SET–"X"

(Total No. of printed pages : 24)

(DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU ARE ASKED TO DO SO)

(PH.D/URS-EE-December-2022)

10029

Code **A** **Mechanical Engineering** Sr. No._____

Time : 1¼ Hours **Total Questions : 100** **Max. Marks : 100**

Roll No. _____ (in figure)_____ (in words)

Name : _____ Date of Birth : _____

Father's Name : _____ Mother's Name : _____

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(Signature of the candidate) (Signature of the Invigilator)

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Question No.	Questions
1.	A ladder is resting on a smooth ground and leaning against a rough vertical wall. The force of friction will act (1) Downward at its upper end (2) Upward at its upper end (3) Zero at its upper end (4) Perpendicular to the wall at its upper end
2.	The acceleration of a particle with simple harmonic motion, at any instant is given by (1) $\omega.y$ (2) $\omega^2.y$ (3) ω^2/y (4) $\omega^3.y$
3.	A particle moves in a circular path with constant speed v. The change in velocity when it traverses an angle of 120° is (1) 2v (2) 2.5v (3) $\sqrt{3}v$ (4) $3\sqrt{2}v$
4.	For a 25 mm hole drilled in plates, the diameter of rivet shank should be (1) 23 mm (2) 24.5 mm (3) 25 mm (4) 26 mm
5.	A beam of triangular section is placed with its base horizontal. The maximum shear stress occurs at (1) Apex of the triangle (2) Mid of the height (3) Centre of gravity of the triange (4) Base of the triangle

Question No.	Questions
6.	Pitching of a ship exerts force on the bearings (1) Perpendicular to their axis (2) Along the axis of the bearings (3) Plain perpendicular to the pitching (4) None of the above
7.	A compound cylinder with inner radius 5 cm and outer radius 7 cm is made by shrinking one cylinder onto the other cylinder. The junction radius is 6 cm and the junction pressure is 11 kg/cm^2. The maximum hoop stress developed in the inner cylinder is (1) 36 kg/cm^2 compression (2) 36 kg/cm^2 tension (3) 72 kg/cm^2 compression (4) 72 kg/cm^2 tension
8.	A shaft was initially subjected to bending moment and then was subjected to torsion. If the magnitude of bending moment is found to be the same as that of torque, then the ratio of maximum bending stress to shear stress would be (1) 0.25 (2) 0.50 (3) 2.0 (4) 4.0

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9.	A transmission shaft subjected to bending loads must be designed on the basis of (1) Maximum normal stress theory (2) Maximum shear stress theory (3) Maximum normal stress and maximum shear stress theories (4) Fatigue strength
10.	Maximum shear stress in Mohr's circle is equal to (1) Radius of circle (2) Diameter of circle (3) Centre of circle from y-axis (4) Chord of circle
11.	A spring with 25 active coils cannot be accommodated within a given space. Hence 5 coils of the spring are cut. What is the stiffness of the new spring? (1) Same as the original spring (2) 1.25 times the original spring (3) 0. times the original spring (4) 0.5 times the original spring

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12.	The effective diameter of an external or internal screw thread, is known as (1) Minor diameter (2) Major diameter (3) Pitch diameter (4) None of these
13.	A point on a link connecting a double slider crank chain will trace a (1) Straight line (2) Circle (3) Parabola (4) Ellipse
14.	In pivot bearing, the wear at the contact area is : (1) Zero at the centre (2) Uniform throughout (3) Max. at the centre (4) Max. at the outer radius
15.	An involute pinion and gear are in mesh. If both have the same size of addendum, then there will be an interference between the (1) Tip of the ear tooth and flank of pinion (2) Tip of pinion and flank of gear (3) Flanks of both gear and pinion (4) Tip of both ear and pinion
16.	A spring controlled governor is found unstable. It can be made stable by (1) Increasing the spring stiffness (2) Decreasing the spring stiffness (3) Increasing the ball weight (4) Decreasing the ball weight

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17.	The point on the cam with maximum pressure angle is called (1) The trace point (2) The pitch point (3) Cam centre (4) None of the above
18.	Best position of crank for blanking operation in a mechanical press is (1) Top dead centre (2) 20 degree below top dead centre (3) 20 degress before bottom dead centre (4) Bottom dead centre
19.	A connecting rod has a mass of 0.5 kg, the radius of gyration through its centre of gravity is 5 cm and its acceleration is 2×10^4 rad/sec^2. The equivalent two mass system for the connecting rod has a radius of gyration 6 cm. What is the correction couple of the equivalent system ? (1) 11 Nm (2) 9 Nm (3) 6 Nm (4) 1 Nm
20.	Petroff's equation is used when journal (1) Coincides with bearing (2) Is concentric with bearing (3) Rotates in clockwise direction (4) Rotates in anticlockwise direction

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21.	Design of shafts made of brittle materials is based on : (1) Guest's theory (2) Ranine's theory (3) St. Venant's theory (4) Von Mises theory
22.	According to Indian Boilers Regulations, the factor of safety in riveted joint should not be less than : (1) 1.5 (2) 2 (3) 4 (4) 6
23.	Miter gears are : (1) Right angled bevel gears with same number of teeth (2) Spur gears with same number of teeth (3) Helical gears with same number of teeth (4) None of the above
24.	The bearing characteristic relating absolute viscosity of lubricant(Z), speed of journal (N) and bearing pressure (p) is defined as : (1) ZN/p (2) Zp/N (3) pN/Z (4) ZpN
25.	What is sunk key made in the form of a segment of a circular disc of uniform thickness, known as ? (1) Feather key (2) Kennedy key (3) Woodruff key (4) Saddle key

Question No.	Questions
26.	Fluids that require a gradually increasing shear stress to maintain a constant strain rate are known as : (1) Rhedopectic fluids (2) Thixotropic fluid (3) Pseudoplastic fluid (4) Newtonian fluids
27.	The capillary rise at 20°C in clean glass tube of 1 mm diameter containing water is approximately. (1) 15 mm (2) 50 mm (3) 20 mm (4) 3 mm
28.	Prandtl's mixing length hypothesis is based on : (1) Eddy viscosity (2) Momentum exchange that occurs due to random motion (3) Similarity of turbulent flow pattern (4) None of the above
29.	In the case of pelton turbine installed in a hydraulic power plant, the gross head available is the vertical distance between (1) Forebay and tail race (2) Reservoir level and turbine inlet (3) Forebay and turbine inlet (4) Reservoir level and tail race

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30.	In a centrifugal pump when delivery value is fully closed, the pressure of fluid inside the pump will (1) Become zero (2) Reduce (3) Increase (4) Remain unaltered
31.	Water is flowing with a flow rate of 0.002 m^3/s. What is the average velocity at an outlet where the area is 4 cm^2 ? (1) 50 m/s (2) 20 m/s (3) 10 m/s (4) 5 m/s
32.	In a hydraulic coupling (1) Slip is negligible at low speeds (2) Efficiency of transmission is high at low speeds (3) Slip is around 2 to 3 percent at the running speed (4) Efficiency is high as compared to mechanical coupling
33.	The magnus effect is defined as : (1) The generation of lift per unit drag force (2) The circulation induced in an aircraft wing (3) The separation of boundary layer near the trailing edge of a slender body (4) The generation of lift on a rotating cylinder in a uniform flow

