Group Code	COURSE
ME	**MECHANICAL ENGINEERING**

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

MENTION YOUR DIPLOMA CET NUMBER					BOOKLET VERSION CODE	SERIAL NUMBER
					A1	236733

ME A1

DOs:

1. This question booklet is issued to you by the invigilator after the **2nd bell i.e., after 9.50 am.**
2. Check whether the DCET Number has been entered and shaded in the respective circles on the OMR answer sheet.
3. The version code and 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 and Serial Number of this question booklet should be entered on the Nominal Roll without any mistakes.
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 am, till then;**
   - Do not remove the seal present on the right hand side of this question booklet.
   - Do not look inside this question booklet or start answering on the OMR answer sheet.

IMPORTANT INSTRUCTIONS TO CANDIDATES

1. In case of usage of signs and symbols in the questions, the regular textbook connotation should be considered unless stated otherwise.
2. This question booklet contains 180 (items) questions and each question will have one statement and four different options / responses & out of which you have to choose one correct answer.
3. After the 3rd Bell is rung at 10.00 am, remove the paper seal on the right hand side 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.
4. Completely **darken / shade** the relevant circle with a **blue or black ink ballpoint pen against the question number on the OMR answer sheet.**

ಸರಿಯಾದ ಕ್ರಮ CORRECT METHOD	ತಪ್ಪು ಕ್ರಮಗಳು WRONG METHOD
(A) ● (C) (D)	⊗ (B) (C) (D) (A) (B) (C) ⊘ (A) ● ● (D)
	(A) (B) (C) (D) (A) ● (C) (D)

5. Please note that even a minute unintended ink dot on the OMR answer sheet will also be recognized and recorded by the scanner. Therefore, avoid multiple markings of any kind on the OMR answer sheet.
6. Use the space provided on each page of the question booklet for Rough Work. Do not use the OMR answer sheet for the same.
7. **Last bell will ring at 1.00 pm,** stop marking on the OMR answer sheet.
8. Hand over the **OMR answer sheet** to the room invigilator as it is.
9. After separating the top sheet (Office copy), the invigilator will return the bottom sheet replica (candidate's copy) to you to carry home for self-evaluation.

PART - A

APPLIED SCIENCE

1. Which of the following is the supplementary unit of SI System?

   (A) Candela (B) Kelvin

   (C) Radian (D) Mole

2. The main scale of Slide Calipers is divided into millimeter, the length of Vernier is 19 mm and is divided into 20 equal parts. The least count is

   (A) 0.01 cm (B) 0.001 cm

   (C) 0.05 cm (D) 0.005 cm

3. Which one of the following is not a vector quantity?

   (A) Velocity (B) Acceleration

   (C) Speed (D) Force

4. The magnitude of resultant of two forces $\vec{P}$ and $\vec{Q}$ acting in the same line and in opposite direction is

   (A) $P + Q$ (B) $P - Q$

   (C) $\frac{P}{Q}$ (D) $\frac{Q}{P}$

5. Two forces 3N and 5N are acting at a point making an angle of 60°. The magnitude of the resultant is

   (A) 15 N (B) 2 N

   (C) 7 N (D) 8 N

6. Torque produces

   (A) rotational motion (B) linear motion

   (C) both rotational and linear motion (D) neither rotational nor linear motion

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Space For Rough Work

7. Which one of the following is not related to couple?

(A) Kicking of football
(B) Opening and closing of tap
(C) Rotation of steering wheel
(D) Pedalling of bicycle

8. Within elastic limit, stress is

(A) independent of strain
(B) zero
(C) directly proportional to strain
(D) inversely proportional to strain

9. The length of a wire increases by 1% on suspending a load of 2 N from it. The tensile strain in the wire is

(A) 0.01
(B) 0.5
(C) 2
(D) 1

10. Pressure at any point inside a liquid

(A) remains zero
(B) increases with depth
(C) decreases with depth
(D) independent of depth

11. The pressure at the bottom of a swimming pool 20m wide and the water 2m deep (given density of water 1000 Kg/m^3 and $g = 10\ m/s^2$) is

(A) 2×10^3 Pa
(B) 40×10^3 Pa
(C) 10×10^3 Pa
(D) 20×10^3 Pa

12. In the case of liquids, as the temperature increases, the surface tension generally

(A) remains constant
(B) decreases
(C) increases
(D) zero

Space For Rough Work

13. The property of a liquid to oppose the relative motion between different layers is called

(A) density (B) elasticity

(C) viscosity (D) capillarity

14. An expression for coefficient of viscosity is (if F = viscous force; A = Area, V = difference in Velocity, x = distance between two layers)

