



Kerala Public Enterprises (Selection and Recruitment) Board

Opposite KELTRON, Vellayambalam, Thiruvananthapuram

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Version: A

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	The algebraic sum of moments about a point for a body in equilibrium is			
	(A)	Unity	(B)	Zero
	(C)	Infinite	(D)	Constant
2	Maximum shear stress on Mohr's circle occurs at			
	(A)	Zero radius	(B)	Centre of circle
	(C)	Top and bottom points	(D)	Points where normal stress=0
3	Bernoulli's theorem is based on			

	(A) Law of energy conservation	(B) Law of mass conservation
	(C) Newton's second law	(D) Pascal's law
4	The critical Reynolds number for flow through pipe is about	
	(A) 2300	(B) 1000
	(C) 5000	(D) 4000
5	Break-even point occurs when	
	(A) Fixed cost=Variable cost	(B) Total cost = Total revenue
	(C) Profit = Sales	(D) Cost = Zero
6	CPM and PERT are used for	
	(A) Forecasting	(B) Scheduling and control
	(C) Design optimization	(D) Cost analysis
7	Total Quality Management (TQM) focuses on	
	(A) Inspection	(B) Continuous improvement
	(C) Production speed	(D) Cost reduction only
8	The normal distribution curve is	
	(A) Symmetrical	(B) Skewed left
	(C) Skewed right	(D) Asymmetrical
9	The ABC analysis in inventory is based on	
	(A) Annual consumption value	(B) Item size
	(C) Storage volume	(D) Purchase price
10	The bending moment at the free end of a cantilever beam is	
	(A) Maximum	(B) Minimum
	(C) Zero	(D) constant
11	For air-standard Otto cycle, efficiency increases with	

	(A) Decrease in compression ratio	(B) Increase in compression ratio	
	(C) Decrease in expansion ratio	(D) Increase in heat input	
12	For Laminar flow in a circular pipe, the velocity distribution is		
	(A) Parabolic	(B) Linear	
	(C) Uniform	(D) Exponential	
13	The most efficient cycle for a gas turbine is		
	(A) Otto	(B) Diesel	
	(C) Brayton	(D) Dual	
14	In conduction through a plane wall, heat flow is directly proportional to		
	(A) Temperature difference	(B) Wall thickness	
	(C) Area and ΔT	(D) Time	
15	In an impulse turbine, pressure drop occurs		
	(A) In nozzle	(B) In blades	
	(C) In casing	(D) Throughout	
16	The dryness fraction of steam is measured by		
	(A) Calorimeter	(B) Thermocouple	
	(C) Hygrometer	(D) Thermometer	
17	The grinding wheel speed is measured in		
	(A) RPM	(B) m/s	
	(C) m/min	(D) rad/s	
18	Taylor's tool life equation relates		
	(A) Speed and tool life	(B) Feed and temperature	
	(C) Depth of cut and time	(D) Hardness and wear	
19	EOQ stands for		

	(A) Economic Order Quantity	(B) Equal Order Quantity
	(C) Estimated Order Quantity	(D) Effective Output Quantity
20	The maximum shear stress theory is also called	
	(A) Rankine theory	(B) Guest's theory
	(C) Tresca's theory	(D) Both A & B
21	The deflection of a beam varies directly with	
	(A) Load	(B) Moment of inertia
	(C) Young's modulus	(D) Length ⁴
22	The ratio of lateral strain to linear strain is called	
	(A) Modulus of rigidity	(B) Poisson's ratio
	(C) Bulk modulus	(D) Young's modulus
23	The unit of modulus of elasticity is same as	
	(A) Strain	(B) Stress
	(C) Force	(D) Energy
24	The main alloying element in stainless steel is	
	(A) Nickel	(B) Chromium
	(C) Molybdenum	(D) Vanadium
25	In powder metallurgy, sintering means	
	(A) Compacting	(B) Heating below melting point
	(C) Melting completely	(D) Cooling rapidly
26	Hardenability is measured by	
	(A) Izod test	(B) Jominy test
	(C) Brinell test	(D) Vickers test
27	The gear ratio in a simple gear train is	

