



Kerala Public Enterprises (Selection and Recruitment) Board

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Version: D

Question Booklet No: 04725

Name of Examination: Mechanical Engineering

Date: 13/09/2026

Written examination for:

**(1) 047-2025 Senior Engineer - Maintenance (Executive Trainee -Mechanical)
-Travancore Cochin Chemicals Limited**

Instructions to Candidates:

1. Candidate should not start writing answers until indication is given to start answering.
2. The question paper contains 100 questions. Each question is provided with four choices (A), (B), (C) and (D) having one correct answer. Choose the correct answer and darken the Bubble corresponding to the question number using Blue or Black ball point pen in the OMR Sheet.
3. Each correct answer carries 1 mark. There will be no negative mark for wrong answers or unattended questions.
4. Do not write anything else on the question paper. Space for rough work is provided at the end.
5. No candidate will be allowed to leave the examination hall till the end of the session and without handing over his/her Answer Sheet to the Invigilator. Candidates should ensure that the Invigilator has verified all the entries in the 'Basic Data' portion and that the Invigilator has affixed his/her signature in the space provided in the OMR sheet.

Total number of questions: 100 Maximum marks: 100 Time: 90 Minutes

1	Thermal diffusivity is the ratio of			
	(A)	$k \cdot pC_p$	(B)	kC_p^2
	(C)	pC_p/k	(D)	k/pC_p
2	In simplex method, a basic feasible solution must:			
	(A)	Include all variables	(B)	Maximize objective function
	(C)	Use only slack variables	(D)	Satisfy non-negativity and constraints

3	Taylor's tool life equation relates			
	(A)	Feed and temperature	(B)	Depth of cut and time
	(C)	Hardness and wear	(D)	Speed and tool life
4	A body is said to be in dynamic equilibrium when			
	(A)	Force is zero	(B)	It moves with constant velocity
	(C)	Acceleration is constant	(D)	It is at rest
5	The SPT scheduling rule			
	(A)	Minimizes flow time	(B)	Maximizes throughput
	(C)	Minimizes make span	(D)	Minimizes machine idle time
6	A block of 100 N is on a horizontal rough surface. If limiting friction is 40 N, the coefficient of friction is			
	(A)	0.4	(B)	4
	(C)	0.25	(D)	2.5
7	The most critical factor influencing factory location for heavy engineering industries is			
	(A)	Proximity to raw materials	(B)	Availability of skilled labour
	(C)	Climate conditions	(D)	Availability of bank facilities
8	The deflection of a beam varies directly with			
	(A)	Load	(B)	Young's modulus
	(C)	Length ⁴	(D)	Moment of inertia
9	The S-N curve is used to find			
	(A)	Ductility	(B)	Hardness
	(C)	Impact toughness	(D)	Fatigue life
10	The efficiency of a Carnot engine depends on			
	(A)	Mean effective pressure	(B)	Compression ratio
	(C)	Working substance	(D)	Source and sink temperatures

11	Hoop stress in a thin cylinder is			
	(A)	pD/t	(B)	$pD/4t$
	(C)	$2pD/t$	(D)	$pD/2t$
12	The type of bearing used for heavy radial load is			
	(A)	Journal bearing	(B)	Thrust bearing
	(C)	Roller bearing	(D)	Ball bearing
13	The stress concentration factor increases with			
	(A)	Increase in notch radius	(B)	Decrease in notch radius
	(C)	Increase in thickness	(D)	Increase in elastic modulus
14	In EOQ, the cost curve at the minimum point is			
	(A)	Flat with many minima	(B)	Symmetrical
	(C)	Circular	(D)	Asymmetrical
15	In a UTM tensile test, the yield point is identified by			
	(A)	Proportional limit	(B)	Sudden increase in strain without increase in stress
	(C)	Maximum load	(D)	Breaking point
16	Cavitation in pumps occurs when			
	(A)	Pressure rises above vapour pressure	(B)	Pressure falls below vapour pressure
	(C)	Flow velocity decreases	(D)	Temperature decreases
17	The main purpose of jigs and fixtures is to			
	(A)	Increase accuracy and productivity	(B)	Improve surface finish
	(C)	Reduce material waste	(D)	Reduce power consumption
18	The work done by a force is the product of			
	(A)	Mass and velocity	(B)	Momentum and distance
	(C)	Force and displacement	(D)	Force and acceleration