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34.	In a centrifugal compressor, the highest Mach number leading to shock wave in the fluid flow occurs at (1) Diffuser inlet radius (2) Diffuser outlet radius (3) Impeller inlet radius (4) Impeller outlet radius
35.	The Moody diagram is used in fluid mechanics to obtain the (1) Drag coefficient (2) Strouhal number (3) Friction factor (4) Manning constant
36.	Hot oil is cooled from 80 to 50°C in an oil cooler which uses air as the coolant. The air temperature rises from 30 to 40°C. The designer uses a LMTD value of 26°C. The type of heat exchanger is (1) Parallel (2) Double pipe (3) Counter flow (4) Cross flow
37.	Prandtl number has least value in which of the following ? (1) Gases (2) Brine solution (3) Liquid metal (4) Oil film
38.	In spite of large heat transfer coefficients in boiling liquids, fins are used advantageously when the entire surface is exposed to (1) Nucleate boiling (2) Film boiling (3) Transition boiling (4) All modes of boiling

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39.	Fraction of radiative energy leaving one surface that strikes the other surface is called (1) Radiative flux (2) Emissive power of the first surface (3) View factor (4) Re-radiation flux
40.	In unsteady-state heat conduction for bodies with negligible temperature gradients, the time temperature variation curve is (1) Linear (2) Parabolic (3) Sinusoidal (4) Exponential
41.	A mass M of a fluid at temperature T_1 is mixed with an equal mass of the same fluid at temperature T_2. The resultant change in entropy of the universe is (1) Zero (2) Negligible (3) Always negative (4) Always positive
42.	If methane undergoes combustion with the stoichiometric quantity of air fuel ratio on molar basis would be (1) 15.22:1 (2) 12.30:1 (3) 14.56:1 (4) 9.52:1
43.	A cylinder contains 5 m^3 of ideal gas at a pressure of 1 bar. This gas is compressed in a reversible isothermal process till its pressure increases to 5 bar. The work in kJ is required for this process is (1) 804.7 (2) 953.2 (3) 981.7 (4) 1012.2

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44.	Energy conversion takes place only in one row of rotor of nozzle blades and later the steam glides over the rotor and guide rows in the case of (1) De Laval turbine (2) Rateau turbine (3) Parson's turbine (4) Curtis turbine
45.	The degree of reaction of a turbine is the ratio of enthalpy drop in (1) Moving blades to enthalpy drop in the stage (2) Fixed blades to enthalpy drop in the stage (3) Moving blades to enthalpy drop in fixed blades (4) Fixed blades to enthalpy drop in moving blades
46.	A solar energy based heat engine which receives 80 kJ of heat at 100°C and rejects 70 kJ of heat to the ambient at 30°C is to be designed. The thermal efficiency of the heat engine is : (1) 70% (2) 1.88% (3) 12.5% (4) Indeterminate
47.	Which phenomena have the most adverse effect on volumetric efficiency when engine works at high speeds ? (1) Flow friction and choking (2) Ram effect and choking (3) Flow friction and charge heating (4) Charge heating and back flow

Question No.	Questions
48.	In the Rankine cycle, lower limit on the condenser pressure is due to the (1) Expansion limit in turbine (2) Condenser size (3) Air leakage into the condenser (4) Temperature of cooling water
49.	Efficiency of nozzle governed turbine is affected mainly by losses to (1) Partial admission (2) Throttling (3) Interstage pressure drop (4) Condensation in last
50.	In a Carnot refrigeration cycle, for constant upper temperature T_h, as the lower temperature increases (1) COP increases (2) COP decreases (3) Power consumption increases (4) Heat transfer during isothermal process decreases
51.	In the forging operation, fullering is done to : (1) Draw out the material (2) Bend the material (3) Upset the material (4) Extrude the material

Question No.	Questions
52.	A spherical drop of molten metal of radius 2 mm was found to solidify in 10 seconds. A similar drop of radius 4 mm would solidify in : (1) 14.14 seconds (2) 20 seconds (3) 18.30 seconds (4) 40 seconds
53.	Directional solidification in castings can be improved by using : (1) Chills and chaplets (2) Chills and padding (3) Chaplets and padding (4) Chills, chaplets and padding
54.	Preheating before welding is done to : (1) Make the steel softer (2) Burn away oil, grease etc. from the plate surface (3) Prevent cold cracks (4) Prevent plate distortion
55.	Which one of the following sets of forces are encountered by a lathe parting tool while groove cutting (1) Tangential, radial and axial (2) Tangential and radial (3) Tangential and axial (4) Radial and axial

uestion No.	Questions
56.	Poor machinability of centrifugally cast iron pipe is due to : (1) Chilling (2) Segregation (3) Dense structure (4) High mould rotation speed
57.	A single short thread of pitch 2 mm is to be produced on a lathe having a lead screw with a double start thread of pitch 4 mm. The ratio of speeds between the spindle and lead screw for this operation is : (1) 1:2 (2) 2:1 (3) 1:4 (4) 4:1
58.	Crater wear is predominant in : (1) Carbon steel tools (2) Tungsten carbide tools (3) High speed steel tools (4) Ceramic tools
59.	A surface finish of 0.025-0.1 micrometer CLA values to be produced. Which machining process would you recommend ? (1) Grinding (2) Rough Turning (3) Lapping (4) Honing
60.	A straight teeth slab milling cutter of 100 mm diameter and 10 teeth rotating at 200 rpm is used to remove a layer of 3 mm thickness from a steel bar. If the table feed is 400 mm/minute, the feed per tooth in this operation will be : (1) 0.2 mm (2) 0.4 mm (3) 0.5 mm (4) 0.6 mm

Question No.	Questions
61.	The white aluminium oxide is denoted by : (1) Al (2) A (3) WA (4) WAL
62.	The length of approach in case of drilling operation is equal to : (1) 0.8 D (2) 0.6 D (3) 0.29 D (4) 0.14 D
63.	In chemical milling process, the chemical reagent for steel work piece is : (1) Nitric acid (2) Sodium sulphate (3) Caustic soda (4) Sodium chloride
64.	The numerical control machines are controlled by the tape whose width is: (1) 50 mm (2) 40 mm (3) 30 mm (4) 20 mm
65.	High speed steel tools retail their hardness upto a temperature of : (1) 1400°C (2) 1200°C (3) 900°C (4) 500°C
66.	The floating position of the holding fixture in a rotary transfer device is used to : (1) Improve the accuracy of location (2) Reduce the tendency to cover-index (3) Improve upon the acceleration and deceleration characteristics (4) Reduce the cycle time