(A) $\eta = -\frac{FA}{xV}$ (B) $\eta = -\frac{FV}{Ax}$

(C) $\eta = -\frac{Fx}{AV}$ (D) $\eta = -\frac{FxA}{V}$

15. The expression that represents Charle's law is

(A) PV = constant (B) VT = constant

(C) $\frac{P}{V}$ = constant (D) $\frac{V}{T}$ = constant

16. The pressure of a gas at 27°C is one atmospheric pressure. Keeping the volume constant, if the temperature is raised to 60°C, then its pressure will be

(A) 1.11 atmospheric pressure (B) 1.5 atmospheric pressure

(C) 2.2 atmospheric pressure (D) 2 atmospheric pressure

17. Hot water at 80°C will exchange heat with surroundings maintained at 25°C till the temperature of water becomes

(A) 80°C (B) 50°C

(C) 55°C (D) 25°C

18. Radiator in automobiles works on the principle of

(A) Conduction (B) Convection

(C) Radiation (D) Evaporation

Space For Rough Work

19. In the expression $C_p - C_v = R$, notation R represents

(A) Resultant force (B) Planck's constant

(C) Universal gas constant (D) Resonance

20. Physical quantity that represents the energy of the mechanical wave is

(A) Wave length (B) Frequency

(C) Amplitude (D) Wave period

21. Which one of the following is not an example of simple harmonic motion?

(A) Swinging of cradle (B) Oscillations of simple pendulum

(C) Vibrations of tuning fork (D) Motion of hands of clock

22. In the equation for velocity of sound in air, which of the following options does not hold good according to Laplace?

(A) Poor conductivity of air (B) Rapid pressure changes

(C) Maintaining constant temperature (D) Rise and fall of temperature

23. Distance between two consecutive nodes in a stationary wave is equal to

(A) Wavelength of individual wave (B) Difference of wavelengths of two waves

(C) Sum of wavelengths of two waves (D) Half of wavelength of individual wave

24. When the tension on the sonometer wire is increased by 15 N, its frequency is doubled. The original tension is

(A) Zero (B) 5 N

(C) 10 N (D) 15 N

Space For Rough Work

25. Two identical waves superpose on one another, then the beat frequency is

(A) Zero (B) One

(C) Ten (D) Infinity

26. Damage to the suspension bridge by marching military troops is due to

(A) Reverberation (B) Resonance

(C) Beats (D) Noise

27. A tuning fork produces waves in a medium. The parameter that changes with temperature of the medium is

(A) Wavelength (B) Frequency

(C) Amplitude (D) Period

28. The electromagnetic radiation used to detect the artificial gems from the original gems is

(A) Microwave (B) Radio wave

(C) Ultraviolet ray (UV ray) (D) X-ray

29. During excitation of an atom from ground state to excited state, the number of photons absorbed by the single atom is

(A) 2 (B) 1

(C) 3 (D) 0

30. In Nano-technology, the manipulation of atom is done in the range of

(A) 1 nano meter – 100 nano meter (B) 1 micro meter – 100 micro meter

(C) 1 pico meter – 100 pico meter (D) 1 millimeter – 100 millimeter

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Space For Rough Work

31. Live telecast of a programme can be viewed by

(A) Manual communication
(B) X-ray communication
(C) Landline communication
(D) Satellite communication

32. Optical Fibre is used in

(A) Endoscopy
(B) Biometric Machine
(C) Simple Microscope
(D) Simple Telescope

33. Acetic acid is an example for

(A) Strong Electrolyte
(B) Neutral Solution
(C) Weak Electrolyte
(D) Non-Electrolyte

34. The process of coating tin over iron and steel is known as

(A) Alloying
(B) Galvanizing
(C) Tinning
(D) Refining

35. The batteries which are recharged and reused are called

(A) Primary Battery
(B) Secondary Battery
(C) Fuel Cell
(D) Alkaline Battery

Space For Rough Work

36. PAFC is a type of

(A) Primary Cell (B) Secondary Cell

(C) Solar Cell (D) Fuel Cell

37. The easily fusible material which is formed when Flux reacts with gangue is

(A) Slag (B) Alloy

(C) Polymer (D) Mineral

38. Which of the below given polymers is obtained by condensation polymerization?

(A) Poly ethene (B) Nylon

(C) PVC (D) Poly propane

39. Which of the following is not a composite material?

(A) Fibreglass (B) Concrete

(C) Ceramic (D) Bronze

40. The pH value of Lemon juice is about

(A) 2.4 (B) 8.2

(C) 10.2 (D) 14

Space For Rough Work

PART – B

ENGINEERING MATHEMATICS

41. The value of $\begin{vmatrix} \cos 50^\circ & \sin 10^\circ \\ \sin 50^\circ & \cos 10^\circ \end{vmatrix}$ is

(A) $\frac{1}{\sqrt{2}}$ (B) $\frac{\sqrt{3}}{2}$

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

42. The values of x & y from the simultaneous equations $3x + 4y = 7$ and $7x - y = 6$ are.

(A) $x = 1, y = 1$ (B) $x = -1, y = -1$

(C) $x = 1, y = -1$ (D) $x = -1, y = 1$

43. If $\begin{vmatrix} x & 3 \\ 3 & x \end{vmatrix} = 0$ then the value of x is

(A) ± 1 (B) ± 3

(C) ± 9 (D) $\pm \sqrt{6}$

44. If $A = \begin{bmatrix} -1 & 3 \\ 4 & -5 \end{bmatrix}$, then $2A^T$ is

(A) $\begin{bmatrix} -2 & 6 \\ 8 & -10 \end{bmatrix}$ (B) $\begin{bmatrix} -1 & 4 \\ 3 & -5 \end{bmatrix}$

