evaluation.

21. Gear finishing operation is called

A) shaping B) milling

C) hobbing D) varnishing.

22. Which of the following processes is used for preparing parts having large curved surfaces and thin sections ?

A) Hot machining B) Ultrasonic machining

C) ECM process D) Chemical milling.

23. Thread grinding requires work speed from

A) 1 to 3 m/min B) 5 to 10 m/min

C) 10 to 14 m/min D) 14 to 20 m/min.

24. The process of removing surface roughness, tool marks and other minor defects from the previous operations is called

A) lapping B) honing

C) broaching D) reaming.

25. ..... system is not an 'island of automation'.

A) Computer Numerical Control B) Robotic

C) Automated storage / Retrieval D) Flexible Manufacturing.

26. The equipment that measures surface roughness is

A) Profile projector B) Laser interferometer

C) Profile gauge D) Profilometer.

27. Expressing a dimension as $\frac{36 \cdot 2}{36 \cdot 0}$ mm is the case of

A) bilateral tolerancing B) limiting dimensions

C) unilateral tolerancing D) plus-minus tolerancing.

28. Auto collimator is used for ..... measurement.

A) straightness B) angular

C) linear movement D) flatness.

29. Which of the following gives an idea about the ability of the equipment to detect *small variation in the input signal (quantity being measured)* ?

A) Readability B) Accuracy

C) Sensitivity D) Precision.

30. Parasitic error is caused due to

A) improper use of measuring instrument

B) wrong design of instrument

C) changes in ambient conditions

D) errors in computation.

31. The cutting speed of a drill depends upon the

A) material of drill B) type of material to be drilled

C) quality of surface finish desired D) all of these.

32. A twist drill is a / an

A) side cutting tool B) front cutting tool

C) end cutting tool D) none of these.

33. Drilling is an example of

A) simple cutting B) uniform cutting

C) orthogonal cutting D) oblique cutting.

34. Which of the following is not the part of a shaper ?

A) Clapper box B) Ram

C) Table D) Cross slide.

35. The tool used for drilling holes of large diameter (diameter greater than 80 mm) is

A) trepanning drill B) double-flute twist drill

C) single flute drill D) multiple flute drill with a web.

36. The process that provides a recess for seating of bolt heads and nuts is

A) spot facing B) counter sinking

C) reaming D) counter boring.

37. The work-holding device used for finishing the work which has been bored and partly turned on the lathe is

A) an Arbor B) a steady rest

C) a collet chuck D) a Mandrel.

38. A hole of 1 mm is to be drilled in glass. It could best be done by

A) laser drilling

B) plasma arc drilling

C) ultrasonic method

D) electro-chemical discharge method.

39. The abrasive slurry used in ultrasonic machining contains fine particles of

A) aluminium oxide B) boron carbide

C) silicon carbide D) any one of these.

40. Buffing wheels are made of

A) softer metals B) cotton fabric

C) carbon D) graphite.

41. 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.

42. The rubbing speed of worm gear is said to be

A) 2·5 m/s B) 5 m/s

C) 7·5 m/s D) 12·5 m/s.

43. A *V*-belt should touch the pulley groove at the

A) sides only B) bottom only

C) bottom and sides D) one side only.

44. The type of gears used for noise-free power transmission is

A) spur gears B) helical gears

C) involute gears D) epicyclic gears.

45. The gears used to connect two non-intersecting non-coplanar shafts are

A) bevel gears B) helical gears

C) spiral gears D) spur gears.

46. The surface of the gear tooth below the pitch surface is known as

A) flank B) dedendum

C) addendum D) face.

47. Find the correct statement :

A) F_n accelerates the chip upwards

B) F_n accelerates but F_s retards the chip equally

C) F_s retards the chip but N accelerates equally

D) All the four forces together keep the chip in equilibrium.

F_n = perpendicular to shear plane, F_s = parallel to shear plane, F = parallel to tool chip interface, N = normal to tool chip interface.