Question No.	Questions
67.	Gear burnishing is a process for : (1) Surface finishing (2) Undercut gears (3) Cycloidal gears (4) Removing residual stresses from teeth roots
68.	During a single pass rolling processes, the thickness of metallic sheet is reduced from 18 mm to 12 mm. Roll diameter is 500 mm. Angle of bite in degrees is (1) 5.24 (2) 4.79 (3) 8.83 (4) 6.68
69.	A commonly used 30 mm H-hole with tolerance grade IT9 is expressed as (1) 30IT9 (2) 30HIT9 (3) 30H9 (4) 9H30
70.	Stellite is a non ferrous cast alloy composed of (1) Cobalt, Chromium and Tungsten (2) Tungsten, Chromium and Vanadium (3) Molybdenum, Tungsten and Chromium (4) Tungsten, Chromium, Molybdenum and Vanadium

Question No.	Questions
71.	In the 3-2-1 principle of fixture design, 3 refers to number of (1) Setup possible (2) Clamps required (3) Positions on primary face (4) Locating positions
72.	For resistance spot welding of 2.0 mm thick steel sheets, the current required is of the order of (1) 10 A (2) 100 A (3) 1000 A (4) 10,000 A
73.	The ratio of surface area to volume for a unit volume of riser is minimum in case of (1) Cylindrical riser (2) Spherical riser (3) Hemispherical riser (4) Cuboids riser
74.	Which of the following cutting tool bits are made by powder metallurgy process (1) Carbon steel bits (2) Stellite tool bits (3) Ceramic tool bits (4) All of the above
75.	For drilling aluminium, a drill with (1) High helix angle is required (2) Low helix angle is required (3) Any helix angle can be used (4) Zero helix angle is required

Question No.	Questions
76.	In Optiz code, the first five digits express (1) Production operation type and sequence (2) Attributes which are used for manufacturing (3) Primary design attributes of the part (4) None of these
77.	The probability distribution of project completion in PERT flows following distribution : (1) Normal (2) Binomial (3) Beta (4) Gaussian
78.	From the point of motion economy it is preferable to move : (1) Both hands in the same direction (2) Right hand first and then the left hand (3) Only one hand at a time (4) Both hands in opposite direction
79.	A device used for lifting or lowering objects suspended from a hook at the end of retractable chains or cable is called (1) Hoist (2) Job crane (3) Portable elevator (4) Chain conveyor

Question No.	Questions
80.	A diagram showing the path followed by men and materials while performing a task is known as : (1) String diagram (2) Flow process chart (3) Travel chart (4) Flow diagram
81.	Forecasting which assumes a static environment in the future is : (1) Passive forecasting (2) Active forecasting (3) Long term forecasting (4) Short term forecasting
82.	In production, planning and control, the document which authorizes the start of an operation on the shop floor is the : (1) Dispatch order (2) Route plan (3) Loading chart (4) Schedule
83.	In a study to estimate the idle time of a machine, out of 100 random observations the machine is found idle on 40 observations. The total random observations for 95% confidence level and ± 5% accuracy are : (1) 384 (2) 600 (3) 2400 (4) 9600
84.	Which of the following wage incentive plan guarantees minimum wage and bonus is paid for the fixed percentage of time saved ? (1) Hasley plan (2) Emerson plan (3) Haynes plan (4) Gnatt plan

Question No.	Questions
85.	The most traditional and most often used work measurement technique is: (1) Time study-stop watch (2) Work sampling (3) Analytical estimating (4) Pre-determined motion time system
86.	Amortization means : (1) Liquidation of financial obligations (2) Liquidation of an industry (3) Commitment of financial obligations (4) Liquidation of financial obligations on the indeterminable
87.	In simplest method, the row to be replaced (1) Zero (2) Less than zero (3) More than zero (4) Infinity
88.	Given set of vectors (2, 3, – 1), (1, 7, –2) and (3, 5, 2) in R^3 is (1) Linearly dependent over R^3 (2) Linearly independent over R^3 (3) Will form a matrix with all zero solutions (4) System has no solution
89.	Suppose rank of a matrix $A_{(7\times8)}$ is 6, then which of the following is correct (1) A is invertible matrix (2) A is skew-symmetric matrix (3) A has fifteen linear independent solutions (4) A will have six linearly independent rows and column

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90.	Which one of the following is not a technique of PMTS ? (1) Synthetic data (2) Stop-watch time study (3) Work factor (4) MTM
91.	In inventory planning, extra inventory is unnecessarily carried to the end of the planning period when using one of the following lot size decision policies : (1) Lot-for-lot production (2) EOQ lot size (3) Period order quantity (4) Part period total cost balancing
92.	Dummy activities are used in a network to : (1) Facilitate computation of slacks (2) Satisfy precedence requirements (3) Determine project completion time (4) Avoid use of resource
93.	If the value of variance is more : (1) Certainty is more (2) Probability of certainty is more (3) Uncertainty is more (4) Probability distribution curve shall be having a unsymmetrical shape

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94.	Bucket is a term used in MRP systems, it is a (1) Principal unit of time measurement (2) Demand for a raw material (3) Product mix (4) Material in hand
95.	The probability law that determines the fluctuations of fraction defective is (1) Poisson (2) Normal (3) Binomial (4) Exponential
96.	In value engineering "worth" is value of (1) Product (2) Service (3) System (4) Function
97.	Which of the following represents the reduction in duration ? (1) Crushing (2) Negative slack (3) Variance (4) All of the above
98.	For a skew-symmetric matrix, minimum possible rank is : (1) 0 (2) 1 (3) Greater than 1 (4) 2

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99.	Degeneracy in LPP method indicates (1) Tie for key column (2) Tie for key row (3) Infeasible problem (4) Multiple optional solutions
100.	Programmable Logic Controller is used for applications like (1) On/Off control (2) Timing (3) Counting and sequencing (4) All of the above

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27.	Which of the following represents the reduction in duration ? (1) Crushing (2) Negative slack (3) Variance (4) All of the above
28.	For a skew-symmetric matrix, minimum possible rank is : (1) 0 (2) 1 (3) Greater than 1 (4) 2
29.	Degeneracy in LPP method indicates (1) Tie for key column (2) Tie for key row (3) Infeasible problem (4) Multiple optional solutions
30.	Programmable Logic Controller is used for applications like (1) On/Off control (2) Timing (3) Counting and sequencing (4) All of the above
31.	A ladder is resting on a smooth ground and leaning against a rough vertical wall. The force of friction will act (1) Downward at its upper end (2) Upward at its upper end (3) Zero at its upper end (4) Perpendicular to the wall at its upper end

Question No.	Questions
32.	The acceleration of a particle with simple harmonic motion, at any instant is given by (1) $\omega.y$ (2) $\omega^2.y$ (3) ω^2/y (4) $\omega^3.y$
33.	A particle moves in a circular path with constant speed v. The change in velocity when it traverses an angle of 120° is (1) 2v (2) 2.5v (3) $\sqrt{3}v$ (4) $3\sqrt{2}v$
34.	For a 25 mm hole drilled in plates, the diameter of rivet shank should be (1) 23 mm (2) 24.5 mm (3) 25 mm (4) 26 mm
35.	A beam of triangular section is placed with its base horizontal. The maximum shear stress occurs at (1) Apex of the triangle (2) Mid of the height (3) Centre of gravity of the triange (4) Base of the triangle
36.	Pitching of a ship exerts force on the bearings (1) Perpendicular to their axis (2) Along the axis of the bearings (3) Plain perpendicular to the pitching (4) None of the above