(C) $\begin{bmatrix} -2 & 8 \\ 6 & 8 \end{bmatrix}$ (D) $\begin{bmatrix} -2 & 8 \\ 6 & -10 \end{bmatrix}$

Space For Rough Work

45. If A is a given square Matrix then

(A) $\text{adj } A = \frac{A^{-1}}{|A|}$ (B) $\text{adj } A = \frac{|A|}{|A^{-1}|}$

(C) $\text{adj } A = |A| . A^{-1}$ (D) $AA^{-1} = \text{adj } A . |A|$

46. The characteristic Equation of the Matrix $A = \begin{bmatrix} -5 & 6 \\ -2 & 1 \end{bmatrix}$ is

(A) $\lambda^2 - 6\lambda + 12 = 0$ (B) $\lambda^2 - 4\lambda + 17 = 0$

(C) $\lambda^2 + 4\lambda + 7 = 0$ (D) $\lambda^2 - 4\lambda + 7 = 0$

47. The unit vector in the direction of $\vec{a} = 3i + 4j - 2k$ is

(A) $\hat{a} = \frac{3i + 4j - 2k}{\sqrt{26}}$ (B) $\hat{a} = \frac{3i + 4j - 2k}{\sqrt{29}}$

(C) $\hat{a} = i + j - 2k$ (D) $\hat{a} = \frac{3i + 4j - 2K}{\sqrt{21}}$

48. If $\vec{a} = i + \lambda j$ and $\vec{b} = 2j + 3k$ and $\vec{a} . \vec{b} = 0$ then 'λ' is Equal to

(A) $\frac{-2}{3}$ (B) $\frac{2}{3}$

(C) $\frac{3}{2}$ (D) 0

49. Area of the triangle whose adjacent sides are $\vec{a} = 2i - j + 2k$ and $\vec{b} = 3i - j$ is

(A) $\sqrt{41}$ sq.units (B) $\frac{\sqrt{41}}{2}$ sq.units

(C) $\frac{3}{2}$ sq. units (D) $\frac{\sqrt{65}}{2}$ sq.units

Space For Rough Work

50. The number of possible outcomes in the sample space when two dice of different colours are rolled is

(A) 36 (B) 6

(C) 9 (D) 12

51. Sin θ is positive and tan θ is negative when θ is in

(A) I quadrant (B) II quadrant

(C) III quadrant (D) IV quadrant

52. The value of

$$\frac{\tan(\pi-\alpha)}{\tan(-\alpha)} + \frac{\cos(\pi/2-\alpha)}{\sin(2\pi-\alpha)} + \frac{\operatorname{cosec}\left(\frac{3\pi}{2}+\alpha\right)}{\sec(\pi+\alpha)}$$ is