19	The critical Reynolds number for flow through pipe is about			
	(A)	5000	(B)	1000
	(C)	2300	(D)	4000
20	Heisler charts are used for			
	(A)	Transient conduction	(B)	Steady conduction
	(C)	One-dimensional convection	(D)	Radiation exchange
21	Brass is an alloy of			
	(A)	Copper and Tin	(B)	Copper and Aluminium
	(C)	Copper and Nickel	(D)	Copper and Zinc
22	A clutch is used to			
	(A)	Stop motion	(B)	Reduce speed
	(C)	Increase torque	(D)	Engage and disengage power
23	The thermal conductivity of a perfect vacuum is			
	(A)	Very low	(B)	Zero
	(C)	Very high	(D)	Infinite
24	Break-even analysis assumes			
	(A)	Continuous inflation	(B)	Nonlinear revenue
	(C)	Constant selling price	(D)	Variable fixed costs
25	Maximum shear stress on Mohr's circle occurs at			
	(A)	Zero radius	(B)	Points where normal stress=0
	(C)	Centre of circle	(D)	Top and bottom points
26	Ceramics are			
	(A)	Soft	(B)	Flexible
	(C)	Ductile	(D)	Brittle

27	Mohr's circle is drawn to determine			
	(A)	Principal stresses and maximum shear	(B)	Deflection
	(C)	Only bending stress	(D)	Only shear force
28	The maximum shear stress theory is also called			
	(A)	Tresca's theory	(B)	Both A & B
	(C)	Guest's theory	(D)	Rankine theory
29	A thin cylinder subjected to internal pressure fails mainly due to			
	(A)	Torsional stress	(B)	Longitudinal stress
	(C)	Shear stress	(D)	Hoop stress
30	For a simply supported beam, maximum bending moment occurs at			
	(A)	Quarter span	(B)	Supports
	(C)	Centre	(D)	Neutral axis
31	The head loss due to friction in a pipe is given by			
	(A)	Bernoulli equation	(B)	Hagen's law
	(C)	Poiseuille equation	(D)	Darcy-Weisbach equation
32	In refrigeration, the COP of a heat pump is always			
	(A)	Greater than unity	(B)	Zero
	(C)	Equal to unity	(D)	Less than unity
33	A material subjected to sudden load experiences stress			
	(A)	Double the static stress	(B)	Zero stress
	(C)	Half of static stress	(D)	Equal to static stress
34	In powder metallurgy, sintering means			
	(A)	Compacting	(B)	Cooling rapidly
	(C)	Heating below melting point	(D)	Melting completely

35	Maximum power transmission in a shaft occurs when:			
	(A)	shear stress = zero	(B)	Torque = constant
	(C)	angle of twist = minimum	(D)	twisting moment is 1/3 greater than that for full load
36	The compressibility factor (Z) for an ideal gas is			
	(A)	Z=1	(B)	Z=0
	(C)	Z<1	(D)	Z>1
37	A governor is used to			
	(A)	Maintain constant load	(B)	Reduce vibration
	(C)	Regulate fuel supply	(D)	Control speed
38	For Laminar flow in a circular pipe, the velocity distribution is			
	(A)	Parabolic	(B)	Exponential
	(C)	Uniform	(D)	Linear
39	Diesel cycle efficiency is higher than Otto cycle because			
	(A)	Cut-off ratio is lower	(B)	Diesel fuel has higher calorific value
	(C)	Compression ratio is lower	(D)	Average temperature of heat addition is higher
40	In an impulse turbine, pressure drop occurs			
	(A)	Throughout	(B)	In casing
	(C)	In nozzle	(D)	In blades
41	The ABC analysis in inventory is based on			
	(A)	Item size	(B)	Annual consumption value
	(C)	Purchase price	(D)	Storage volume
42	In oxy-acetylene gas welding, the highest flame temperature occurs in			

	(A)	All flames have equal temperature	(B)	Oxidizing flame
	(C)	Neutral flame	(D)	Carburizing flame
43	In project management, slack time means			
	(A)	Maximum delay	(B)	Excess inventory
	(C)	Delay without affecting project completion	(D)	Unused time of labour
44	In inter-plant logistics, the primary objective is			
	(A)	Increase batch sizes	(B)	Increase WIP
	(C)	Optimize transport and transfer between plants	(D)	Minimize holding cost
45	A four-bar mechanism has			
	(A)	None	(B)	3 degrees of freedom
	(C)	1 degree of freedom	(D)	2 degrees of freedom
46	Fins are used to			
	(A)	Increase surface area for convection	(B)	Reduce temperature difference
	(C)	Reduce heat transfer	(D)	Change thermal conductivity
47	The main purpose of riser in casting is to			
	(A)	Allow gases to escape	(B)	Feed molten metal during solidification
	(C)	Improve surface finish	(D)	Act as a reservoir
48	Total Quality Management (TQM) focuses on			
	(A)	Production speed	(B)	Inspection
	(C)	Cost reduction only	(D)	Continuous improvement
49	The process of removing burrs and sharp edges is called			

