DIPLOMA - COMMON ENTRANCE TEST-2017

ME	COURSE	DAY : SUNDAY DATE : 02-07-2017
	MECHANICAL	TIME : 10.00 a.m. to 1.00 p.m.

MAXIMUM MARKS	TOTAL DURATION	MAXIMUM TIME FOR ANSWERING
180	200 MINUTES	180 MINUTES

MENTION YOUR DIPLOMA CET NUMBER					QUESTION BOOKLET DETAILS	
					VERSION CODE	SERIAL NUMBER
					B - 1	222314

DOs :

1. Check whether the Diploma CET No. has been entered and shaded in the respective circles on the OMR answer sheet.
2. This Question Booklet is issued to you by the invigilator after the **2nd Bell i.e., after 9.50 a.m.**
3. The Serial Number of this question booklet should be entered on the OMR answer sheet and the respective circles should also be shaded completely.
4. The Version Code of this question booklet should be entered on the OMR answer sheet and the respective circles should also be shaded completely.
5. Compulsorily sign at the bottom portion of the OMR answer sheet in the space provided.

DON'Ts :

1. **THE TIMING AND MARKS PRINTED ON THE OMR ANSWER SHEET SHOULD NOT BE DAMAGED / MUTILATED / SPOILED.**
2. The **3rd Bell rings at 10.00 a.m., till then;**
   - Do not remove the paper seal / polythene bag of this question booklet.
   - Do not look inside this question booklet.
   - Do not start answering on the OMR answer sheet.

IMPORTANT INSTRUCTIONS TO CANDIDATES

1. This question booklet contains 180 (items) questions and each question will have one statement and four answers. (Four different options / responses.)
2. After the **3rd Bell is rung at 10.00 a.m.,** remove the paper seal / polythene bag of this question booklet and check that this booklet does not have any unprinted or torn or missing pages or items etc., if so, get it replaced by a complete test booklet. Read each item and start answering on the OMR answer sheet.
3. During the subsequent 180 minutes:
   - Read each question (item) carefully.
   - Choose one correct answer from out of the four available responses (options / choices) given under each question / item. 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.
   - **Completely darken / shade the relevant circle with a BLUE OR BLACK INK BALL POINT PEN against the question number on the OMR answer sheet.**

Correct Method of shading the circle on the OMR answer sheet is as shown below :

(A) (●) (C) (D)

4. Use the space provided on each page of the question booklet for Rough Work. Do not use the OMR answer sheet for the same.
5. After the **last Bell is rung at 1.00 p.m.,** stop marking on the OMR answer sheet and affix your **left hand thumb impression** on the OMR answer sheet as per the instructions.
6. Handover the **OMR ANSWER SHEET** to the room invigilator as it is.
7. After separating the top sheet (KEA copy), the invigilator will return the bottom sheet replica (Candidate's copy) to you to carry home for self-evaluation.
8. Preserve the replica of the OMR answer sheet for a minimum period of **ONE year.**

ME-B1

CONFIDENTIAL

PART – A

APPLIED SCIENCE

1. The equation of motion of a body for distance travelled 'S_n' in the 'n^{th}' second is given by

(A) $S_n = u + \frac{a}{2}(2n-1)$ (B) $S_n = u - \frac{a}{2}(2n-1)$

(C) $S_n = u + \frac{a}{2}(2n+1)$ (D) $S_n = u - \frac{a}{2}(2n+1)$

2. A bullet of mass 0.01 kg is fired with a velocity of 960 ms^{-1} from a rifle of mass 3 kg, the velocity of recoil of rifle is