Question No.	Questions
37.	A compound cylinder with inner radius 5 cm and outer radius 7 cm is made by shrinking one cylinder onto the other cylinder. The junction radius is 6 cm and the junction pressure is 11 kg/cm^2. The maximum hoop stress developed in the inner cylinder is (1) 36 kg/cm^2 compression (2) 36 kg/cm^2 tension (3) 72 kg/cm^2 compression (4) 72 kg/cm^2 tension
38.	A shaft was initially subjected to bending moment and then was subjected to torsion. If the magnitude of bending moment is found to be the same as that of torque, then the ratio of maximum bending stress to shear stress would be (1) 0.25 (2) 0.50 (3) 2.0 (4) 4.0
39.	A transmission shaft subjected to bending loads must be designed on the basis of (1) Maximum normal stress theory (2) Maximum shear stress theory (3) Maximum normal stress and maximum shear stress theories (4) Fatigue strength

Question No.	Questions
40.	Maximum shear stress in Mohr's circle is equal to (1) Radius of circle (2) Diameter of circle (3) Centre of circle from y-axis (4) Chord of circle
41.	In the forging operation, fullering is done to : (1) Draw out the material (2) Bend the material (3) Upset the material (4) Extrude the material
42.	A spherical drop of molten metal of radius 2 mm was found to solidify in 10 seconds. A similar drop of radius 4 mm would solidify in : (1) 14.14 seconds (2) 20 seconds (3) 18.30 seconds (4) 40 seconds
43.	Directional solidification in castings can be improved by using : (1) Chills and chaplets (2) Chills and padding (3) Chaplets and padding (4) Chills, chaplets and padding

Question No.	Questions
44.	Preheating before welding is done to : (1) Make the steel softer (2) Burn away oil, grease etc. from the plate surface (3) Prevent cold cracks (4) Prevent plate distortion
45.	Which one of the following sets of forces are encountered by a lathe parting tool while groove cutting (1) Tangential, radial and axial (2) Tangential and radial (3) Tangential and axial (4) Radial and axial
46.	Poor machinability of centrifugally cast iron pipe is due to : (1) Chilling (2) Segregation (3) Dense structure (4) High mould rotation speed
47.	A single short thread of pitch 2 mm is to be produced on a lathe having a lead screw with a double start thread of pitch 4 mm. The ratio of speeds between the spindle and lead screw for this operation is : (1) 1:2 (2) 2:1 (3) 1:4 (4) 4:1

estion No.	Questions
48.	Crater wear is predominant in : (1) Carbon steel tools (2) Tungsten carbide tools (3) High speed steel tools (4) Ceramic tools
49.	A surface finish of 0.025-0.1 micrometer CLA values to be produced. Which machining process would you recommend ? (1) Grinding (2) Rough Turning (3) Lapping (4) Honing
50.	A straight teeth slab milling cutter of 100 mm diameter and 10 teeth rotating at 200 rpm is used to remove a layer of 3 mm thickness from a steel bar. If the table feed is 400 mm/minute, the feed per tooth in this operation will be : (1) 0.2 mm (2) 0.4 mm (3) 0.5 mm (4) 0.6 mm
51.	The white aluminium oxide is denoted by : (1) A*l* (2) A (3) WA (4) WAL
52.	The length of approach in case of drilling operation is equal to : (1) 0.8 D (2) 0.6 D (3) 0.29 D (4) 0.14 D
53.	In chemical milling process, the chemical reagent for steel work piece is : (1) Nitric acid (2) Sodium sulphate (3) Caustic soda (4) Sodium chloride

Question No.	Questions
54.	The numerical control machines are controlled by the tape whose width is: (1) 50 mm (2) 40 mm (3) 30 mm (4) 20 mm
55.	High speed steel tools retail their hardness upto a temperature of : (1) 1400°C (2) 1200°C (3) 900°C (4) 500°C
56.	The floating position of the holding fixture in a rotary transfer device is used to : (1) Improve the accuracy of location (2) Reduce the tendency to cover-index (3) Improve upon the acceleration and deceleration characteristics (4) Reduce the cycle time
57.	Gear burnishing is a process for : (1) Surface finishing (2) Undercut gears (3) Cycloidal gears (4) Removing residual stresses from teeth roots

Question No.	Questions
58.	During a single pass rolling processes, the thickness of metallic sheet is reduced from 18 mm to 12 mm. Roll diameter is 500 mm. Angle of bite in degrees is (1) 5.24 (2) 4.79 (3) 8.83 (4) 6.68
59.	A commonly used 30 mm H-hole with tolerance grade IT9 is expressed as (1) 30IT9 (2) 30HIT9 (3) 30H9 (4) 9H30
60.	Stellite is a non ferrous cast alloy composed of (1) Cobalt, Chromium and Tungsten (2) Tungsten, Chromium and Vanadium (3) Molybdenum, Tungsten and Chromium (4) Tungsten, Chromium, Molybdenum and Vanadium
61.	Design of shafts made of brittle materials is based on : (1) Guest's theory (2) Ranine's theory (3) St. Venant's theory (4) Von Mises theory
62.	According to Indian Boilers Regulations, the factor of safety in riveted joint should not be less than : (1) 1.5 (2) 2 (3) 4 (4) 6

Question No.	Questions
63.	Miter gears are : (1) Right angled bevel gears with same number of teeth (2) Spur gears with same number of teeth (3) Helical gears with same number of teeth (4) None of the above
64.	The bearing characteristic relating absolute viscosity of lubricant(Z), speed of journal (N) and bearing pressure (p) is defined as : (1) ZN/p (2) Zp/N (3) pN/Z (4) ZpN
65.	What is sunk key made in the form of a segment of a circular disc of uniform thickness, known as ? (1) Feather key (2) Kennedy key (3) Woodruff key (4) Saddle key
66.	Fluids that require a gradually increasing shear stress to maintain a constant strain rate are known as : (1) Rhedopectic fluids (2) Thixotropic fluid (3) Pseudoplastic fluid (4) Newtonian fluids
67.	The capillary rise at 20°C in clean glass tube of 1 mm diameter containing water is approximately. (1) 15 mm (2) 50 mm (3) 20 mm (4) 3 mm

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68.	Prandtl's mixing length hypothesis is based on : (1) Eddy viscosity (2) Momentum exchange that occurs due to random motion (3) Similarity of turbulent flow pattern (4) None of the above
69.	In the case of pelton turbine installed in a hydraulic power plant, the gross head available is the vertical distance between (1) Forebay and tail race (2) Reservoir level and turbine inlet (3) Forebay and turbine inlet (4) Reservoir level and tail race
70.	In a centrifugal pump when delivery value is fully closed, the pressure of fluid inside the pump will (1) Become zero (2) Reduce (3) Increase (4) Remain unaltered
71.	A spring with 25 active coils cannot be accommodated within a given space. Hence 5 coils of the spring are cut. What is the stiffness of the new spring? (1) Same as the original spring (2) 1.25 times the original spring (3) 0. times the original spring (4) 0.5 times the original spring