	(A) Deburring	(B) Polishing
	(C) Lapping	(D) Honing
50	In a fully developed laminar flow through a circular pipe, the velocity profile is	
	(A) Parabolic	(B) Uniform
	(C) Linear	(D) Hyperbolic
51	Deep drawing is primarily used for manufacturing	
	(A) Rivets	(B) Shafts
	(C) Gears	(D) Thin-walled cups
52	The unit of modulus of elasticity is same as	
	(A) Energy	(B) Stress
	(C) Force	(D) Strain
53	Shrinkage allowance is provided on	
	(A) Pattern	(B) Mould
	(C) Core	(D) Casting
54	A cam with high jerk causes	
	(A) Increased damping	(B) Smooth follower motion
	(C) Reduced stress	(D) Impact loading
55	The gear ratio in a simple gear train is	
	(A) Constant	(B) Product of driven/driver gears
	(C) Ratio of last to first gear teeth	(D) Zero
56	Boundary-layer separation occurs when	
	(A) Wall shear stress increases	(B) Pressure decreases in direction of flow
	(C) Pressure increases in direction of flow	(D) Velocity gradient is zero

57	Poisson's ratio for steel is approximately			
	(A)	0.3	(B)	0.25
	(C)	0.1	(D)	0.5
58	For air-standard Otto cycle, efficiency increases with			
	(A)	Increase in compression ratio	(B)	Decrease in compression ratio
	(C)	Increase in heat input	(D)	Decrease in expansion ratio
59	The command "M06" in CNC denotes:			
	(A)	Spindle on	(B)	Coolant on
	(C)	Tool change	(D)	End of program
60	Lagrange's equation is primarily used for			
	(A)	Constraint equations	(B)	Analytical dynamics
	(C)	rotational equilibrium	(D)	Beam deflection
61	Whirling of a shaft occurs when			
	(A)	shaft speed equals natural frequency of lateral vibration	(B)	Speed of shaft is low
	(C)	Shaft is vertical	(D)	Shaft has high damping
62	R-charts monitor			
	(A)	Number of defectives	(B)	Cycle time
	(C)	Process variability	(D)	Process mean
63	The device used to measure air velocity is			
	(A)	Pitot tube	(B)	Manometer
	(C)	Venturi meter	(D)	Orifice meter
64	Break-even point occurs when			
	(A)	Fixed cost=Variable cost	(B)	Total cost = Total revenue
	(C)	Cost = Zero	(D)	Profit = Sales

65	The most efficient cycle for a gas turbine is			
	(A)	Brayton	(B)	Dual
	(C)	Otto	(D)	Diesel
66	In rolling, the phenomenon of “forward slip” occurs when			
	(A)	Strip speed > roll speed	(B)	Strip speed < roll speed
	(C)	Roll force is zero	(D)	Roll speed = strip speed
67	The main alloying element in stainless steel is			
	(A)	Vanadium	(B)	Nickel
	(C)	Chromium	(D)	Molybdenum
68	Dynamic viscosity has the SI unit			
	(A)	m^2/s	(B)	$\text{N} \cdot \text{s}/\text{m}^2$
	(C)	kg/m^3	(D)	N/m^2
69	A block is released on a 30° inclined plane with no friction. Its acceleration is approximately			
	(A)	8.5 m/s^2	(B)	4.9 m/s^2
	(C)	9.81 m/s^2	(D)	2.5 m/s^2
70	Balancing of rotating masses is done to reduce			
	(A)	Friction	(B)	Heat
	(C)	Noise	(D)	Vibration
71	A plant layout based on grouping machines for families of parts is			
	(A)	Cellular layout	(B)	Fixed layout
	(C)	Process layout	(D)	Product layout
72	In SPT scheduling, jobs with -----are processed first			
	(A)	Higher priority weights	(B)	Higher due dates
	(C)	Larger processing times	(D)	Smaller processing times