(A) $-320\ ms^{-1}$ (B) $-0.32\ ms^{-1}$

(C) $-3.2\ ms^{-1}$ (D) $-32\ ms^{-1}$

3. One of the following is not a scalar quantity :

(A) Mass (B) Density

(C) Force (D) Speed

4. If a body fixed about a point rotates in clockwise direction, the moment of force is measured as

(A) Positive (B) Negative

(C) Zero (D) Equal

5. The resultant magnitude of two forces P and Q acting in same line and in same direction is

(A) P – Q (B) P + Q

(C) Q – P (D) $\frac{P}{Q}$

Space For Rough Work

6. The resultant magnitude of two forces 6 N and 8 N acting at right angles to each other is

(A) 100 N (B) 10 N

(C) 48 N (D) 14 N

7. The value of resultant magnitude of two forces acting at a point is maximum, when the angle between the two forces is

(A) 0° (B) 90°

(C) 180° (D) 45°

8. Rise of liquid in a capillary tube is due to

(A) Energy (B) Viscosity

(C) Surface tension (D) Pressure

9. The ratio of volume stress to volume strain is called

(A) Bulk modulus (B) Young's modulus

(C) Rigidity modulus (D) Poisson's ratio

10. The reciprocal of bulk modulus of elasticity is called

(A) Compressibility (B) Rigidity

(C) Plasticity (D) Modulus of elasticity

11. The force of cohesion is maximum in

(A) Solids (B) Gases

(C) Liquids (D) Plasma

Space For Rough Work

12. The value of surface tension is 80 dyne/cm. What will be its value in Nm^{-1} ?

(A) $8\times10^{2}\ Nm^{-1}$ (B) $80\ Nm^{-1}$

(C) $8\times10^{-2}\ Nm^{-1}$ (D) $8\times10^{3}\ Nm^{-1}$

13. Pressure at the bottom of a container having base area of $10\ m^2$ filled with water to a height of 10 m is

(A) 9.8×10^{4} Pa (B) 980×10^{4} Pa

(C) 9.8×10^{-4} Pa (D) 980×10^{-4} Pa

14. 100 °C when expressed in absolute scale is

(A) 100 K (B) 0 K

(C) 273 K (D) 373 K

15. Gas law which gives the relation between pressure and volume changes is

(A) Boyle's law (B) Charles' law

(C) Gay-Lussac's law (D) Hooke's law

16. Amount of heat required to raise the temperature of one gram of water through 1 °C is

(A) Heat capacity (B) Conductivity

(C) Calorie (D) Joule

17. An example of longitudinal wave is

(A) Sound waves (B) Waves on the surface of water

(C) Light waves (D) Electromagnetic waves

Space For Rough Work

18. The relation between velocity of sound v, and absolute temperature T is

(A) $v \propto T$ (B) $v \propto \frac{1}{T}$

(C) $v \propto \sqrt{T}$ (D) $v \propto T^2$

19. The distance between a node and the next antinode in a stationary wave is equal to

(A) one wavelength (B) half wavelength

(C) twice wavelength (D) one fourth wavelength

20. Damage caused by marching military columns to the suspension bridge is due to

(A) Echo (B) Resonance

(C) Beats (D) Interference

21. During forced vibrations, if the forced frequency is F_1 and natural frequency is F_2, the body resonates if

(A) $F_1 > F_2$ (B) $F_2 > F_1$

(C) $F_1 = 2.5\, F_2$ (D) $F_1 = F_2$

22. The fundamental frequency of transverse vibrations of the stretched string is inversely proportional to

(A) tension (B) length of string

(C) square root of tension (D) square root of length of string

23. Minimum length of a hall to produce an echo is

(A) 50 m (B) 34 m

(C) 25 m (D) 17 m

Space For Rough Work

24. The property of light that Huygen's wave theory could explain is

(A) Polarisation (B) Photoelectric effect

(C) Interference (D) Compton effect

25. The spectrum of black body radiation is successfully explained by

(A) Newton's corpuscular theory of light

(B) Huygen's wave theory of light

(C) Maxwell's electromagnetic theory of light

(D) Planck's quantum theory of light

26. For constructive interference of light, the path difference should be

(A) $\frac{2n\lambda}{2}$ (B) $(2n+1)\frac{\lambda}{2}$

(C) $(2n+1)\frac{\lambda}{3}$ (D) $(2n+1)\frac{\lambda}{4}$

27. Two very close objects are just resolved if the central maximum of one object is on