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72.	The effective diameter of an external or internal screw thread, is known as (1) Minor diameter (2) Major diameter (3) Pitch diameter (4) None of these
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75.	An involute pinion and gear are in mesh. If both have the same size of addendum, then there will be an interference between the (1) Tip of the ear tooth and flank of pinion (2) Tip of pinion and flank of gear (3) Flanks of both gear and pinion (4) Tip of both ear and pinion
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77.	The point on the cam with maximum pressure angle is called (1) The trace point (2) The pitch point (3) Cam centre (4) None of the above
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80.	Petroff's equation is used when journal (1) Coincides with bearing (2) Is concentric with bearing (3) Rotates in clockwise direction (4) Rotates in anticlockwise direction

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81.	Forecasting which assumes a static environment in the future is : (1) Passive forecasting (2) Active forecasting (3) Long term forecasting (4) Short term forecasting
82.	In production, planning and control, the document which authorizes the start of an operation on the shop floor is the : (1) Dispatch order (2) Route plan (3) Loading chart (4) Schedule
83.	In a study to estimate the idle time of a machine, out of 100 random observations the machine is found idle on 40 observations. The total random observations for 95% confidence level and ± 5% accuracy are : (1) 384 (2) 600 (3) 2400 (4) 9600
84.	Which of the following wage incentive plan guarantees minimum wage and bonus is paid for the fixed percentage of time saved ? (1) Hasley plan (2) Emerson plan (3) Haynes plan (4) Gnatt plan
85.	The most traditional and most often used work measurement technique is: (1) Time study-stop watch (2) Work sampling (3) Analytical estimating (4) Pre-determined motion time system

Question No.	Questions
86.	Amortization means : (1) Liquidation of financial obligations (2) Liquidation of an industry (3) Commitment of financial obligations (4) Liquidation of financial obligations on the indeterminable
87.	In simplest method, the row to be replaced (1) Zero (2) Less than zero (3) More than zero (4) Infinity
88.	Given set of vectors (2, 3, – 1), (1, 7, –2) and (3, 5, 2) in R^3 is (1) Linearly dependent over R^3 (2) Linearly independent over R^3 (3) Will form a matrix with all zero solutions (4) System has no solution
89.	Suppose rank of a matrix $A_{(7\times8)}$ is 6, then which of the following is correct (1) A is invertible matrix (2) A is skew-symmetric matrix (3) A has fifteen linear independent solutions (4) A will have six linearly independent rows and column
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91.	Water is flowing with a flow rate of 0.002 m^3/s. What is the average velocity at an outlet where the area is 4 cm^2 ? (1) 50 m/s (2) 20 m/s (3) 10 m/s (4) 5 m/s
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Question No.
100.

Question No.	Questions
100.	In unsteady-state heat conduction for bodies with negligible temperature gradients, the time temperature variation curve is (1) Linear (2) Parabolic (3) Sinusoidal (4) Exponential

SET–"X"

(Total No. of printed pages : 24)

(DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU ARE ASKED TO DO SO)

(PH.D/URS-EE-December-2022)

Code C Mechanical Engineering Sr. No. 10027

Time : 1¼ Hours **Total Questions : 100** **Max. Marks : 100**

Roll No. _____ (in figure) _____ (in words)

Name : _____ Date of Birth : _____

Father's Name : _____ Mother's Name : _____

Date of Examination : _____

(Signature of the candidate) (Signature of the Invigilator)

CANDIDATES MUST READ THE FOLLOWING INFORMATION/ INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER.

1. **All questions are compulsory.**
2. The candidates must return the Question book-let as well as OMR answer-sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / mis-behaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
3. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
4. Question Booklet along-with answer key of all the A,B,C and D code shall be got uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University website. The complaint be sent by the students to the Controller of Examinations by hand or through email. Thereafter, no complaint in any case will considered.
5. The candidate MUST NOT do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question book-let itself. Answers **MUST NOT** be ticked in the Question book-let.
6. **There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.**
7. Use only Black or Blue <u>BALL POINT PEN</u> of good quality in the OMR Answer-Sheet.
8. BEFORE ANSWERING THE QUESTIONS, THE CANDIDATES SHOULD ENSURE THAT THEY HAVE BEEN SUPPLIED CORRECT AND COMPLETE BOOK-LET. COMPLAINTS, IF ANY, REGARDING MISPRINTING ETC. WILL NOT BE ENTERTAINED 30 MINUTES AFTER STARTING OF THE EXAMINATION.

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32.	For resistance spot welding of 2.0 mm thick steel sheets, the current required is of the order of (1) 10 A (2) 100 A (3) 1000 A (4) 10,000 A
33.	The ratio of surface area to volume for a unit volume of riser is minimum in case of (1) Cylindrical riser (2) Spherical riser (3) Hemispherical riser (4) Cuboids riser
34.	Which of the following cutting tool bits are made by powder metallurgy process (1) Carbon steel bits (2) Stellite tool bits (3) Ceramic tool bits (4) All of the above

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35.	For drilling aluminium, a drill with (1) High helix angle is required (2) Low helix angle is required (3) Any helix angle can be used (4) Zero helix angle is required
36.	In Optiz code, the first five digits express (1) Production operation type and sequence (2) Attributes which are used for manufacturing (3) Primary design attributes of the part (4) None of these
37.	The probability distribution of project completion in PERT flows following distribution : (1) Normal (2) Binomial (3) Beta (4) Gaussian
38.	From the point of motion economy it is preferable to move : (1) Both hands in the same direction (2) Right hand first and then the left hand (3) Only one hand at a time (4) Both hands in opposite direction

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39.	A device used for lifting or lowering objects suspended from a hook at the end of retractable chains or cable is called (1) Hoist (2) Job crane (3) Portable elevator (4) Chain conveyor
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64.	For a 25 mm hole drilled in plates, the diameter of rivet shank should be (1) 23 mm (2) 24.5 mm (3) 25 mm (4) 26 mm
65.	A beam of triangular section is placed with its base horizontal. The maximum shear stress occurs at (1) Apex of the triangle (2) Mid of the height (3) Centre of gravity of the triange (4) Base of the triangle

Question No.	Questions
66.	Pitching of a ship exerts force on the bearings (1) Perpendicular to their axis (2) Along the axis of the bearings (3) Plain perpendicular to the pitching (4) None of the above
67.	A compound cylinder with inner radius 5 cm and outer radius 7 cm is made by shrinking one cylinder onto the other cylinder. The junction radius is 6 cm and the junction pressure is 11 kg/cm^2. The maximum hoop stress developed in the inner cylinder is (1) 36 kg/cm^2 compression (2) 36 kg/cm^2 tension (3) 72 kg/cm^2 compression (4) 72 kg/cm^2 tension
68.	A shaft was initially subjected to bending moment and then was subjected to torsion. If the magnitude of bending moment is found to be the same as that of torque, then the ratio of maximum bending stress to shear stress would be (1) 0.25 (2) 0.50 (3) 2.0 (4) 4.0