(A) – 1 (B) 2

(C) – 2 (D) 1

53. The value of sin (105°) is

(A) $\frac{\sqrt{3}+1}{2\sqrt{2}}$ (B) $\frac{\sqrt{3}-1}{2\sqrt{2}}$

(C) $\frac{1-\sqrt{3}}{2\sqrt{2}}$ (D) $\frac{\sqrt{3}}{2\sqrt{2}}$

54. The value of $\frac{1-\cos A+\sin A}{1+\cos A+\sin A}$ is

(A) tan A (B) tan $(A/2)$

(C) cot $(A/2)$ (D) cot A

55. If sin A = $\frac{1}{3}$, then the value of sin 3A is

(A) $\frac{-3}{27}$ (B) 1

(C) $\frac{-4}{27}$ (D) $\frac{23}{27}$

Space For Rough Work

56. The value of 2 cos 3A. sin 2A is

(A) sin 5A + sin A

(B) cos 5A + cos A

(C) sin 5A – sin A

(D) cos 5A – cos A

57. The polar form of 1 + i is

(A) $\sqrt{2}\left[\cos\frac{\pi}{4} + i\sin\frac{\pi}{4}\right]$

(B) $\sqrt{2}\left[\cos\frac{\pi}{4} - i\sin\frac{\pi}{4}\right]$

(C) $\sqrt{2}\left[\sin\pi/4 + i\cos\frac{\pi}{4}\right]$

(D) $\sqrt{2}\left[-\cos\frac{\pi}{4} - i\sin\frac{\pi}{4}\right]$

58. $\lim_{x \to -3} \frac{x^2 - 5x + 6}{x^2 - 3x} =$

(A) $\frac{-5}{3}$

(B) $\frac{1}{3}$

(C) $\frac{-1}{3}$

(D) $\frac{5}{3}$

59. $\lim_{x \to a} \frac{\sqrt{x^3} - \sqrt{a^3}}{x - a} =$

(A) $\frac{3}{2}\sqrt{a}$

(B) $\frac{3}{2\sqrt{a}}$

(C) $\sqrt{a}$

(D) $\frac{1}{\sqrt{a}}$

60. $\lim_{\theta \to 0} \frac{\cos 3\theta - \cos\theta}{\theta \sin 2\theta} =$

(A) $\tan 2\theta$

(B) 2

(C) –2

(D) 1

Space For Rough Work

61. Equation of the straight line passing through the point (1, 3) and having slope – 2 is

(A) $2x - y + 5 = 0$ (B) $x + 2y + 5 = 0$

(C) $x - 2y - 5 = 0$ (D) $2x + y - 5 = 0$

62. Equation of the straight line passing through the origin and perpendicular to the line $5x - 4y - 1 = 0$ is

(A) $5x - 4y = 0$ (B) $4x + 5y = 0$

(C) $5x - 4y + 1 = 0$ (D) $4x + 5y + 1 = 0$

63. If $y = \frac{X^2 - 5}{X^2 + 3}$, then $\frac{dy}{dx} =$

(A) $\frac{4x^3 - 4x}{(x^2 + 3)^2}$ (B) $\frac{16x}{(x^2 + 3)^2}$

(C) $\frac{4x}{(x^2 + 3)^2}$ (D) $\frac{-16x}{(x^2 + 3)^2}$

64. If $y = \sin^{-1}(\cos x)$, then $\frac{dy}{dx} =$

(A) $\frac{1}{\sqrt{1 - x^2}}$ (B) $\frac{-\sin x}{\sqrt{1 - x^2}}$

(C) 1 (D) – 1

65. If $y = \sqrt{y \log x}$, then $\frac{dy}{dx} =$

(A) $\frac{1}{x(2y - 1)}$ (B) $\frac{1}{x}$

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

Space For Rough Work

66. If $x = a\cos^2\theta$ and $y = b\sin^3\theta$, then $\frac{dy}{dx}$ =

(A) $-\frac{3b}{2a}\sin\theta$ (B) $-\frac{3b}{2a}$

(C) $\frac{2a}{b}\cos\theta$ (D) $\frac{-2a}{3b\sin\theta}$

67. If $y = x^y$, then $\frac{dy}{dx}$ =

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

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

68. If $y = \sin^2 x$, then $\frac{d^2y}{dx^2}$ =

(A) 2 cos 2x (B) 2 sin 2x

(C) 2 sin x cos x (D) 2x sin x

69. The Equation of tangent to the curve $y = \sin x$ at the point $(\pi, 0)$ is

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

(C) $x + y - \pi = 0$. (D) $x - y + \pi = 0$.

70. The rate of change of radius of the sphere is 9cm/s. Then the rate of change of volume of the sphere when the radius is 2 cm is equal to

(A) $144\pi\ cm^3/s$ (B) $9\pi\ cm^3/s$

(C) $56\pi\ cm^3/s$ (D) $64\pi\ cm^3/s$

Space For Rough Work

71. $\int \frac{1}{1+\cos x}\,dx =$

(A) $\tan x + \sec x + c$ (B) $\tan x - \sec x + c$

(C) $-\cot x + \operatorname{cosec} x + c$ (D) $\cot x - \operatorname{cosec} x + c$

72. $\int \left(\sqrt{x} + \cot x\right) dx =$

(A) $\frac{2}{3} x^{3/2} + \log \sin x + c$ (B) $\frac{3}{2} x^{2/3} + \log \sec x + c$

(C) $\frac{2}{3} x^{3/2} - \log \sin x + c$ (D) $\frac{3}{2} x^{2/3} - \log \sec x + c$

73. $\int \frac{e^{\log x}}{x}\,dx =$

(A) $e^x + c$ (B) $\log (e^x) + c$

(C) $x \log e^x + c$ (D) $e^{\log x} + c$

74. $\int \log x . dx =$

(A) $x \log x + x + c$ (B) $x \log x - x + c$

(C) $x + \log x + c$ (D) $x - \log x + c$

75. $\int \frac{x}{\sqrt{1+x^2}}\,dx =$

(A) $\sqrt{1+x^2} + c$ (B) $\sqrt{1-x^2} + c$

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

Space For Rough Work

76. $\int_{-2}^{1} (x + 1)(x - 1)\, dx =$

(A) 0 (B) 1

(C) – 1 (D) – 2

77. The area bounded by the curve $y = \sin^2 x$, the x–axis and the ordinates $x = 0$ and $x = \pi/2$ is

(A) $\frac{\pi}{4}$ sq. units (B) $\frac{\pi}{2}$ sq. units

(C) $\frac{\pi}{3}$ sq. units (D) $\frac{\pi}{6}$ sq. units

78. The order and degree of a differential equation $4\left(\frac{dy}{dx}\right)^3 + 8xy + \left(\frac{d^2y}{dx^2}\right)^2 - 7 = 0$ respectively are