(A) central maximum of another

(B) first minimum of another

(C) beyond second minimum of another

(D) between central maximum and first minimum of another

28. The light is incident at polarising angle θ_p and the angle of refraction is r, then

(A) $\theta_p + r = 0°$ (B) $\theta_p + r = 90°$

(C) $\theta_p + r = 180°$ (D) $\theta_p + r = 360°$

Space For Rough Work

29. Minimum energy required to remove an electron from the metal surface is called

(A) Kinetic energy (B) Potential energy

(C) Work function (D) Energy function

30. When the size of the scattering particle is small, the intensity of scattered light is inversely proportional to

(A) fourth power of wavelength (B) square of wavelength

(C) square root of wavelength (D) cube of wavelength

31. Time for which an atom stays in metastable state is of the order of

(A) Seconds (B) Milli-seconds

(C) Micro-seconds (D) Nano-seconds

32. If an element emits β-ray then its atomic number

(A) increases by one (B) decreases by one

(C) remains same (D) decreases by two

33. If the concentration of H^+ ions is more than 10^{-7} gm ion per litre, the solution is

(A) Base (B) Acid

(C) Neutral (D) Both Acid and Base

34. A galvanic cell is one in which

(A) chemical energy produce electric energy

(B) electric energy produce chemical energy

(C) chemical energy will not produce electric energy

(D) electric energy will not produce chemical energy

Space For Rough Work

35. The S.I. unit of Coefficient of Viscosity is

(A) Poise
(B) NSm^{-2}
(C) $NS^{-1}m^2$
(D) $NS^{-1}m^{-2}$

36. The prefix used for 10^{+9} is

(A) Mega
(B) Tera
(C) Giga
(D) Hecta

37. The physical quantity which has the dimensional formula $[ML^0T^{-2}]$ is

(A) Force
(B) Surface tension
(C) Viscosity
(D) Work

38. The least count of slide callipers is given by

(A) 1 MSD + 1 VSD
(B) 1 MSD × 1 VSD
(C) 1 MSD – 1 VSD
(D) $\frac{1\,MSD}{1\,VSD}$

39. The product of force and time is

(A) Momentum
(B) Moment
(C) Impulse
(D) Acceleration

40. The change in position of a particle in a particular direction is referred to as

(A) Speed
(B) Displacement
(C) Velocity
(D) Acceleration

Space For Rough Work

PART – B
APPLIED MATHEMATICS

41. The sine of the angle between the vectors $(2i - 2j + k)$ and $2i + j + 2k$ is

(A) $\frac{\sqrt{65}}{3}$ (B) $\frac{\sqrt{65}}{\sqrt{3}}$

(C) $\frac{\sqrt{65}}{9}$ (D) $\sqrt{65}$

42. If $x \sin^2 45 = \frac{\tan^2 45 + \cot^2 30}{\sin^2 45 + \cos^2 45}$ then the value of x is

(A) 4 (B) 2

(C) 6 (D) 8

43. The value of $\frac{4}{3}\sec^2\frac{\pi}{3} - \text{cosec}^2\frac{\pi}{6} + \frac{3}{4}\tan^2\frac{\pi}{4} - 2\sin^2\frac{\pi}{3}$ is

(A) $-\frac{11}{12}$ (B) $\frac{53}{12}$

(C) $\frac{7}{12}$ (D) $-\frac{7}{12}$

44. The value of

$$\frac{\sin(90-\theta)}{\cos(360-\theta)} + \frac{\sec\left(\frac{3\pi}{2}+\theta\right)}{\text{cosec}(\pi+\theta)} + \frac{\tan(180-\theta)}{\tan(-\theta)} \text{ is}$$

(A) 1 (B) –1

(C) 3 (D) 2

45. The value of cosec 43 cot 43 cot 47 cos 47

(A) 1 (B) 0

(C) –1 (D) 2

Space For Rough Work

46. The value of $\frac{\tan 69^\circ + \tan 66^\circ}{1 - \tan 69^\circ \tan 66^\circ}$

(A) 1 (B) -1

(C) 0 (D) ∞

47. If $\tan \frac{A}{2} = x$ then $\sin A + \tan A$ is

(A) $\frac{4x}{1-x^2}$ (B) $\frac{4x}{1+x^2}$

(C) $\frac{4x}{1+x^4}$ (D) $\frac{4x}{1-x^4}$

48. The value of $\sin 70^\circ - \sin 50^\circ - \sin 10^\circ$ is

(A) 1 (B) 0

(C) -1 (D) $\frac{1}{2}$

49. $\sin^{-1} x$ is also equal to

(A) $\text{cosec}^{-1}\left(\frac{1}{x}\right)$ (B) $\text{cosec}\, x$

(C) $\text{cosec}^{-1} x$ (D) $\frac{1}{\sin x}$

50. Centroid divides the median in the ratio

(A) 2 : 1 (B) 1 : 2

(C) 1 : 1 (D) 1 : 4

51. The co-ordinates of a point which divides the line join of the points (a + b, a − b) and (a − b, a + b) in the ratio 2 : 3 is