48. Which one cannot be oblique cutting ?

A) Turning B) Milling

C) Broaching D) Boring.

49. 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.

50. The helix angle of a drill is ..... for drilling brass.

A) equal to 30° B) less than 30°

C) more than 30° D) none of these.

51. A connecting rod is designed as a

A) long column B) short column

C) strut D) none of these.

52. A cotter joint is used to transmit

A) axial tensile load only

B) axial compressive load only

C) combined axial and twisting loads

D) axial tensile or compressive loads.

53. A feather key is generally

A) loose in shaft and tight in hub B) tight in both shaft and hub

C) tight in shaft and loose in hub D) loose in both shaft and hub.

54. A sliding bearing which operates without any lubricant present is called

A) zero film bearing B) boundary lubricated bearing

C) hydrodynamic lubricated bearing D) hydrostatic lubricated bearing.

55. Which type of spring is used in table clocks out of the following ?

A) Spiral B) Leaf

C) Helical D) Conical.

56. The bearing efficiency of a riveted joint is given by

A) $\frac{p - d_0}{p}$ B) $\frac{p}{d_0}$

C) $\frac{d_0}{p}$ D) $\frac{p - 2d_0}{p}$

where d_0 = rivet hole diameter, p = pitch.

57. For a screw to be of the self locking type, its efficiency should be

A) equal to 50% B) less than 50%

C) more than 50% D) less than 25%.

58. In Journal bearings, the load acts

A) perpendicular to the axis of the shaft

B) along the axis of the shaft

C) parallel to the axis of the shaft

D) none of these.

59. Diametral quotient is defined as

A) reference dia / axial module B) axial module / reference dia

C) axial pitch / pitch dia D) pitch dia / axial pitch.

60. *V*-belt drives can be safely used for peripheral velocities of

A) 5 — 10 m/sec B) 10 — 20 m/sec

C) 25 — 30 m/sec D) 35 — 50 m/sec.

61. The critical speed of a shaft depends upon its

A) mass B) stiffness

C) mass and stiffness D) stiffness and eccentricity.

62. The radial distance from the top of a tooth to the bottom of a tooth is called

A) dedendum B) addendum

C) clearance D) working depth.

63. The frictional torque transmitted by a disc of plate clutch is same as that of

A) flat pivot bearing B) flat collar bearing

C) conical pivot bearing D) none of these.

64. The swaying couple is due to the

A) primary unbalanced force B) secondary unbalanced force

C) two cylinders of locomotive D) partial balancing.

65. The primary unbalanced force is maximum ..... in one revolution of the crank.

A) twice B) four times

C) eight times D) sixteen times.

66. In a gear train, when the axes of the shafts, over which the gears are mounted, move relative to a fixed axis, it is called

A) simple gear train B) compound gear train

C) reverted gear train D) epicyclic gear train.

67. In a steady state forced vibrations, the amplitude of vibrations at resonance is ..... damping coefficient.

A) equal to B) directly proportional to

C) inversely proportional to D) independent of.

68. The cam follower generally used in automobile engines is

A) knife edge follower B) flat faced follower

C) spherical faced follower D) roller follower.

69. Which of the following formulae is used in designing a connecting rod ?

A) Euler's formula B) Rankine's formula

C) Johnson's straight line formula D) None of these.

70. A column is known as a long column if the slenderness ratio is

A) 40 B) 50

C) 70 D) 100.

71. The Coriolis component of acceleration is taken into account for

A) slider crank mechanism B) four bar chain mechanism

C) quick return motion mechanism D) none of these.

72. Which one of the following is an inversion of slider crank mechanism ?

A) Whitworth quick return mechanism

B) Reciprocating I.C. engine mechanism

C) Crank and slotted lever mechanism

D) All of these.

73. The number of natural frequencies for a 3 rotor system will be

A) 1 B) 2

C) 3 D) 6.

74. The relation between no. of pairs (p) forming kinematic chain and the no. of links (l) is

A) $l = 2p - 2$ B) $l = 2p - 3$

C) $l = 2p - 4$ D) $l = 2p - 5$.