(A) 1 and 3 (B) 2 and 2

(C) 2 and 3 (D) 2 and 1

79. The differential equation formed from the equation $y^2 = 4ax$ by eliminating arbitrary constant is

(A) $2x\frac{dy}{dx} - y = 0$ (B) $2x\frac{dy}{dx} + y = 0$

(C) $y.\frac{dy}{dx} - 2x = 0$ (D) $y\frac{dy}{dx} + 2x = 0$

80. For the differential equation $\frac{dy}{dx} + (\tan x).\, y = \cos x$, the integrating factor is

(A) log x (B) cot x

(C) cosec x (D) sec x

Space For Rough Work

PART - C
MECHANICAL ENGINEERING

81. Which of the following chucks is particularly used in the setting up of heavy and irregular shaped articles?

(A) Collet chuck
(B) Universal chuck
(C) Four-Jaw independent chuck
(D) Magnetic chuck

82. In Taper turning by a taper attachment, the angle of swivelling the guide bar is calculated using the equation

(A) $\tan\alpha = \frac{D - d}{2l}$
(B) $\tan\alpha = \frac{D - d}{2}$
(C) $\tan\alpha = \frac{2l}{D - d}$
(D) $\tan\alpha = \frac{D - d}{l}$

83. Process of boring a groove or a large hole at a fixed distance from the end of hole is

(A) Tapping
(B) Undercutting
(C) Boring
(D) Counterboring

84. Which of the following cutting tool material has very low heat conductivity and extremely high compressive strength?

(A) Stellites
(B) Diamond
(C) Ceramics
(D) Carbon steels

85. Which of the following cutting fluid property permits free flow of the liquid?

(A) High flash point
(B) Low viscosity
(C) Stability
(D) Neutral

86. Point angle for usual work provided on drill bit is

(A) 108°
(B) 128°
(C) 180°
(D) 118°

Space For Rough Work

87. Which type of Drilling machine is used to drill deep holes in Rifle barrels and Crank shafts?

(A) Gang drilling machine
(B) Deep hole drilling machine
(C) Radial drilling machine
(D) Portable drilling machine

88. The size of a Shaper is given by

(A) Stroke length
(B) Motor power
(C) Mass of machine
(D) Ratio of cutting to Return Stroke

89. Which type of planer is used for squaring and bevelling the edges of steel plates?

(A) Pit Planer
(B) Divided table planer
(C) Open side planer
(D) Edge or plate planer

90. Down milling is also called as

(A) Face milling
(B) End milling
(C) Conventional milling
(D) Climb milling

91. Method of dividing the periphery of a job into any number of even equal parts is called

(A) Dividing
(B) Indexing
(C) Cutting
(D) Broaching

92. A grinding wheel gets glazed due to

(A) Wear of abrasive grains
(B) Wear of bond
(C) Breaking of abrasives
(D) Cracks in wheel

93. The hardness of a grinding wheel is specified by

(A) B H N
(B) Letter of Alphabet
(C) R H N
(D) V H N

Space For Rough Work

94. In Electron Beam Machining, temperature of Cathode which is hot tungsten filament emitting high negative potential electrons is

(A) 500°C (B) 1000°C

(C) 1500°C (D) 2500°C

95. A typical material removing rate for Abrasive jet machining is

(A) 16 mm^3/min in cutting glass (B) 1 mm^3/min in cutting glass

(C) 6 mm^3/min in cutting glass (D) 1/6 mm^3/min in cutting glass

96. There is no need for the withdrawal of pattern from the mould in case of

(A) Wax pattern (B) Hollow pattern

(C) Pattern with core (D) Consumable pattern

97. Addition of saw dust to moulding sand increases its

(A) gas permeability (B) refractoriness

(C) cohesiveness (D) adhesiveness

98. The consumable electrode is used in

(A) Carbon Arc welding (B) Submerged Arc welding

(C) TIG Arc welding (D) MIG Arc welding

99. The oxy-acetylene gas used in gas welding produces a flame temperature of

(A) 1800°C (B) 2100°C

(C) 2400°C (D) 3200°C

Space For Rough Work

100. Operation of producing thin-walled hollow shaped parts from Sheet Metal is called

(A) Drawing
(B) Trimming
(C) Piercing
(D) Rolling

101. In Blanking _____ stresses are induced

(A) Shear
(B) Tensile
(C) Compressive
(D) Both tension and compression

102. The code M08 stands for

(A) Tool change
(B) Coolant on
(C) Coolant off
(D) Program Start

103. The Device which is attached to Robot Wrist to perform a specific task is called

(A) End effector
(B) Gripper
(C) Arm
(D) Wrist

104. Jigs are used

(A) For holding and guiding the tool in drilling, reaming or tapping operation
(B) For holding the work in milling, grinding, planing or turning operation
(C) To check accuracy of work piece
(D) To check precision of work piece.