(A) $\frac{5a+5b}{5}, \frac{5a-5b}{5}$ (B) $\frac{a+b}{5}, \frac{a-b}{5}$

(C) $\frac{5a+b}{5}, \frac{5a-b}{5}$ (D) $\frac{5a-b}{5}, \frac{a+5b}{5}$

Space For Rough Work

52. The equation of straight line whose intercepts are 3 and 5 on the axes is

(A) $5x - 3y = 15$ (B) $5x + 3y = 15$

(C) $5x + 3y = 1$ (D) $15x + 15y = 1$

53. The angle between the lines whose slopes are $\sqrt{3}$ and $\frac{1}{\sqrt{3}}$ respectively is

(A) $\frac{\pi}{6}$ (B) $\frac{\pi}{3}$

(C) $\frac{\pi}{4}$ (D) $\frac{\pi}{2}$

54. The equation of the straight line passing through (2, 3) and x intercept is twice its y intercept is

(A) $x + 2y = 8$ (B) $x - 2y = 8$

(C) $x + y = 4$ (D) $2x + 2y = 8$

55. The equation to the line passing through the point (–6, 7) and parallel to the line joining (3, 4) and (6, –8) is

(A) $4x + y + 31 = 0$ (B) $x + 4y - 1 = 0$

(C) $x - 4y + 1 = 0$ (D) $4x + y + 17 = 0$

56. $\lim_{\theta \to \pi/2} (\sec\theta - \tan\theta)$ is equal to

(A) .0 (B) 1

(C) $\frac{\pi}{2}$ (D) π

57. $\lim_{x \to 4} \frac{x-4}{3-\sqrt{13-x}}$ is equal to

(A) 3 (B) 9

(C) 6 (D) 0

Space For Rough Work

58. If $y = (1 + \log x)^5$, then $\frac{dy}{dx}$ is

(A) $5(\log x)^4$ (B) $\frac{5}{x}(1 + \log x)^4$

(C) $5(1 + \log x)^4$ (D) $5x^4 \log x$

59. If $x = \cos^{-1} t$ and $y = \sin^{-1} t$, then $\frac{dy}{dx}$ is

(A) -1 (B) 1

(C) $\frac{1}{2\sqrt{1-t^2}}$ (D) $\frac{2}{\sqrt{1-t^2}}$

60. If $y = x \log y$, then $\frac{dy}{dx}$ is

(A) $\frac{\log x^x}{x-y}$ (B) $\frac{\log y^x}{x-y}$

(C) $\frac{\log y^y}{x-y}$ (D) $\frac{\log y^y}{y-x}$

61. If $y = \frac{x+1}{x+2}$, then $\frac{dy}{dx}$ is

(A) $\frac{1}{(x+2)^2}$ (B) $\frac{2x+3}{(x+2)^2}$

(C) $-\frac{1}{(x+2)^2}$ (D) $\frac{2x-3}{(x+2)^2}$

62. The equation of tangent to the curve $y^2 = 4x$ at $(1, 2)$ is

(A) $x + y - 3 = 0$ (B) $x - y + 1 = 0$

(C) $2x - y = 0$ (D) $2x + y - 4 = 0$

Space For Rough Work

63. The maximum value of $7 - 8x - 2x^2$ is

(A) 15 (B) -4

(C) -2 (D) 31

64. The value of $\int \log 2x \, dx$ is

(A) $x \log 2x + x + C$ (B) $x \log 2x - x + C$

(C) $\frac{1}{2x} + C$ (D) $\frac{1}{x} + C$

65. The value of $\int \sec^4 x \cdot \tan x \, dx$

(A) $\frac{\sec^4 x}{4} + C$ (B) $4 \sec^4 x + C$

(C) $3 \sec^2 x + C$ (D) $\frac{\tan^4 x}{4} + C$

66. The value of $\int x \log x \, dx$ is

(A) $\frac{x^2}{2} \log x - \frac{x^2}{2} + C$ (B) $\frac{x^2}{2} \log x + \frac{x^2}{2} + C$

(C) $\frac{x^2}{2} \log x - \frac{x^2}{4} + C$ (D) $\frac{x^2}{2} \log x + \frac{x^2}{4} + C$

67. $\int_0^{\pi/4} \tan^2 x \, dx$ is equal to

(A) $\frac{\pi}{4} - 1$ (B) $1 - \frac{\pi}{4}$

(C) $\frac{\pi^2}{16}$ (D) $\frac{\pi^2}{16} - 1$

Space For Rough Work

68. The value of $\int_0^1 x\sqrt{1-x^2}\,dx$ is

(A) $-\frac{1}{3}$ (B) 0

(C) ∞ (D) $\frac{1}{3}$

69. The volume generated by revolving the line $y = x + 1$ about the x-axis between the ordinates $x = 0$ and $x = 2$

(A) $\frac{26\pi}{3}$ units (B) $\frac{10\pi}{3}$ units

(C) $\frac{26}{3}$ units (D) 4 units

70. The degree and order of the differential equation $\frac{d^2y}{dx^2} = \left[1+\left(\frac{dy}{dx}\right)^2\right]^{1/3}$ are

(A) 2 and 1 (B) 1 and 2

(C) 3 and 2 (D) 2 and 3

71. The solution of differential equation $\frac{dy}{dx} + y \tan x = \sec x$ is

(A) $y \sec x = \tan x + C$

(B) $y \sin x = \sec x + C$

(C) $\log(\sec x) = \tan x + C$

(D) $y \sec x = -\cot x + C$

Space For Rough Work

72. The value of x if $\begin{vmatrix} 1 & 2 & 3 \\ 2 & x & 3 \\ 3 & 4 & 3 \end{vmatrix} = 0$ is

(A) 0 (B) -3

(C) 3 (D) 18

73. The value of x, if $4x + y = 7$, $3y + 4z = 5$ and $3z + 5x = 2$ is

(A) 0 (B) 1

(C) 3 (D) -1

74. If $A = \begin{bmatrix} 2 & -1 \\ 3 & -4 \end{bmatrix}$, then A^{-1} is

(A) $-\frac{1}{5}\begin{bmatrix} -4 & -3 \\ 1 & 2 \end{bmatrix}$ (B) $-\frac{1}{5}\begin{bmatrix} -4 & 1 \\ -3 & 2 \end{bmatrix}$