	(A) Product of driven/driver gears	(B) Ratio of last to first gear teeth	
	(C) Constant	(D) Zero	
28	The type of bearing used for heavy radial load is		
	(A) Thrust bearing	(B) Ball bearing	
	(C) Roller bearing	(D) Journal bearing	
29	The S-N curve is used to find		
	(A) Impact toughness	(B) Fatigue life	
	(C) Hardness	(D) Ductility	
30	Just – In-Time (JIT) aims to		
	(A) Increase inventory	(B) Eliminate waste	
	(C) Increase lead time	(D) Increase set up time	
31	In project management, slack time means		
	(A) Delay without affecting project completion	(B) Maximum delay	
	(C) Unused time of labour	(D) Excess inventory	
32	A block is released on a 30^0 inclined plane with no friction. Its acceleration is approximately		
	(A) 2.5m/s^2	(B) 4.9m/s^2	
	(C) 8.5 m/s^2	(D) 9.81m/s^2	
33	According to Euler's buckling theory, the critical load is inversely proportional to		
	(A) L	(B) L^2	
	(C) L^3	(D) L^4	
34	Dynamic viscosity has the SI unit		
	(A) $\text{N} \cdot \text{s/m}^2$	(B) N/m^2	
	(C) m^2/s	(D) kg/m^3	

35	In a fully developed laminar flow through a circular pipe, the velocity profile is			
	(A)	Uniform	(B)	Parabolic
	(C)	Hyperbolic	(D)	Linear
36	Boundary-layer separation occurs when			
	(A)	Pressure decreases in direction of flow	(B)	Pressure increases in direction of flow
	(C)	Wall shear stress increases	(D)	Velocity gradient is zero
37	Thermal diffusivity is the ratio of			
	(A)	$k/\rho C_p$	(B)	$\rho C_p/k$
	(C)	$k \cdot \rho C_p$	(D)	$k C_p^2$
38	The compressibility factor (Z) for an ideal gas is			
	(A)	$Z < 1$	(B)	$Z > 1$
	(C)	$Z = 1$	(D)	$Z = 0$
39	For an impulse turbine			
	(A)	All pressure drop occurs in nozzle	(B)	All pressure drop occurs in runner
	(C)	Pressure drop is uniform	(D)	Pressure drop is zero
40	Deep drawing is primarily used for manufacturing			
	(A)	Shafts	(B)	Thin-walled cups
	(C)	Gears	(D)	Rivets
41	In oxy-acetylene gas welding, the highest flame temperature occurs in			
	(A)	Neutral flame	(B)	Carburizing flame
	(C)	Oxidizing flame	(D)	All flames have equal temperature
42	Additive manufacturing supports:			
	(A)	High-volume mass production	(B)	Complex geometry fabrication
	(C)	Simple rectangular shapes only	(D)	Only metallic materials

43	A CMM (Co-ordinate Measuring Machine) uses			
	(A)	Mechanical cams	(B)	Laser interferometry and probing
	(C)	Lead screws	(D)	Pneumatic pistons
44	In simplex method, a basic feasible solution must:			
	(A)	Include all variables	(B)	Satisfy non-negativity and constraints
	(C)	Maximize objective function	(D)	Use only slack variables
45	A block of 100 N is on a horizontal rough surface. If limiting friction is 40 N, the coefficient of friction is			
	(A)	2.5	(B)	0.4
	(C)	0.25	(D)	4
46	Mohr's circle is drawn to determine			
	(A)	Only bending stress	(B)	Only shear force
	(C)	Principal stresses and maximum shear	(D)	Deflection
47	Maximum power transmission in a shaft occurs when:			
	(A)	Torque = constant	(B)	angle of twist = minimum
	(C)	shear stress = zero	(D)	twisting moment is 1/3 greater than that for full load
48	The relation between Young's modulus and shear modulus is			
	(A)	$E=2G(1+\nu)$	(B)	$E=G(1+2\nu)$
	(C)	$E=\nu G$	(D)	$E=G/\nu$
49	Hoop stress in a thin cylinder is			
	(A)	$pD/4t$	(B)	$pD/2t$
	(C)	$2pD/t$	(D)	pD/t
50	A material subjected to sudden load experiences stress			