105. Surface finish symbol ∇ indicates which of the following roughness value in microns?

(A) 12.5 to 25
(B) 1.6 to 6.3
(C) Less than 0.025
(D) Greater than 100

Space For Rough Work

106. When a body is subjected to some external force, if there is some decrease in length of the body, then the ratio of decrease of length of the body to the original length is known as

(A) Tensile strain
(B) Compressive strain
(C) Volumetric strain
(D) Shear strain

107. Ratio of shear stress to shear strain is

(A) Young's modulus
(B) Rigidity modulus
(C) Bulk modulus
(D) Poisson's ratio

108. Moment of Inertia of a hollow circular section

(A) $\frac{\pi d^4}{64}$
(B) $\frac{\pi}{64}(D^4 - d^4)$
(C) $\frac{\pi}{32}(D^4 - d^4)$
(D) $\frac{\pi d^4}{34}$

109. A Beam which is fixed at one end and free at the other end is known as

(A) Simply supported beam
(B) Cantilever beam
(C) Overhanging beam
(D) Fixed beam

110. Bending moment diagram for a simply supported beam with a point load at mid point is represented by

(A) Rectangle
(B) Triangle
(C) Circle
(D) Parabola

111. When a solid shaft is subjected to torsion, the shear stress induced in the shaft at its centre is

(A) Zero
(B) Minimum
(C) Maximum
(D) Average

Space For Rough Work

112. The centre of gravity of a hemisphere measured along the vertical radius from its base

(A) $\frac{3r}{8}$ (B) $\frac{3}{8r}$

(C) $\frac{8r}{3}$ (D) $\frac{8}{3r}$

113. A quick-return mechanism is an inversion of

(A) Crossed-slider crank chain (B) Single-slider crank chain

(C) Four-bar chain (D) Double-slider crank chain

114. Due to slip of the belt, the velocity ratio of the belt drive

(A) Becomes zero (B) Increases

(C) Does not change (D) Decreases

115. Which of the following belt drive is used to transmit medium power at belt speeds over 10 m/s but upto 22 m/s?

(A) Open belt drive (B) Heavy drive

(C) Medium belt drive (D) Light drives

116. Which of the following flat belt drive is used to change the speed of driven shaft while the main or driving shaft runs at constant speed?

(A) Compound belt drive (B) Fast and Loose pulley drive

(C) Stepped cone pulley drive (D) Open belt drive

117. Gear train used when there are more than one gear on intermediate shaft

(A) Simple Gear train (B) Compound Gear train

(C) Epicyclic Gear train (D) Reverted Gear train

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118. The ratio of circular pitch and module is

(A) $\frac{1}{\pi}$ (B) π^2

(C) $d \times \pi$ (D) π

119. Groove angle of the pulley for rope drive is

(A) 30° (B) 45°

(C) 55° (D) 40°

120. The angle which the Resultant reaction R makes with the normal Reaction R_N.

(A) Limiting angle of friction (B) Angle of repose

(C) Angle of projection (D) Angle of slide

121. Friction between two surfaces completely separated by a lubricant is

(A) Dry friction (B) Greasy friction

(C) Film friction (D) Sliding friction

122. The length of the tooth parallel to the gear axis is

(A) Space width (B) Working depth

(C) Face width (D) Flank

123. The work and heat are mutually convertible. This statement is called

(A) Zeroth Law of Thermodynamics (B) First Law of Thermodynamics

(C) Second Law of Thermodynamics (D) Law of Energy Conservation

124. The value of ratio of two specific heats for air is

(A) 1.4 (B) 1.8

(C) 2.3 (D) 1

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125. A system, in which heat and work cross the boundary of the system, but there is no loss of the original mass

(A) Open system
(B) Closed system
(C) Isolated system
(D) Thermodynamic system

126. Which of the following is a reversible non-flow process?

(A) Hyberbolic process
(B) Isobaric process
(C) Isochoric process
(D) All of these

127. When the expansion or compression takes place according to the Law $PV^n = C$, the process is known as

(A) Hyperbolic process
(B) Polytropic process
(C) Isothermal process
(D) Adiabatic process

128. In the equation $PV^n = C$, if the value of $n = 0$, then the process is called

(A) Constant pressure process
(B) Constant volume process
(C) Adiabatic process
(D) Isothermal process