(C) $-\frac{1}{11}\begin{bmatrix} -4 & -3 \\ 1 & 2 \end{bmatrix}$ (D) $-\frac{1}{11}\begin{bmatrix} -4 & 1 \\ -3 & 2 \end{bmatrix}$

75. The characteristic equation of the matrix $A = \begin{bmatrix} 2 & -1 \\ 5 & -6 \end{bmatrix}$ is

(A) $A^2 + 8A - 7I = 0$ (B) $A^2 + 4A - 17I = 0$

(C) $A^2 + 4A + 7I = 0$ (D) $A^2 + 4A - 7I = 0$

Space For Rough Work

76. If $\begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix} + A = \begin{bmatrix} 5 & 1 \\ 3 & 2 \end{bmatrix}$, then A is

(A) $\begin{bmatrix} 3 & 2 \\ -2 & 0 \end{bmatrix}$ (B) $\begin{bmatrix} 3 & -2 \\ 2 & 0 \end{bmatrix}$

(C) $\begin{bmatrix} -2 & 3 \\ 2 & 0 \end{bmatrix}$ (D) $\begin{bmatrix} 0 & 3 \\ -2 & 2 \end{bmatrix}$

77. The middle term of the expansion of $\left(x^2 - \frac{2}{x}\right)^{24}$ is

(A) ${}^{24}C_{10}2^{10}x^{12}$ (B) ${}^{24}C_{11}2^{12}x^{12}$

(C) ${}^{24}C_{13}2^{10}x^{10}$ (D) ${}^{24}C_{12}2^{12}x^{12}$

78. The term independent of x in $\left(x^2 - \frac{4}{3x}\right)^9$ is

(A) ${}^{9}C_{6}(4)^{6}$ (B) ${}^{9}C_{6}(3)^{-6}$

(C) ${}^{9}C_{6}\left(\frac{4}{3}\right)^{6}$ (D) ${}^{9}C_{6}\left(\frac{3}{4}\right)^{6}$

79. If $3i - 2j + k$, $i - 3j + 5k$, $2i + j - 4k$ are the sides of a triangle, then the triangle is

(A) Right angled triangle (B) Equilateral triangle

(C) Isosceles triangle (D) Isosceles right angled triangle

80. If $\vec{a} = (2, -1, 4)$ and $\vec{b} = (2, -3, 4)$, then projection of $\vec{a}$ on $\vec{b}$ is

(A) $\frac{23}{\sqrt{21}}$ (B) $\frac{23}{\sqrt{29}}$

(C) $\frac{-23}{\sqrt{29}}$ (D) $\frac{-23}{\sqrt{21}}$

Space For Rough Work

PART – C

MECHANICAL ENGINEERING

81. The standard covering design, development, production & installation is

(A) ISO : 9000 (B) ISO : 9001

(C) ISO : 9003 (D) ISO : 9004

82. The type of loss occurs due to the reduction in the efficiency of the worker is

(A) No loss (B) Direct loss

(C) Indirect loss (D) None of the above

83. The unit of lathe which houses, lathe spindle and control levers for speed selection is called

(A) Head stock (B) Tail stock

(C) Saddle (D) Carriage

84. _____ lathe is used for precision work on tools, dies and gauges.

(A) Speed lathe (B) Engine lathe

(C) Tool room lathe (D) Capstone & Turret lathe

85. Square or irregular shaped workpiece for turning is usually mounted in

(A) Three jaw chuck (B) Collet chuck

(C) Mandrel (D) Independent chuck

86. Operation of finishing & sizing a hole which has been previously drilled is

(A) Reaming (B) Drilling

(C) Boring (D) Counter boring

87. Size of the shaper is usually specified by

(A) Size of table (B) Length of stroke

(C) HP of motor (D) None of these

Space For Rough Work

88. The arbor of the milling machine is used to hold

(A) Cutting tool (B) Work piece

(C) Mandrel (D) Spindle

89. The process of changing the shape of worn out grinding wheel to the original shape is called

(A) Glazing (B) Dressing

(C) Truing (D) None of these

90. A control system code used for generating circular interpolation clockwise in CNC machine is

(A) G01 (B) G02

(C) G03 (D) G00

91. The principle of erosion of metals by an interrupted electric spark discharge between tool and work is used in

(A) Electric discharge machining (B) Abrasive jet machining

(C) Ultrasonic machining (D) Laser beam machining

92. The process of removal of metal by controlled dissolution of the anode of an electrolytic cell in _____ machining.

(A) EBM (B) ECM

(C) EDM (D) LBM

93. It is the taper allowed on vertical faces of a pattern for easy removal of pattern without damaging the cavity surface :