	(A) Equal to static stress	(B) Half of static stress	
	(C) Double the static stress	(D) Zero stress	
51	Glass transition temperature (T_g) is associated with		
	(A) Ceramics	(B) Metals	
	(C) Polymers	(D) All materials	
52	Whirling of a shaft occurs when		
	(A) Speed of shaft is low	(B) shaft speed equals natural frequency of lateral vibration	
	(C) Shaft has high damping	(D) Shaft is vertical	
53	In a mechanism, Grueblers equation applies to		
	(A) All types of linkages	(B) Only planar mechanisms	
	(C) Only spatial mechanisms	(D) Only four-bar mechanisms	
54	The most critical factor influencing factory location for heavy engineering industries is		
	(A) Availability of skilled labour	(B) Proximity to raw materials	
	(C) Climate conditions	(D) Availability of bank facilities	
55	The SPT scheduling rule		
	(A) Minimizes make span	(B) Minimizes flow time	
	(C) Minimizes machine idle time	(D) Maximizes throughput	
56	In inter-plant logistics, the primary objective is		
	(A) Minimize holding cost	(B) Optimize transport and transfer between plants	
	(C) Increase WIP	(D) Increase batch sizes	
57	In EOQ, the cost curve at the minimum point is		
	(A) Symmetrical	(B) Asymmetrical	
	(C) Flat with many minima	(D) Circular	

58	A plant layout based on grouping machines for families of parts is			
	(A)	Product layout	(B)	Fixed layout
	(C)	Cellular layout	(D)	Process layout
59	Break-even analysis assumes			
	(A)	Nonlinear revenue	(B)	Constant selling price
	(C)	Variable fixed costs	(D)	Continuous inflation
60	In SPT scheduling, jobs with -----are processed first			
	(A)	Higher due dates	(B)	Smaller processing times
	(C)	Larger processing times	(D)	Higher priority weights
61	The work done by a force is the product of			
	(A)	Force and acceleration	(B)	Force and displacement
	(C)	Mass and velocity	(D)	Momentum and distance
62	The head loss due to friction in a pipe is given by			
	(A)	Bernoulli equation	(B)	Darcy-Weisbach equation
	(C)	Poiseuille equation	(D)	Hagen's law
63	In refrigeration, the COP of a heat pump is always			
	(A)	Less than unity	(B)	Equal to unity
	(C)	Greater than unity	(D)	Zero
64	Shrinkage allowance is provided on			
	(A)	Pattern	(B)	Core
	(C)	Mould	(D)	Casting
65	The process of removing burrs and sharp edges is called			
	(A)	Lapping	(B)	Honing
	(C)	Deburring	(D)	Polishing

66	For a simply supported beam, maximum bending moment occurs at			
	(A)	Supports	(B)	Centre
	(C)	Quarter span	(D)	Neutral axis
67	Brass is an alloy of			
	(A)	Copper and Tin	(B)	Copper and Zinc
	(C)	Copper and Nickel	(D)	Copper and Aluminium
68	A governor is used to			
	(A)	Regulate fuel supply	(B)	Control speed
	(C)	Maintain constant load	(D)	Reduce vibration
69	Balancing of rotating masses is done to reduce			
	(A)	Noise	(B)	Vibration
	(C)	Friction	(D)	Heat
70	A body is said to be in dynamic equilibrium when			
	(A)	It moves with constant velocity	(B)	It is at rest
	(C)	Acceleration is constant	(D)	Force is zero
71	In a UTM tensile test, the yield point is identified by			
	(A)	Maximum load	(B)	Proportional limit
	(C)	Sudden increase in strain without increase in stress	(D)	Breaking point
72	Heisler charts are used for			
	(A)	Steady conduction	(B)	One-dimensional convection
	(C)	Transient conduction	(D)	Radiation exchange
73	In rolling, the phenomenon of “forward slip” occurs when			
	(A)	Strip speed < roll speed	(B)	Strip speed > roll speed
	(C)	Roll speed = strip speed	(D)	Roll force is zero