129. In diesel engines, the approximate pressure at the end of the compression stroke is

(A) 25 bar
(B) 35 bar
(C) 10 bar
(D) 20 bar

130. The ratio of indicated thermal efficiency to the air standard efficiency is called as

(A) Volumetric efficiency
(B) Overall efficiency
(C) Relative efficiency
(D) Mechanical efficiency

131. A device used to produce a spark for igniting the charge in the petrol engine is

(A) Carburettor
(B) Governor
(C) Dynamometer
(D) Spark plug

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132. The mass of gas turbine per KW developed is about _____ as that of I.C. engine

(A) one-fourth (B) one-sixth

(C) one-eighth (D) one-tenth

133. A gas turbine has a compression ratio of

(A) 7 (B) 9

(C) 4 (D) 12

134. The ratio of the isentropic power to the brake power required to drive the compressor:

(A) Mechanical efficiency (B) Overall Thermal efficiency

(C) Isentropic efficiency (D) Volumetric efficiency

135. The absolute pressure of air at the outlet of a compressor is called

(A) Critical pressure (B) Back pressure

(C) Discharge pressure (D) Sub-critical pressure

136. The condition for perfect intercooling in a two-stage compressor:

(A) $\frac{P_1}{P_3} = \frac{P_2}{P_1}$ (B) $\frac{P_2}{P_1} = \frac{P_3}{P_2}$

(C) $P_1 = P_3$ (D) $P_1 = P_2 P_3$

137. The capacity of a compressor is expressed in

(A) Kg/m^3 (B) m^3/min

(C) m^3/Kg (D) Kg/m^2

138. The Co-efficient Of Performance (C.O.P.) of a refrigerator working as a heat pump is given by

(A) $[C.O.P.]_P = [C.O.P.]_R + 2$ (B) $[C.O.P.]_P = [C.O.P.]_R$

(C) $[C.O.P.]_P = [C.O.P]_R - 1$ (D) $[C.O.P.]_P = [C.O.P.] + 1$

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139. The C.O.P. of a refrigerator working on a reversed Carnot cycle is (where T_1 = Lowest temperture, T_2 = Highest temperature):

(A) $\frac{T_1}{T_2 - T_1}$ (B) $\frac{T_2 - T_1}{T_1}$

(C) $\frac{T_1 - T_2}{T_1}$ (D) $\frac{T_2}{T_2 - T_1}$

140. The pressure which is marked as zero on gauge scale is known as

(A) Atmospheric pressure (B) Gauge pressure

(C) Absolute pressure (D) Vacuum pressure

141. Which of the following is not suitable for measuring negative pressure?

(A) Simple Manometer (B) Micro Manometer

(C) Differential Manometer (D) Piezo Meter Tube

142. A flow in which the velocities of liquid particles at all sections of pipe are equal is called

(A) Uniform flow (B) Non-uniform flow

(C) Streamline flow (D) Turbulant flow

143. Which of the following equation is true in case of Bernoulli's theorem?

(A) $Z_1 + \frac{V_1^2}{2g} + \frac{P_1}{W} = Z_2 + \frac{V_2^2}{2g} + \frac{P_2}{W}$

(B) $Z_1 + \frac{V_1}{2g} + \frac{P_1}{W} = Z_2 + \frac{V_2}{2g} + \frac{P_2}{W}$

(C) $Z_1^2 + \frac{V_1}{2g} + \frac{P_1}{W} = Z_2^2 + \frac{V_2}{2g} + \frac{P_2}{W}$

(D) $Z_1 + \frac{V_1}{2g} + \frac{P_1^2}{W} = Z_2 + \frac{V_2}{2g} + \frac{P_2^2}{W}$

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144. In pipeline, the total energy line lies over the hydraulic Gradient line by an amount equal to the

(A) pressure head (B) atmospheric head

(C) vacuum head (D) velocity head

145. The actual head against which a centrifugal pump has to work is called

(A) Delivery head (B) Manometric head

(C) Suction head (D) Vacuum head

146. The priming is needed in which of the following pumps?

(A) Reciprocating pump (B) Lobe pump

(C) Vane pump (D) Centrifugal pump

147. The actual discharge of a Reciprocating Pump is more than the theoritical discharge then it is called as

(A) Positive slip (B) Negative slip

(C) Slip (D) Coefficient of discharge

148. In which of the following pumps the air vessel is fitted?

(A) Centrifugal pump (B) Vane pump

(C) Lobe pump (D) Reciprocating pump

149. Which of the following pumps is generally used to pump highly viscous fluid?

(A) Centrifugal pump (B) Reciprocating pump

(C) Airlift pump (D) Screw pump

150. The valve which is used to operate the cycle of a machine automatically is called

(A) Pressure Relief valve (B) Sequence value

(C) Non-Return valve (D) Pressure control valve

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151. The valve which is used to control double acting return cylinder which has a double input of air is called