(A) Machining allowance (B) Shrinkage allowance

(C) Distortion allowance (D) Draft allowance

94. The property of sand to flow to all portions of a mould is

(A) Porosity (B) Flowability

(C) Collapsibility (D) Cohesiveness

Space For Rough Work

95. The precision casting process which does not require machining is

(A) Bench moulding (B) Machine moulding

(C) Investment moulding (D) Pit moulding

96. The sand used to separate cope & drag surface is

(A) Dry sand (B) Green sand

(C) Parting sand (D) Backing sand

97. Which of the following gas flame has excess of acetylene ?

(A) Neutral flame (B) Carburising flame

(C) Oxidising flame (D) None of these

98. In which of the following resistance welding process, continuous weld is produced ?

(A) Spark welding (B) Projection welding

(C) Seam welding (D) None of these

99. Consumable wire electrode is used in

(A) MIG welding (B) TIG welding

(C) Gas welding (D) None of these

100. The process of cutting extra metal in a work piece is called

(A) Drawing (B) Shearing

(C) Piercing (D) Trimming

101. In forging, the process of increasing the length of a bar at the expense of its thickness is

(A) Upsetting (B) Drawing down

(C) Setting down (D) Bending

Space For Rough Work

102. Metal is forced by high pressure through an orifice to get the desired form in

(A) Rolling (B) Forging

(C) Extrusion (D) Embossing

103. When both mass and energy is allowed to cross the boundary of a system, it is called

(A) Closed system (B) Open system

(C) Isolated system (D) None of these

104. Which of the following is an intensive property ?

(A) Temperature (B) Volume

(C) Energy (D) None of these

105. The state of a substance whose evaporation from its liquid state is complete :

(A) Steam (B) Vapour

(C) Air (D) Perfect gas

106. General law of expansion or compression is $PV^n = C$. The process is said to be hyperbolic, if 'n' is equal to

(A) 0 (B) 1

(C) γ (D) ∞

107. The heating of a gas at constant pressure is governed by

(A) Boyle's law (B) Charle'slaw

(C) Gay-Lussac law (D) Joule's law

108. The gas constant 'R' is equal to _____ of two specific heats.

(A) Sum (B) Difference

(C) Product (D) Ratio

Space For Rough Work

109. For the same compression ratio, the efficiency of diesel cycle is _____ otto cycle.

(A) greater than (B) equal to

(C) less than (D) None of these

110. Which of the following cycle consists of two isothermal and two reversible adiabatic processes ?

(A) Carnot cycle (B) Diesel cycle

(C) Otto cycle (D) Dual-combustion cycle

111. Which of the following does not relate to S.I. engine ?

(A) Ignition coil (B) Spark plug

(C) Distributor (D) Fuel injector

112. The process of removing burnt gases from the combustion chamber of the engine cylinder is

(A) Detonation (B) Supercharging

(C) Scavenging (D) Governing

113. The power actually developed by the engine cylinder of an I.C. engine is known as

(A) Indicated power (B) Brake power

(C) Actual power (D) Friction power

114. The volume of air delivered by the compressor is called

(A) Free air delivery (B) Compressor capacity

(C) Swept volume (D) None of these

115. In a four stroke petrol engine, inlet valve opens at

(A) 10°–20° before TDC (B) 10° – 20°after TDC

(C) 10° – 20° before BDC (D) 10° – 20°after BDC

Space For Rough Work

116. Bomb calorimeter is used for finding higher calorific value of

(A) Solid fuel (B) Liquid fuel

(C) Gaseous fuel (D) Both solid & liquid fuel

117. In two stroke engine following are provided for better cooling purpose :

(A) Fins (B) Carburettor

(C) Water jackets (D) Muffler

118. Kinematic pairs are those which have two elements that

(A) have line contact (B) have surface contact

(C) permit relative motion (D) have dynamic forces

119. The example of spherical pair is

(A) Bolt and Nut (B) Ball and socket joint

(C) Lead screw of lathe (D) Ball and roller bearing

120. In higher pair, the relative motion is

(A) Purely turning (B) Purely sliding

(C) Purely surface contact (D) Combination of sliding and turning

121. The angle during which the follower returns to its initial position :

(A) Angle of descent (B) Angle of Ascent

(C) Angle of dwell (D) None of the above

122. In a cylindrical cam, the follower moves

(A) in a direction perpendicular to cam axis

(B) in a direction parallel to cam axis

(C) in any direction irrespective to cam axis

(D) None of these

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123. Length of open belt in addition to centre distance depends

(A) only on sum of radii of pulleys.