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69.	A transmission shaft subjected to bending loads must be designed on the basis of (1) Maximum normal stress theory (2) Maximum shear stress theory (3) Maximum normal stress and maximum shear stress theories (4) Fatigue strength
70.	Maximum shear stress in Mohr's circle is equal to (1) Radius of circle (2) Diameter of circle (3) Centre of circle from y-axis (4) Chord of circle
71.	A mass M of a fluid at temperature T_1 is mixed with an equal mass of the same fluid at temperature T_2. The resultant change in entropy of the universe is (1) Zero (2) Negligible (3) Always negative (4) Always positive
72.	If methane undergoes combustion with the stoichiometric quantity of air fuel ratio on molar basis would be (1) 15.22:1 (2) 12.30:1 (3) 14.56:1 (4) 9.52:1

Question No.	Questions
73.	A cylinder contains 5 m^3 of ideal gas at a pressure of 1 bar. This gas is compressed in a reversible isothermal process till its pressure increases to 5 bar. The work in kJ is required for this process is (1) 804.7 (2) 953.2 (3) 981.7 (4) 1012.2
74.	Energy conversion takes place only in one row of rotor of nozzle blades and later the steam glides over the rotor and guide rows in the case of (1) De Laval turbine (2) Rateau turbine (3) Parson's turbine (4) Curtis turbine
75.	The degree of reaction of a turbine is the ratio of enthalpy drop in (1) Moving blades to enthalpy drop in the stage (2) Fixed blades to enthalpy drop in the stage (3) Moving blades to enthalpy drop in fixed blades (4) Fixed blades to enthalpy drop in moving blades
76.	A solar energy based heat engine which receives 80 kJ of heat at 100°C and rejects 70 kJ of heat to the ambient at 30°C is to be designed. The thermal efficiency of the heat engine is : (1) 70% (2) 1.88% (3) 12.5% (4) Indeterminate

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77.	Which phenomena have the most adverse effect on volumetric efficiency when engine works at high speeds ? (1) Flow friction and choking (2) Ram effect and choking (3) Flow friction and charge heating (4) Charge heating and back flow
78.	In the Rankine cycle, lower limit on the condenser pressure is due to the (1) Expansion limit in turbine (2) Condenser size (3) Air leakage into the condenser (4) Temperature of cooling water
79.	Efficiency of nozzle governed turbine is affected mainly by losses to (1) Partial admission (2) Throttling (3) Interstage pressure drop (4) Condensation in last
80.	In a Carnot refrigeration cycle, for constant upper temperature T_h, as the lower temperature increases (1) COP increases (2) COP decreases (3) Power consumption increases (4) Heat transfer during isothermal process decreases

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81.	In inventory planning, extra inventory is unnecessarily carried to the end of the planning period when using one of the following lot size decision policies : (1) Lot-for-lot production (2) EOQ lot size (3) Period order quantity (4) Part period total cost balancing
82.	Dummy activities are used in a network to : (1) Facilitate computation of slacks (2) Satisfy precedence requirements (3) Determine project completion time (4) Avoid use of resource
83.	If the value of variance is more : (1) Certainty is more (2) Probability of certainty is more (3) Uncertainty is more (4) Probability distribution curve shall be having a unsymmetrical shape
84.	Bucket is a term used in MRP systems, it is a (1) Principal unit of time measurement (2) Demand for a raw material (3) Product mix (4) Material in hand

Question No.	Questions
85.	The probability law that determines the fluctuations of fraction defective is (1) Poisson (2) Normal (3) Binomial (4) Exponential
86.	In value engineering "worth" is value of (1) Product (2) Service (3) System (4) Function
87.	Which of the following represents the reduction in duration ? (1) Crushing (2) Negative slack (3) Variance (4) All of the above
88.	For a skew-symmetric matrix, minimum possible rank is : (1) 0 (2) 1 (3) Greater than 1 (4) 2
89.	Degeneracy in LPP method indicates (1) Tie for key column (2) Tie for key row (3) Infeasible problem (4) Multiple optional solutions
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91.	The white aluminium oxide is denoted by : (1) A*l* (2) A (3) WA (4) WAL
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100.	Stellite is a non ferrous cast alloy composed of (1) Cobalt, Chromium and Tungsten (2) Tungsten, Chromium and Vanadium (3) Molybdenum, Tungsten and Chromium (4) Tungsten, Chromium, Molybdenum and Vanadium

SET–"X"

(Total No. of printed pages : 24)

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(PH.D/URS-EE-December-2022)

Code D Mechanical Engineering

Sr. No. 10028

Time : 1¼ Hours **Total Questions : 100** **Max. Marks : 100**

Roll No. _____ (in figure) _____ (in words)

Name ; _____ Date of Birth : _____

Father's Name : _____ Mother's Name : _____

Date of Examination : _____

(Signature of the candidate) (Signature of the Invigilator)

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2. The candidates must return the Question book-let as well as OMR answer-sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / mis-behaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
3. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
4. Question Booklet along-with answer key of all the A,B,C and D code shall be got uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University website. The complaint be sent by the students to the Controller of Examinations by hand or through email. Thereafter, no complaint in any case will considered.
5. The candidate MUST NOT do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question book-let itself. Answers **MUST NOT** be ticked in the Question book-let.
6. **There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.**
7. Use only Black or Blue **BALL POINT PEN** of good quality in the OMR Answer-Sheet.
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11.	Water is flowing with a flow rate of 0.002 m^3/s. What is the average velocity at an outlet where the area is 4 cm^2 ? (1) 50 m/s (2) 20 m/s (3) 10 m/s (4) 5 m/s
12.	In a hydraulic coupling (1) Slip is negligible at low speeds (2) Efficiency of transmission is high at low speeds (3) Slip is around 2 to 3 percent at the running speed (4) Efficiency is high as compared to mechanical coupling
13.	The magnus effect is defined as : (1) The generation of lift per unit drag force (2) The circulation induced in an aircraft wing (3) The separation of boundary layer near the trailing edge of a slender body (4) The generation of lift on a rotating cylinder in a uniform flow
14.	In a centrifugal compressor, the highest Mach number leading to shock wave in the fluid flow occurs at (1) Diffuser inlet radius (2) Diffuser outlet radius (3) Impeller inlet radius (4) Impeller outlet radius

Question No.	Questions
15.	The Moody diagram is used in fluid mechanics to obtain the (1) Drag coefficient (2) Strouhal number (3) Friction factor (4) Manning constant
16.	Hot oil is cooled from 80 to 50°C in an oil cooler which uses air as the coolant. The air temperature rises from 30 to 40°C. The designer uses a LMTD value of 26°C. The type of heat exchanger is (1) Parallel (2) Double pipe (3) Counter flow (4) Cross flow
17.	Prandtl number has least value in which of the following ? (1) Gases (2) Brine solution (3) Liquid metal (4) Oil film
18.	In spite of large heat transfer coefficients in boiling liquids, fins are used advantageously when the entire surface is exposed to (1) Nucleate boiling (2) Film boiling (3) Transition boiling (4) All modes of boiling
19.	Fraction of radiative energy leaving one surface that strikes the other surface is called (1) Radiative flux (2) Emissive power of the first surface (3) View factor (4) Re-radiation flux