75. In a cam follower system, dwell is the period in which

A) acceleration of the follower is zero

B) velocity of the follower is constant

C) velocity of the follower varies linearly

D) velocity of the cam is zero.

76. Which of the following is a pendulum type governor ?

A) Watt governor B) Porter governor

C) Hartnell governor D) None of these.

77. In a Hartnell governor, if a spring of greater stiffness is used, then the governor will be

A) less sensitive B) more sensitive

C) unaffected of sensitivity D) isochronous.

78. When the speed of the engine fluctuates continuously above and below the mean speed, the governor is said to be

A) stable B) unstable

C) isochronous D) hunt.

79. When there is reduction in amplitude over every cycle of vibration, then the body is said to have

A) free vibration B) forced vibration

C) damped vibration D) under-damped vibration.

80. Longitudinal vibrations are said to occur when the particles of a body move

A) perpendicular to its axis B) parallel to its axis

C) in a circle about its axis D) none of these.

81. In the case of non-dilatant material, the value of Poisson's ratio is

A) 0·25 B) 0·35

C) 0·50 D) 0·60.

82. In case of thin walled cylinder, if Poisson's ratio is 0·25, their ratio of volumetric strain to circumferential strain is

A) 8 B) 3

C) $\frac{16}{7}$ D) $\frac{8}{7}$.

83. The point of contraflexure is a point where

A) shear force changes sign B) bending moment changes sign

C) shear force is maximum D) bending moment is maximum.

84. If a beam is subjected to a constant bending moment along its length, then the shear force will

A) also have a constant value everywhere along its length

B) be zero at all sections along the beam

C) be maximum at the centre and zero at the ends

D) zero at the centre and maximum at the ends.

85. If three kinematic links have plane motions, their instantaneous centre is

A) straight line B) circle

C) both (A) and (B) D) none of these.

86. Cam and follower is an example of instantaneous centres of rotation of

A) lower pair B) higher pair

C) screw pair D) rolling pair.

87. The number of links in Hart mechanism is

A) 8 B) 6

C) 5 D) 4.

88. A mechanism with four links is

A) simple mechanism B) inversion of the mechanism

C) both (A) and (B) D) none of these.

89. Which of the following is an example of sliding pair ?

A) Piston and cylinder of a reciprocating steam engine

B) Shaft with collars at both ends fitted into a circular hole

C) Lead screw of a lathe with nut

D) Ball and socket joint.

90. The mechanism forms a structure, when the number of degrees of freedom n is equal to

A) 0 B) 1

C) 2 D) – 1.

91. Manometers measure unknown pressure by

A) measuring liquid levels

B) measuring height of liquid columns

C) balancing the unknown force produced by pressure against a known force

D) noting the deflection of a pointer.

92. The property of the system which opposes a change in the output variable is

A) load B) power element

C) resistance D) damping.

93. Factor of safety is given by which of the following expressions ?

A) $\frac{\text{working stress}}{\text{yield stress}}$ B) $\frac{\text{working strain}}{\text{yield strain}}$

C) $\frac{\text{yield stress}}{\text{working stress}}$ D) $\frac{\text{yield strain}}{\text{working strain}}$.

94. A fixed beam of span 6 m carries a point load of 120 kN at its centre. The magnitude of fixing moments at the ends is

A) 40 k N.m B) 90 k N.m

C) 120 k N.m D) 45 k N.m.

95. In a thick cylinder pressurized from inside, the hoop stress is maximum at

A) the centre of the wall thickness B) the outer radius

C) the inner radius D) both the inner and the outer radii.

96. In the case of a circular section, the section modulus (Z) is given by the value

A) $\frac{\pi d^3}{32}$ B) $\frac{\pi d^3}{64}$

C) $\frac{\pi d^2}{16}$ D) $\frac{\pi d^4}{64}$.