(B) only on difference of radii of pulleys.

(C) on sum and difference of radii of pulleys.

(D) None of these

124. In a gear, the radial distance of a tooth from pitch circle to the bottom of tooth is called

(A) Dedendum (B) Adendum

(C) Clearance (D) Working depth

125. The type of gears used to connect two non-parallel non-intersecting shafts are

(A) Spur gear (B) Spiral gear

(C) Bevel gear (D) Rack and pinion

126. In the following gear train the inter mediate shaft carries more than one gear :

(A) Simple gear train (B) Compound gear train

(C) Reverted gear train (D) Epicyclic gear train

127. When the inertia force and couples exerted by the moving parts are in equilibrium among then themselves the system is in

(A) Static balance (B) Standing balance

(C) Dynamic balance (D) None of these

128. Which of the following is transmission dynamometer ?

(A) Rope brake (B) Prony brake

(C) Hydraulic dynamometer (D) None of these

129. A clutch is located between

(A) Engine and brake (B) Engine and gear box

(C) Drum and brake (D) Axle and brake

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130. The brakes commonly used in railway train are

(A) Shoe brake (B) Band brake

(C) Band and Block brake (D) Internal expanding brake

131. In gears, the circular pitch can be calculated by

(A) $\frac{D}{T}$ (B) $\frac{T}{D}$

(C) $\frac{\pi D}{T}$ (D) $\frac{D}{\pi T}$

132. Creep in belt drive is due to

(A) Material of pulley

(B) Material of belt

(C) Uneven extensions and contractions of belt due to varying tension

(D) Expansion of belt

133. If a force acts on a body, it sets up some resistance to the deformation. This resistance is known as

(A) Stress (B) Strain

(C) Modulus of elasticity (D) Modulus of rigidity

134. Whenever a material is loaded with in elastic limit, stress is _____ strain.

(A) equal to (B) directly proportional to

(C) inversely proportional to (D) None of these

135. Modulus of rigidity is defined as

(A) The ratio of direct stress to linear strain

(B) The ratio of direct stress to volumetric strain

(C) The ratio of shear stress to shear strain

(D) The ratio of lateral strain to linear strain

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136. The value of Poisson's ratio for steel

(A) 0.25 to 0.33 (B) 0.08 to 0.18

(C) 0.5 to 0.6 (D) Unity

137. The Bulk modulus is expressed in

(A) N/m (B) N-m

(C) N/m^2 (D) $N\text{-}m^2$

138. The relation between Young's modulus and bulk modulus is given by

(A) $K = \frac{mE}{2(m-3)}$ (B) $K = \frac{mE}{2(m-4)}$

(C) $K = \frac{mE}{(m-2)}$ (D) $K = \frac{mE}{3(m-2)}$

139. The thermal stress (σ) is calculated using the relation

(A) $\sigma = \alpha E$ (B) $\sigma = \alpha t E$

(C) $\sigma = \frac{\alpha}{tE}$ (D) $\sigma = \frac{E}{\alpha t}$

140. If one end of the beam is fixed, then it is called

(A) Fixed beam (B) Simply supported beam

(C) Continuous beam (D) Cantilever

141. The reactions of each support of beam can be determined from following conditions of equilibrium :

(A) Algebraic sum of vertical forces is zero.

(B) Algebraic sum of moments about any point is zero.

(C) Algebraic sum of horizontal forces is zero.

(D) All of these

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142. The point of contraflexure occurs only in

(A) Overhanging beams (B) Cantilever beams

(C) Continuous beams (D) Simply supported beams

143. The SFD for a cantilever beam carrying UDL will be

(A) Rectangle (B) Triangle

(C) Parabola (D) Elliptical

144. When shear force changes its sign, the bending moment is

(A) Maximum (B) Minimum

(C) Zero (D) None of these

145. The BMD of a simply supported beam of span 'l' & carrying a point load W at the centre of beam is

(A) A right angled triangle (B) An Isosceles triangle

(C) An equilateral triangle (D) Rectangle

146. The shear force in the centre of a simply supported beam carrying a UDL of W per unit length is

(A) Zero (B) $\frac{Wl^2}{2}$

(C) $\frac{Wl^2}{4}$ (D) $\frac{Wl^2}{8}$

147. The bending moment at the free end of a cantilever beam carrying load at its free end is

(A) Wl (B) W

(C) $\frac{Wl}{2}$ (D) Zero

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148. Ductility of a material is defined as

(A) Ability to undergo large permanent deformation in tension.

(B) Ability to undergo large permanent deformation in Compression.

(C) Ability to recover its original form.