Question No.	Questions
20.	In unsteady-state heat conduction for bodies with negligible temperature gradients, the time temperature variation curve is (1) Linear (2) Parabolic (3) Sinusoidal (4) Exponential
21.	In the 3-2-1 principle of fixture design, 3 refers to number of (1) Setup possible (2) Clamps required (3) Positions on primary face (4) Locating positions
22.	For resistance spot welding of 2.0 mm thick steel sheets, the current required is of the order of (1) 10 A (2) 100 A (3) 1000 A (4) 10,000 A
23.	The ratio of surface area to volume for a unit volume of riser is minimum in case of (1) Cylindrical riser (2) Spherical riser (3) Hemispherical riser (4) Cuboids riser
24.	Which of the following cutting tool bits are made by powder metallurgy process (1) Carbon steel bits (2) Stellite tool bits (3) Ceramic tool bits (4) All of the above

Question No.	Questions
25.	For drilling aluminium, a drill with (1) High helix angle is required (2) Low helix angle is required (3) Any helix angle can be used (4) Zero helix angle is required
26.	In Optiz code, the first five digits express (1) Production operation type and sequence (2) Attributes which are used for manufacturing (3) Primary design attributes of the part (4) None of these
27.	The probability distribution of project completion in PERT flows following distribution : (1) Normal (2) Binomial (3) Beta (4) Gaussian
28.	From the point of motion economy it is preferable to move : (1) Both hands in the same direction (2) Right hand first and then the left hand (3) Only one hand at a time (4) Both hands in opposite direction

Question No.	Questions
29.	A device used for lifting or lowering objects suspended from a hook at the end of retractable chains or cable is called (1) Hoist (2) Job crane (3) Portable elevator (4) Chain conveyor
30.	A diagram showing the path followed by men and materials while performing a task is known as : (1) String diagram (2) Flow process chart (3) Travel chart (4) Flow diagram
31.	Design of shafts made of brittle materials is based on : (1) Guest's theory (2) Ranine's theory (3) St. Venant's theory (4) Von Mises theory
32.	According to Indian Boilers Regulations, the factor of safety in riveted joint should not be less than : (1) 1.5 (2) 2 (3) 4 (4) 6
33.	Miter gears are : (1) Right angled bevel gears with same number of teeth (2) Spur gears with same number of teeth (3) Helical gears with same number of teeth (4) None of the above

Question No.	Questions
34.	The bearing characteristic relating absolute viscosity of lubricant(Z), speed of journal (N) and bearing pressure (p) is defined as : (1) ZN/p (2) Zp/N (3) pN/Z (4) ZpN
35.	What is sunk key made in the form of a segment of a circular disc of uniform thickness, known as ? (1) Feather key (2) Kennedy key (3) Woodruff key (4) Saddle key
36.	Fluids that require a gradually increasing shear stress to maintain a constant strain rate are known as : (1) Rhedopectic fluids (2) Thixotropic fluid (3) Pseudoplastic fluid (4) Newtonian fluids
37.	The capillary rise at 20°C in clean glass tube of 1 mm diameter containing water is approximately. (1) 15 mm (2) 50 mm (3) 20 mm (4) 3 mm
38.	Prandtl's mixing length hypothesis is based on : (1) Eddy viscosity (2) Momentum exchange that occurs due to random motion (3) Similarity of turbulent flow pattern (4) None of the above

Question No.	Questions
39.	In the case of pelton turbine installed in a hydraulic power plant, the gross head available is the vertical distance between (1) Forebay and tail race (2) Reservoir level and turbine inlet (3) Forebay and turbine inlet (4) Reservoir level and tail race
40.	In a centrifugal pump when delivery value is fully closed, the pressure of fluid inside the pump will (1) Become zero (2) Reduce (3) Increase (4) Remain unaltered
41.	The white aluminium oxide is denoted by : (1) *Al* (2) A (3) WA (4) WAL
42.	The length of approach in case of drilling operation is equal to : (1) 0.8 D (2) 0.6 D (3) 0.29 D (4) 0.14 D
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51.	Forecasting which assumes a static environment in the future is : (1) Passive forecasting (2) Active forecasting (3) Long term forecasting (4) Short term forecasting
52.	In production, planning and control, the document which authorizes the start of an operation on the shop floor is the : (1) Dispatch order (2) Route plan (3) Loading chart (4) Schedule
53.	In a study to estimate the idle time of a machine, out of 100 random observations the machine is found idle on 40 observations. The total random observations for 95% confidence level and ± 5% accuracy are : (1) 384 (2) 600 (3) 2400 (4) 9600

Question No.	Questions
54.	Which of the following wage incentive plan guarantees minimum wage and bonus is paid for the fixed percentage of time saved ? (1) Hasley plan (2) Emerson plan (3) Haynes plan (4) Gnatt plan
55.	The most traditional and most often used work measurement technique is: (1) Time study-stop watch (2) Work sampling (3) Analytical estimating (4) Pre-determined motion time system
56.	Amortization means : (1) Liquidation of financial obligations (2) Liquidation of an industry (3) Commitment of financial obligations (4) Liquidation of financial obligations on the indeterminable
57.	In simplest method, the row to be replaced (1) Zero (2) Less than zero (3) More than zero (4) Infinity
58.	Given set of vectors (2, 3, – 1), (1, 7, –2) and (3, 5, 2) in R^3 is (1) Linearly dependent over R^3 (2) Linearly independent over R^3 (3) Will form a matrix with all zero solutions (4) System has no solution

Question No.	Questions
59.	Suppose rank of a matrix $A_{(7\times8)}$ is 6, then which of the following is correct (1) A is invertible matrix (2) A is skew-symmetric matrix (3) A has fifteen linear independent solutions (4) A will have six linearly independent rows and column
60.	Which one of the following is not a technique of PMTS ? (1) Synthetic data (2) Stop-watch time study (3) Work factor (4) MTM
61.	A mass M of a fluid at temperature T_1 is mixed with an equal mass of the same fluid at temperature T_2. The resultant change in entropy of the universe is (1) Zero (2) Negligible (3) Always negative (4) Always positive
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70.	In a Carnot refrigeration cycle, for constant upper temperature T_h, as the lower temperature increases (1) COP increases (2) COP decreases (3) Power consumption increases (4) Heat transfer during isothermal process decreases
71.	In the forging operation, fullering is done to : (1) Draw out the material (2) Bend the material (3) Upset the material (4) Extrude the material

Question No.	Questions
72.	A spherical drop of molten metal of radius 2 mm was found to solidify in 10 seconds. A similar drop of radius 4 mm would solidify in : (1) 14.14 seconds (2) 20 seconds (3) 18.30 seconds (4) 40 seconds
73.	Directional solidification in castings can be improved by using : (1) Chills and chaplets (2) Chills and padding (3) Chaplets and padding (4) Chills, chaplets and padding
74.	Preheating before welding is done to : (1) Make the steel softer (2) Burn away oil, grease etc. from the plate surface (3) Prevent cold cracks (4) Prevent plate distortion
75.	Which one of the following sets of forces are encountered by a lathe parting tool while groove cutting (1) Tangential, radial and axial (2) Tangential and radial (3) Tangential and axial (4) Radial and axial