97. When a rectangular bar is subjected to a tensile stress, then the volumetric strain is equal to

A) $\varepsilon\left[1-\frac{2}{m}\right]$ B) $\varepsilon\left[1+\frac{2}{m}\right]$

C) $\varepsilon\left[2-\frac{1}{m}\right]$ D) $\varepsilon\left[2+\frac{1}{m}\right]$.

98. The total strain energy stored in a body is known as

A) impact energy B) resilience

C) proof resilience D) modulus of resilience.

99. The variation of hoop stress across the thickness of a thick cylindrical shell is

A) linear B) parabolic

C) a cubic curve D) constant.

100. At the neutral axis of a beam, the shear stress is

A) zero B) minimum

C) maximum D) infinity.

101. ..... is a load measuring device whose electrical resistance changes under mechanical load.

A) Piezo-electric transducer B) Strain gauge

C) Proving ring D) Bourdon gauge.

102. McLeod gauge measures

A) high pressures above 250 atm

B) moderate pressures from 1 atm to 250 atm

C) low and very low pressures from 0·01 μ m of Hg to 50 mm Hg

D) ultra-low pressures below 0·01 μ m of Hg.

103. The frequency response can be obtained analytically from the

A) characteristic equation

B) transfer functions of the components

C) polar plot

D) Bode diagram.

104. The overshoot and the settling time are maximum with

A) underdamped system B) overdamped system

C) critically damped system D) damped system.

105. The material used for resistance temperature sensor is

A) copper B) nickel

C) platinum D) all of these.

106. The change in length of humidity sensitive elements is measured by

A) hydrometer B) hygrometer

C) psychrometer D) photometer.

107. Errors due to assignable causes are called

A) static errors B) systematic errors

C) calibration errors D) random errors.

108. Which gauge can be used to measure pressure below 1 μm ?

A) Dead weight tester B) Pirani gauge

C) Ionization gauge D) McLeod gauge.

109. Which of the following is not a negative motivating tool ?

A) Recognition B) Reprimand

C) Demotion D) Lay-off.

110. Which of the following is not an example of internal motivation ?

A) Fear of losing one's job

B) The need to get the job of one's choice

C) The illusion of self-determination and freedom

D) A sense of accomplishment in doing a job well.

111. A body which partly absorbs and partly reflects but does not allow any radiation to pass through, it is called

A) specular B) gray

C) opaque D) none of these.

112. The ratio of hydrodynamic to thermal boundary layer thickness

A) varies as one-third power of Prandtl number

B) varies as two-third power of Stanton number

C) varies as four-fifth power of Nusselt number

D) varies as root of Prandtl number.

113. Capacity of a hydroelectric plant in service in excess of the peak load is known as

A) operating reserve B) spinning reserve

C) cold reserve D) hot reserve.

114. Gas turbines for power generations are normally used

A) to supply base load requirements

B) to supply peak load requirements

C) to enable start thermal power plant

D) in emergency.

115. The maximum continuous power available from a hydroelectric plant under the most adverse hydraulic conditions, is known as

A) base power B) firm power

C) primary power D) secondary power.

116. A moderator generally used in nuclear power plant is

A) graphite B) heavy water

C) concrete D) graphite and concrete.

117. In natural uranium, the constituents of three naturally occurring isotopes are

A) $U_{234} = 0 \cdot 006\%$, $U_{235} = 0 \cdot 712\%$ & $U_{238} = 99 \cdot 282\%$

B) $U_{234} = 0 \cdot 712\%$, $U_{235} = 0 \cdot 006\%$ & $U_{238} = 99 \cdot 282\%$

C) $U_{234} = 99 \cdot 282\%$, $U_{235} = 0 \cdot 006\%$ & $U_{238} = 0 \cdot 712\%$

D) $U_{234} = 0 \cdot 006\%$, $U_{235} = 99 \cdot 282\%$ & $U_{238} = 0 \cdot 712\%$.

118. The sensing element in the control system of nuclear reactors measures the ..... of the neutron flux in the reactor.

A) temperature B) volume

C) density D) none of these.

119. The energy released during the fission of one atom of uranium – 235 in million electron-volts is about

A) 100 B) 200

C) 300 D) 400.