73	CPM and PERT are used for			
	(A)	Forecasting	(B)	Cost analysis
	(C)	Design optimization	(D)	Scheduling and control
74	In a mechanism, Grueblers equation applies to			
	(A)	Only planar mechanisms	(B)	Only spatial mechanisms
	(C)	Only four-bar mechanisms	(D)	All types of linkages
75	For an impulse turbine			
	(A)	All pressure drop occurs in runner	(B)	Pressure drop is uniform
	(C)	Pressure drop is zero	(D)	All pressure drop occurs in nozzle
76	In the Rankine cycle, the pump work is			
	(A)	Negligible	(B)	Maximum
	(C)	Same as heat input	(D)	Equal to turbine work
77	Additive manufacturing supports:			
	(A)	Only metallic materials	(B)	High-volume mass production
	(C)	Simple rectangular shapes only	(D)	Complex geometry fabrication
78	Cast iron contains carbon in the range			
	(A)	0.5-1.0%	(B)	2.0-4.0%
	(C)	0.1-0.5%	(D)	1.5-2.0%
79	According to Euler's buckling theory, the critical load is inversely proportional to			
	(A)	L^4	(B)	L
	(C)	L^3	(D)	L^2
80	Which non-ferrous alloy is used for aircraft structures?			
	(A)	Al-Mg-Si alloys	(B)	Brass
	(C)	Bronze	(D)	Cu-Ni alloys

81	In forecasting, moving average is used to			
	(A)	Predict fixed cost	(B)	Increase demand
	(C)	Control production	(D)	Eliminate random fluctuations
82	The normal distribution curve is			
	(A)	Skewed right	(B)	Symmetrical
	(C)	Asymmetrical	(D)	Skewed left
83	The relation between Young's modulus and shear modulus is			
	(A)	$E=G/v$	(B)	$E=G(1+2v)$
	(C)	$E=vG$	(D)	$E=2G(1+v)$
84	The non-metal used for making bullet-proof glass is			
	(A)	Teflon	(B)	Nylon
	(C)	Epoxy	(D)	Polycarbonate
85	The pressure variation in a static fluid acts			
	(A)	Equally in all directions	(B)	Only horizontally
	(C)	Only normal to the bottom surface	(D)	Only vertically
86	The bending moment at the free end of a cantilever beam is			
	(A)	Minimum	(B)	constant
	(C)	Maximum	(D)	Zero
87	The dryness fraction of steam is measured by			
	(A)	Thermocouple	(B)	Thermometer
	(C)	Hygrometer	(D)	Calorimeter
88	EOQ stands for			
	(A)	Effective Output Quantity	(B)	Economic Order Quantity
	(C)	Estimated Order Quantity	(D)	Equal Order Quantity

89	In conduction through a plane wall, heat flow is directly proportional to			
	(A)	Temperature difference	(B)	Wall thickness
	(C)	Area and $\Delta \{T\}$	(D)	Time
90	The ratio of lateral strain to linear strain is called			
	(A)	Poisson's ratio	(B)	Bulk modulus
	(C)	Modulus of rigidity	(D)	Young's modulus
91	The main objective of lean manufacturing is			
	(A)	Labour reduction	(B)	Inventory increase
	(C)	Waste elimination	(D)	High cost
92	The grinding wheel speed is measured in			
	(A)	rad/s	(B)	m/min
	(C)	m/s	(D)	RPM
93	The method used to solve assignment problems is			
	(A)	Bisection method	(B)	Simpson's rule
	(C)	Newton-Raphson method	(D)	Hungarian method
94	The algebraic sum of moments about a point for a body in equilibrium is			
	(A)	Constant	(B)	Unity
	(C)	Infinite	(D)	Zero
95	A CMM (Co-ordinate Measuring Machine) uses			
	(A)	Mechanical cams	(B)	Laser interferometry and probing
	(C)	Pneumatic pistons	(D)	Lead screws
96	Glass transition temperature (T_g) is associated with			
	(A)	Ceramics	(B)	Metals
	(C)	All materials	(D)	Polymers

97	Just – In-Time (JIT) aims to			
	(A)	Eliminate waste	(B)	Increase lead time
	(C)	Increase set up time	(D)	Increase inventory
98	The moment of inertia of a rectangular section of width b and depth d about its neutral axis is			
	(A)	$\frac{b^2 d^3}{6}$	(B)	$\frac{bd^3}{12}$
	(C)	$\frac{bd^2}{6}$	(D)	$\frac{bd^3}{8}$
99	Hardenability is measured by			
	(A)	Izod test	(B)	Jominy test
	(C)	Brinell test	(D)	Vickers test
100	Bernoulli's theorem is based on			
	(A)	Law of mass conservation	(B)	Newton's second law
	(C)	Pascal's law	(D)	Law of energy conservation



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