(A) 3/2 valve
(B) 5/2 valve
(C) 3/1 valve
(D) 5/1 valve

152. Single acting cylinder is an example of

(A) Pressure control valve
(B) Direction control valve
(C) Flow control valve
(D) Actuator

153. The device that stores the potential energy of an incompressible fluid held under pressure by an external source against some dynamic force is called as

(A) Accumulator
(B) Hydraulic Pump
(C) Hydraulic Turbine
(D) Pressure Control valve

154. Which of the following is not the component of Pneumatic System?

(A) Air Filter
(B) Compressor
(C) Control valve
(D) Thermocouple

155. The valve which is used in Fluid System to permit flow in one direction and to prevent flow in the other direction is called

(A) Check valve
(B) Gate valve
(C) Plug valve
(D) Needle valve

156. The device which converts the potential energy of the compressed air into rotary mechanical energy is called

(A) Stop valve
(B) Air Motor
(C) Air Compressor
(D) Pressure Regulator

157. Military organization is also known as

(A) Line & Staff organization
(B) Line organization
(C) Committee organization
(D) Functional organization

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158. The type of organization preferred for a steel industry is

(A) Line organization
(B) Functional organization
(C) Line & Staff organization
(D) Line, Staff and Functional organization

159. The process of Estimation of types, quantity and quality of Future work is called

(A) Forecasting
(B) Routing
(C) Scheduling
(D) Dispatching

160. The process which involves deciding as to when the work will start and in a certain duration of time how much work will be finished is called

(A) Scheduling
(B) Routing
(C) Dispatching
(D) Planning

161. The chart in which number of defects in a piece or a sample are plotted is called

(A) $\overline{X}$-Chart
(B) C-Chart
(C) P-Chart
(D) R-Chart

162. The maintenance which involves periodic inspection of equipment and machinery to uncover conditions that lead to production breakdown is called

(A) Breakdown maintenance
(B) Preventive maintenance
(C) Scheduled maintenance
(D) Predictive maintenance

163. The Leader who takes decisions by discussing and consulting his subordinates is called

(A) Democratic Leader
(B) Authoritarian Leader
(C) Laissez-Faire Leader
(D) Political Leader

164. If the inspection of product is carried out in a room where all the tools required for inspection is there is called

(A) Centralized Inspection
(B) Decentralized Inspection
(C) Floor Inspection
(D) Shop Inspection.

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165. The material to be purchased is of extreme importance, then it is done through

(A) Global Tender (B) Single Tender

(C) Secret Tender (D) Open Market Purchase

166. The safety methods in industry help to

(A) Increasing the Rate of Production (B) Reducing the Rate of Production

(C) Increasing the Cost of Production (D) Increasing the Loss

167. During Industrial Accident the cost of wages paid to the injured worker comes under

(A) Direct Cost of an Accident (B) Indirect Cost of an Accident

(C) Loss to the Government (D) Loss to the Worker's Family

168. The selection of the paths over which each material should flow during the Production activity is

(A) Despatching (B) Productivity

(C) Scheduling (D) Routing

169. The property of a material due to which it breaks with little permanent distortion is called

(A) Ductility (B) Malleability

(C) Brittleness (D) Plasticity

170. Cast iron is a

(A) Ductile material (B) Brittle material

(C) Tough material (D) Malleable material

171. Which of the following properties is desirable for materials used in tools and machines?

(A) Ductility (B) Malleability

(C) Plasticity (D) Elasticity

172. Which of the following is not a mineral of Copper?

(A) Azurite (B) Malachite

(C) Duralumin (D) Copper glance

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173. The heat treatment process used for softening hardened Steel is

(A) Annealing (B) Tempering

(C) Normalising (D) Carburising

174. Thermosetting plastics are those materials which

(A) are formed into shape under heat and pressure

(B) do not become hard with the application of heat and pressure

(C) are flexible and can withstand considerable wear under suitable condition

(D) are used for friction lining for clutches and brakes.

175. The degree of perfection used in instruments is known as

(A) Accuracy (B) Efficiency

(C) Precision (D) Least count

176. Which of the following transducer is used to translate linear motion into Electrical Signals?

(A) Thermistor (B) Strain gauges

(C) LVDT (D) Bellows

177. A 'LVDT' has

(A) one primary coil and one secondary coil (B) one primary coil and two secondary coils

(C) two primary coils and one secondary coil (D) two primary coils and two secondary coils

178. What is bilateral tolerance?

(A) Total tolerance is in one direction (B) Total tolerance is in both directions

(C) Tolerance is provided all over the body (D) Tolerance is provided in three directions.

179. Expressing a dimension as 60.5 ± 0.4 is an example for

(A) Unilateral tolerance (B) Bilateral tolerance

(C) Trilateral tolerance (D) Limiting dimensions

180. The ratio of output response to a specified change in the input is known as

(A) Range (B) Sensitivity

(C) Error (D) Precision

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