120. The smallest change in input signal that a measuring system is capable of displaying is called

A) Precision B) Accuracy

C) Reliability D) Resolution.

121. Runaway speed of a hydraulic turbine corresponds to the condition of

A) runner revolving freely without load and with the gates wide open

B) critical speed

C) breakage of runner

D) speed obtained when load is suddenly disconnected.

122. Multistage centrifugal pumps are used to obtain

A) high discharge B) high head

C) pumping of viscous fluids D) high efficiency.

123. Impulse turbine is generally fitted

A) at the level of tail race

B) little above the tail race

C) slightly below the tail race

D) about 2·5 m above the tail race to avoid cavitation.

124. A radiation shield should have high

A) emissivity B) absorptivity

C) reflectivity D) emissive power.

125. The overall heat transfer coefficient is the

A) sum of all conductances

B) sum of all resistances

C) sum of the individual convection coefficients

D) resistance due to the wall material.

126. The ratio between actual heat dissipated by the fin and the convection dissipation over the base area is called

A) fin efficiency B) fin effectiveness

C) total efficiency D) none of these.

127. The lowest thermal diffusivity is of

A) iron B) lead

C) aluminium D) rubber.

128. The emissivity for a black body is

A) 0 B) 0·5

C) 0·75 D) 1.

129. A 20 mm thick plate of iron is in contact with 2 mm thick plate of copper making a composite thickness of 22 mm. The heat will flow

A) from copper to iron

B) from iron to copper

C) from copper to iron if surface of copper is at higher temperature

D) from copper to iron if open surface of copper is at lower temperature.

130. The unit of overall coefficient of heat transfer is

A) $W/m^2 K$ B) W/m^2

C) W/mK D) W/m.

131. Across a normal shock

A) the entropy remains constant

B) the pressure and temperature rise

C) the velocity and pressure decrease

D) the density and temperature decrease.

132. A flow through an expanding tube at constant rate is called

A) steady uniform flow B) steady non-uniform flow

C) unsteady uniform flow D) unsteady non-uniform flow.

133. A flow through a long pipe at constant rate is called

A) steady uniform flow B) steady non-uniform flow

C) unsteady uniform flow D) unsteady non-uniform flow.

134. According to equation of continuity

A) $w_1 a_1 = w_2 a_2$ B) $w_1 v_1 = w_2 v_2$

C) $a_1 v_1 = a_2 v_2$ D) $\frac{a_1}{v_1} = \frac{a_2}{v_2}$.

135. The maximum hydraulic efficiency of an impulse turbine is

A) $\frac{1+\cos\phi}{2}$ B) $\frac{1-\cos\phi}{2}$

C) $\frac{1+\sin\phi}{2}$ D) $\frac{1-\sin\phi}{2}$.

136. Cavitation damage in turbine runner occurs near the

A) inlet on the convex side of blades

B) outlet on the convex side of blades

C) inlet on the concave side of blades

D) outlet on the concave side of blades.

137. In a rough turbulent flow in a pipe, the friction factor would depend on

A) velocity of flow B) pipe diameter

C) type of fluid flowing D) pipe condition and pipe diameter.

138. If H is manometric height in metres, Q the discharge in m^3/sec and η the overall efficiency of pump and ρ the density of fluid, then power to drive the centrifugal pump is equal to

A) $\frac{\rho QH}{75\eta}$ B) $\frac{\rho QH\eta}{75}$

C) $\frac{QH\eta}{75}$ D) $\frac{QH}{75\eta}$.

139. Bernoulli's equation is applied to

A) venturimeter B) orifice meter

C) pitot tube D) all of these.

140. Francis turbine is

A) radial flow turbine B) axial flow turbine

C) mixed flow turbine D) inward flow radial type turbine.

141. Oil separator is installed in a refrigeration cycle

A) before compressor

B) between compressor and condenser

C) between condenser and evaporator

D) between condenser and expansion valve.