Question No.	Questions
76.	Poor machinability of centrifugally cast iron pipe is due to : (1) Chilling (2) Segregation (3) Dense structure (4) High mould rotation speed
77.	A single short thread of pitch 2 mm is to be produced on a lathe having a lead screw with a double start thread of pitch 4 mm. The ratio of speeds between the spindle and lead screw for this operation is : (1) 1:2 (2) 2:1 (3) 1:4 (4) 4:1
78.	Crater wear is predominant in : (1) Carbon steel tools (2) Tungsten carbide tools (3) High speed steel tools (4) Ceramic tools
79.	A surface finish of 0.025-0.1 micrometer CLA values to be produced. Which machining process would you recommend ? (1) Grinding (2) Rough Turning (3) Lapping (4) Honing
80.	A straight teeth slab milling cutter of 100 mm diameter and 10 teeth rotating at 200 rpm is used to remove a layer of 3 mm thickness from a steel bar. If the table feed is 400 mm/minute, the feed per tooth in this operation will be : (1) 0.2 mm (2) 0.4 mm (3) 0.5 mm (4) 0.6 mm

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81.	A ladder is resting on a smooth ground and leaning against a rough vertical wall. The force of friction will act (1) Downward at its upper end (2) Upward at its upper end (3) Zero at its upper end (4) Perpendicular to the wall at its upper end
82.	The acceleration of a particle with simple harmonic motion, at any instant is given by (1) $\omega.y$ (2) $\omega^2.y$ (3) ω^2/y (4) $\omega^3.y$
83.	A particle moves in a circular path with constant speed v. The change in velocity when it traverses an angle of 120° is (1) 2v (2) 2.5v (3) $\sqrt{3}v$ (4) $3\sqrt{2}v$
84.	For a 25 mm hole drilled in plates, the diameter of rivet shank should be (1) 23 mm (2) 24.5 mm (3) 25 mm (4) 26 mm
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90.	Maximum shear stress in Mohr's circle is equal to (1) Radius of circle (2) Diameter of circle (3) Centre of circle from y-axis (4) Chord of circle
91.	A spring with 25 active coils cannot be accommodated within a given space. Hence 5 coils of the spring are cut. What is the stiffness of the new spring? (1) Same as the original spring (2) 1.25 times the original spring (3) 0. times the original spring (4) 0.5 times the original spring

Question No.	Questions
92.	The effective diameter of an external or internal screw thread, is known as (1) Minor diameter (2) Major diameter (3) Pitch diameter (4) None of these
93.	A point on a link connecting a double slider crank chain will trace a (1) Straight line (2) Circle (3) Parabola (4) Ellipse
94.	In pivot bearing, the wear at the contact area is : (1) Zero at the centre (2) Uniform throughout (3) Max. at the centre (4) Max. at the outer radius
95.	An involute pinion and gear are in mesh. If both have the same size of addendum, then there will be an interference between the (1) Tip of the ear tooth and flank of pinion (2) Tip of pinion and flank of gear (3) Flanks of both gear and pinion (4) Tip of both ear and pinion
96.	A spring controlled governor is found unstable. It can be made stable by (1) Increasing the spring stiffness (2) Decreasing the spring stiffness (3) Increasing the ball weight (4) Decreasing the ball weight

Question No.	Questions
97.	The point on the cam with maximum pressure angle is called (1) The trace point (2) The pitch point (3) Cam centre (4) None of the above
98.	Best position of crank for blankirg operation in a mechanical press is (1) Top dead centre (2) 20 degree below top dead centre (3) 20 degress before bottom dead centre (4) Bottom dead centre
99.	A connecting rod has a mass of 0.5 kg, the radius of gyration through its centre of gravity is 5 cm and its acceleration is 2×10^4 rad/sec^2. The equivalent two mass system for the connecting rod has a radius of gyration 6 cm. What is the correction couple of the equivalent system ? (1) 11 Nm (2) 9 Nm (3) 6 Nm (4) 1 Nm

Question No.	Questions
100.	Petroff's equation is used when journal (1) Coincides with bearing (2) Is concentric with bearing (3) Rotates in clockwise direction (4) Rotates in anticlockwise direction

ANSWER KEYS OF MECHANICAL UIET FOR SESSION 2022-23				
Q. NO.	A	B	C	D
1	4	4	2	3
2	2	4	3	2
3	3	1	1	3
4	1	4	1	1
5	2	1	3	3
6	2	3	1	4
7	4	3	4	3
8	3	4	2	3
9	3	1	2	2
10	1	1	4	4
11	2	4	1	4
12	3	4	1	3
13	4	2	2	4
14	1	3	3	3
15	2	1	1	3
16	2	2	2	4
17	2	4	4	3
18	3	4	2	2
19	1	1	3	2
20	2	2	1	4
21	2	3	1	4
22	3	2	1	4
23	1	3	3	2
24	1	1	1	3
25	3	3	1	1
26	1	4	4	2
27	4	3	3	4
28	2	3	2	4
29	2	2	4	1
30	4	4	2	2
31	4	4	4	2
32	3	2	4	3
33	4	3	2	1
34	3	1	3	1
35	3	2	1	3
36	4	2	2	1
37	3	4	4	4
38	2	3	4	2
39	2	3	1	2
40	4	1	2	4
41	4	1	2	2
42	4	1	3	3
43	1	2	4	1
44	4	3	1	4
45	1	1	2	3
46	3	2	2	4
47	3	4	2	1
48	4	2	3	3
49	1	3	1	3
50	1	1	2	1

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ANSWER KEYS OF MECHANICAL UIET FOR SESSION 2022-23				
Q. NO.	A	B	C	D
51	1	2	4	1
52	1	3	3	1
53	2	1	4	3
54	3	4	3	1
55	1	3	3	1
56	2	4	4	4
57	4	1	3	3
58	2	3	2	2
59	3	3	2	4
60	1	1	4	2
61	2	2	4	4
62	3	3	2	4
63	1	1	3	1
64	4	1	1	4
65	3	3	2	1
66	4	1	2	3
67	1	4	4	3
68	3	2	3	4
69	3	2	3	1
70	1	4	1	1
71	4	2	4	1
72	4	3	4	1
73	2	4	1	2
74	3	1	4	3
75	1	2	1	1
76	2	2	3	2
77	4	2	3	4
78	4	3	4	2
79	1	1	1	3
80	2	2	1	1
81	1	1	3	4
82	1	1	2	2
83	3	3	3	3
84	1	1	1	1
85	1	1	3	2
86	4	4	4	2
87	3	3	3	4
88	2	2	3	3
89	4	4	2	3
90	2	2	4	1
91	3	4	2	2
92	2	3	3	3
93	3	4	1	4
94	1	3	4	1
95	3	3	3	2
96	4	4	4	2
97	3	3	1	2
98	3	2	3	3
99	2	2	3	1
100	4	4	1	2

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