74	The command “MO6” in CNC denotes:			
	(A)	End of program	(B)	Tool change
	(C)	Spindle on	(D)	Coolant on
75	Which non-ferrous alloy is used for aircraft structures?			
	(A)	Brass	(B)	Bronze
	(C)	Al-Mg-Si alloys	(D)	Cu-Ni alloys
76	A cam with high jerk causes			
	(A)	Smooth follower motion	(B)	Reduced stress
	(C)	Impact loading	(D)	Increased damping
77	The stress concentration factor increases with			
	(A)	Decrease in notch radius	(B)	Increase in notch radius
	(C)	Increase in thickness	(D)	Increase in elastic modulus
78	R-charts monitor			
	(A)	Process mean	(B)	Process variability
	(C)	Number of defectives	(D)	Cycle time
79	Ceramics are			
	(A)	Brittle	(B)	Soft
	(C)	Ductile	(D)	Flexible
80	The device used to measure air velocity is			
	(A)	Venturi meter	(B)	Pitot tube
	(C)	Manometer	(D)	Orifice meter
81	The thermal conductivity of a perfect vacuum is			
	(A)	Very high	(B)	Very low
	(C)	Zero	(D)	Infinite

82	Lagrange's equation is primarily used for			
	(A)	rotational equilibrium	(B)	Constraint equations
	(C)	Analytical dynamics	(D)	Beam deflection
83	A thin cylinder subjected to internal pressure fails mainly due to			
	(A)	Shear stress	(B)	Torsional stress
	(C)	Hoop stress	(D)	Longitudinal stress
84	The pressure variation in a static fluid acts			
	(A)	Only vertically	(B)	Only horizontally
	(C)	Equally in all directions	(D)	Only normal to the bottom surface
85	Fins are used to			
	(A)	Reduce heat transfer	(B)	Increase surface area for convection
	(C)	Change thermal conductivity	(D)	Reduce temperature difference
86	Diesel cycle efficiency is higher than Otto cycle because			
	(A)	Diesel fuel has higher calorific value	(B)	Cut-off ratio is lower
	(C)	Average temperature of heat addition is higher	(D)	Compression ratio is lower
87	The main purpose of jigs and fixtures is to			
	(A)	Reduce material waste	(B)	Increase accuracy and productivity
	(C)	Improve surface finish	(D)	Reduce power consumption
88	The efficiency of a Carnot engine depends on			
	(A)	Working substance	(B)	Source and sink temperatures
	(C)	Compression ratio	(D)	Mean effective pressure
89	Cavitation in pumps occurs when			
	(A)	Pressure falls below vapour pressure	(B)	Pressure rises above vapour pressure
	(C)	Temperature decreases	(D)	Flow velocity decreases

90	In the Rankine cycle, the pump work is			
	(A)	Negligible	(B)	Equal to turbine work
	(C)	Maximum	(D)	Same as heat input
91	The main purpose of riser in casting is to			
	(A)	Feed molten metal during solidification	(B)	Allow gases to escape
	(C)	Act as a reservoir	(D)	Improve surface finish
92	The method used to solve assignment problems is			
	(A)	Hungarian method	(B)	Newton-Raphson method
	(C)	Simpson's rule	(D)	Bisection method
93	Poisson's ratio for steel is approximately			
	(A)	0.1	(B)	0.25
	(C)	0.3	(D)	0.5
94	The moment of inertia of a rectangular section of width b and depth d about its neutral axis is			
	(A)	$\frac{bd^3}{12}$	(B)	$\frac{bd^2}{6}$
	(C)	$\frac{b^2d^3}{6}$	(D)	$\frac{bd^3}{8}$
95	The non-metal used for making bullet-proof glass is			
	(A)	Nylon	(B)	Polycarbonate
	(C)	Epoxy	(D)	Teflon
96	Cast iron contains carbon in the range			
	(A)	0.1-0.5%	(B)	0.5-1.0%
	(C)	1.5-2.0%	(D)	2.0-4.0%
97	A four-bar mechanism has			

	(A)	1 degree of freedom	(B)	2 degrees of freedom
	(C)	3 degrees of freedom	(D)	None
98	A clutch is used to			
	(A)	Engage and disengage power	(B)	Stop motion
	(C)	Increase torque	(D)	Reduce speed
99	In forecasting, moving average is used to			
	(A)	Eliminate random fluctuations	(B)	Increase demand
	(C)	Predict fixed cost	(D)	Control production
100	The main objective of lean manufacturing is			
	(A)	Waste elimination	(B)	Labour reduction
	(C)	Inventory increase	(D)	High cost

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