142. One tonne of refrigeration (1 TR) means that the heat removing capacity is

A) 21 kJ/min B) 210 kJ/min

C) 420 kJ/min D) 620 kJ/min.

143. A condenser of refrigeration system rejects heat at the rate of 120 kW, while its compressor consumes a power of 30 kW. The coefficient of performance of the system will be

A) $\frac{1}{4}$ B) $\frac{1}{3}$

C) 3 D) 4.

144. In a psychrometric process, the sensible heat added is 30 kJ/sec and the latent heat added is 20 kJ/sec. The sensible heat factor for the process will be

A) 0·3 B) 0·6

C) 0·67 D) 1·5.

145. Air conditioning means

A) cooling B) heating

C) dehumidifying D) all of these.

146. In an Electrolux refrigerator

A) ammonia is absorbed in water

B) ammonia is absorbed in hydrogen

C) ammonia is evaporated in hydrogen

D) hydrogen is absorbed in water.

147. The formation of frost on cooling coils in a refrigerator

A) increases heat transfer B) improves C.O.P. of the system

C) increases power consumption D) reduces power consumption.

148. A U-tube Differential Manometer

A) is used upright if the pressure difference is small

B) cannot be inclined at any angle

C) must be fitted with a well for the sake of accuracy

D) is used inverted if the pressure difference is small.

149. The coefficient of discharge (C_d) in terms of C_v and C_c is

A) $C_d = \frac{C_v}{C_c}$ B) $C_d = \frac{C_c}{C_v}$

C) $C_d = C_v \times C_c$ D) independent of C_v and C_c.

150. The sonic velocity in a fluid medium is directly proportional to

A) Mach number B) pressure

C) square root of temperature D) none of these.

151. The critical pressure ratio for gases is

A) 0·528 B) 0·546

C) 0·577 D) 0·582.

152. High air-fuel ratio in gas turbine

A) increases power output B) improves thermal efficiency

C) reduces exhaust temperature D) does not damage turbine blades.

153. In a jet engine, the compression varies as the ..... of the speed.

A) cube B) square

C) square root D) cube root.

154. For speed above 3000 km/hr, it is more advantageous to use

A) Turbo-Jet engine B) Ram-Jet engine

C) Pulse-Jet engine D) Turbo-Prop engine.

155. Propulsion efficiency of which of the following orders is obtained in practice ?

A) 34% B) 50%

C) 60% D) 72%.

156. In order to increase thermal efficiency of aircraft jet engine, use is made of

A) regeneration B) reheating

C) intercooler D) high temperature and pressure.

157. Sensible Heat Factor is given by

A) $\frac{\text{Latent heat}}{\text{Sensible heat + Latent heat}}$ B) $\frac{\text{Sensible heat + Latent heat}}{\text{Latent heat}}$

C) $\frac{\text{Sensible heat}}{\text{Sensible heat + Latent heat}}$ D) $\frac{\text{Latent heat}}{\text{Sensible heat}}$.

158. Bell-Coleman cycle consists of

A) two constant volume processes and two isentropic processes

B) two constant pressure processes and two isentropic processes

C) two constant volume processes and two isothermal processes

D) two constant pressure processes and two isothermal processes.

159. In vapour compression refrigeration cycle, heat is rejected by the refrigerant in

A) compressor B) condenser

C) expansion valve D) evaporator.

160. The freezing point of R-12 is

A) – 86·6° C B) – 95·2° C

C) – 107·7° C D) – 135·8° C.

161. The process of breaking up of a liquid into fine droplets by spraying is called

A) vaporization B) carburation

C) ionization D) automisation.

162. Compression loss in I.C. engines occurs due to

A) leaking piston rings B) use of thick head gasket

C) clogged air-inlet slots D) all of these.

163. The temperature of interior surface of cylinder wall in normal operation is not allowed to exceed

A) 80° C B) 120° C

C) 180° C D) 240° C.

164. The carburetor provides the correct quality of air-fuel mixture during

A) starting B) idling

C) acceleration D) all conditions.

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