(D) None of the above

149. Cast iron is characterised by minimum of following percentage of carbon

(A) 0.2 %

(B) 0.8 %

(C) 2 %

(D) 6.3 %

150. Cupola furnace is used to manufacture

(A) Pig iron

(B) Cast iron

(C) Wrought iron

(D) Steel

151. Aluminium is extracted from which of the following ore ?

(A) Galena

(B) Bauxite

(C) Calamine

(D) None of these

152. Best suited material used for manufacturing of heat exchanges is

(A) Steel

(B) Tin

(C) Copper

(D) Zinc

153. Babbit metal is a

(A) Lead base alloy

(B) Copper base alloy

(C) Tin base alloy

(D) None of these

154. Hypoeutectoid steels have carbon content

(A) 2 %

(B) Less than 0.83 %

(C) More than 2 %

(D) More than 0.83 %

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155. Which of the following is a case hardening process ?

(A) Carburizing (B) Cyaniding

(C) Flame hardening (D) All of these

156. Steel alloy containing 36 % nickel is called

(A) Stainless steel (B) High speed steel

(C) Invar (D) Heat resistant steel

157. The process used for receiving internal stresses for increasing its machinability is

(A) Hardening (B) Annealing

(C) Spherodising (D) Tempering

158. The size of A3 drawing sheet is

(A) 297 × 420 mm (B) 841 × 1189 mm

(C) 210 × 297 mm (D) 594 × 841 mm

159. Type-H line used for indicating

(A) Visible outlines (B) Boundaries

(C) Centroidal lines (D) Cutting planes

160. In the following method of dimensioning, a series of adjacent dimensions are arranged in one horizontal row :

(A) Chain dimensioning (B) Parellel dimensioning

(C) Combined dimensioning (D) None of these

161. The surface roughness value (R_a) 1.6 to 6.3 μ as recommended by BIS is indicated by the symbol

(A) ∇ (B) ∇∇

(C) ~ (D) ∇∇∇

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162. The symbol used for indicating machined surface is

(A) $\sqrt{}$ (B) $\not\forall$

(C) $\forall$ (D) $\sqrt{}$

163. A point is 20 mm above HP and 30 mm behind VP is situated in which quadrant ?

(A) I - Quadrant (B) II - Quadrant

(C) III - Quadrant (D) IV - Quadrant

164. When a line is inclined to one plane and parallel to other, its projection on the plane to which it is inclined is a line _____ to its true length.

(A) equal to (B) shorter than

(C) greater than (D) None of these

165. Front view of a pyramid resting on HP with its base is

(A) Triangle (B) Square

(C) Rectangle (D) None of these

166. When a plane is held parallel to HP & perpendicular to VP, the projection of plane on HP is

(A) Line (B) True shape

(C) Point (D) None

167. In case of Isometric projection, the angle between isometric axes is

(A) 30° (B) 45°

(C) 90° (D) 120°

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168. People who are committed to a common goal and approach is

(A) Team (B) Group

(C) Both Team & Group (D) None of these

169. In _____ members are not committed towards excellance.

(A) Group (B) Team

(C) Both Group & Team (D) None of these

170. Factors to improve the productivity are

(A) Improving volume of production. (B) Reducing rejection rate.

(C) Minimising rework rate. (D) All of these

171. Individual requirements of the customer can met in

(A) Batch production. (B) Job production.

(C) Mass production. (D) None of these

172. Functions of PPC are

(A) Planning (B) Scheduling

(C) Follow up (D) All of these

173. When the job in hand for the process, then the required quantity of material is purchased by

(A) Purchasing for specified period

(B) Purchasing strictly by requirement

(C) Market purchase

(D) Contract purchase

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174. Best suited store for large organisation is
(A) De-centralised store
(B) Centralised store
(C) Both De-centralised store & Centralised store
(D) None of these

175. The charge made for undue detention of goods is
(A) Transportation charge (B) Insurance
(C) Demurrage charge (D) None of these

176. After opening the tender, which of the following is prepared ?
(A) Comparative statement (B) Invoice
(C) Purchase order (D) Purchase requisition

177. The following maintenance is carried out after the equipment fail :
(A) Preventive maintenance
(B) Predictive maintenance
(C) Breakdown maintenance
(D) Both Preventive maintenance & Predictive maintenance

178. The inspection done at or near the machine is
(A) Floor inspection
(B) Centralised inspection
(C) Both Floor inspection & Centralised inspection
(D) None of these

179. The following chart is used to make clear relationship between the cause & result in a manufacturing process :
(A) Fishbone diagram (B) Control chart
(C) Pareto chart (D) Scatter diagram

180. A fishbone diagram is also known as
(A) Taguchi diagram (B) Poka – Yoke
(C) Cause – & – effect diagram (D) Kaizen

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