



Kerala Public Enterprises (Selection and Recruitment) Board

Opposite KELTRON, Vellayambalam, Thiruvananthapuram

Website: kpesrb.kerala.gov.in, Email: kpesrb@gmail.com

Tel: 0471 - 2995042



Version: C

Question Booklet No: 02020

Name of Examination: Junior Operator Trainee

Date: 26/07/2026

Written examination for:

(1) Junior Operator Trainee, Kerala Minerals and Metals Limited -TP Unit

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	What does 3 indicate in the Hazchem code 3 YE			
	(A)	Use water spray	(B)	Use foam
	(C)	Use dry powder	(D)	Use CO ₂
2	A catalytic fluidized bed reactor is characterized by			
	(A)	Uniform temperature	(B)	High pressure drop
	(C)	Poor mixing	(D)	Fixed catalyst bed
3	The ratio of momentum diffusivity to thermal diffusivity is called			

	(A)	Nusselt number	(B)	Prandtl number
	(C)	Reynolds number	(D)	Grashof number
4	The third law of thermodynamics deals with			
	(A)	Chemical reaction	(B)	Quantitative equivalence between heat and work
	(C)	Rate of change of process	(D)	Absolute entropy of perfect crystalline substances
5	Identify the naturally occurring organometallic compound from the following			
	(A)	Haemoglobin	(B)	Chlorophyll
	(C)	Vitamin B ₁₂	(D)	Myoglobin
6	Safety valve is basically a			
	(A)	Gate valve	(B)	Globe valve
	(C)	Check valve	(D)	None of these
7	What is the product formed when 1-methylcyclohexane is reacted with HBr			
	(A)	1-Bromo-1-methylcyclohexane	(B)	1-Bromo-2-methylcyclohexane
	(C)	1-Bromo-3-methylcyclohexane	(D)	None of these
8	Water and Water vapour taken in a closed container is a			
	(A)	Homogeneous system	(B)	Heterogeneous system
	(C)	Isothermal system	(D)	Isolated system
9	Which petroleum fraction has the maximum H/C ratio			
	(A)	Gasoline	(B)	Naptha
	(C)	Kerosene	(D)	Diesel
10	The lanthanide which exhibits radioactivity is			
	(A)	Sm	(B)	Gd
	(C)	La	(D)	Pm

11	Poise is the unit of			
	(A)	Density	(B)	Velocity gradient
	(C)	Kinematic viscosity	(D)	Dynamic viscosity
12	Octane number of gasoline is a measure of its			
	(A)	Knocking tendency	(B)	Ignition delay
	(C)	Ignition temperature	(D)	Smoke point
13	Which of the following process in the oil refinery does not employ cracking			
	(A)	Coking	(B)	Vis breaking
	(C)	Pyrolysis	(D)	None of these
14	Which reaction involves an ylide intermediate in the mechanism			
	(A)	Witting	(B)	Wagner-Meerwein
	(C)	Gattermann-Koch	(D)	HVZ
15	The best quality of steam for indirect heating in industrial process is			
	(A)	Superheated	(B)	Dry saturated
	(C)	Wet	(D)	High pressure
16	Bourdon spring may be of the type of			
	(A)	C	(B)	Helical
	(C)	Spiral	(D)	All of these
17	Find the kilograms of carbon present in 32 kg of methane			
	(A)	32 kg	(B)	24 kg
	(C)	12 kg	(D)	28 kg
18	HLB number is related to			
	(A)	Stability of colloids	(B)	Zeta potential
	(C)	Electrical double layer	(D)	Emulsifier

19	Which thermodynamic property is constant during an "Isentropic" process?			
	(A)	Enthalpy	(B)	Entropy
	(C)	Internal Energy	(D)	Temperature
20	Which is the most stable conformation for 2-Fluoroethanol?			
	(A)	Eclipsed	(B)	Gauche
	(C)	Anti	(D)	Chair
21	Identify the major product from the reaction of $\text{CH}_3\text{CH}_2\text{ONa}$ with $(\text{CH}_3)_3\text{CCl}$ in ethanol			
	(A)	$\text{CH}_3\text{CH}_2\text{OC}(\text{CH}_3)_3$	(B)	$\text{CH}_2=\text{C}(\text{CH}_3)_2$
	(C)	$\text{CH}_3\text{CH}_2\text{C}(\text{CH}_3)_3$	(D)	$\text{CH}_3\text{CH}=\text{CHCH}_3$
22	The proximate analysis of coal gives.			
	(A)	Carbon, hydrogen and ash	(B)	Volatile matter, moisture, ash and fixed carbon
	(C)	Carbon, hydrogen, sulphur and nitrogen	(D)	Volatile matter, moisture, nitrogen and carbon
23	The cleansing action of soap is due to the formation of			
	(A)	Zwitterions	(B)	Micelles
	(C)	Chelates	(D)	Crystals
24	SO_2Cl_2 dissociates to SO_2 and Cl_2 with a $K_p = 2.9 \times 10^{-2}$. The degree of dissociation at a total pressure of 1 atm is:			
	(A)	0.17	(B)	0.22
	(C)	0.29	(D)	0.50
25	The reaction by which Indole is converted into 3-dimethylamino-methylindole (Gramin) by is			
	(A)	Reissert synthesis	(B)	Mannich reaction
	(C)	Reimer-Tiemann reaction	(D)	Friedlander's synthesis
26	When you perform Fehling's test, which among the following will give a positive result			

	(A) Sucrose	(B) Glucose
	(C) Lipids	(D) Proteins
27	Basicity of boric acid is	
	(A) 1	(B) 2
	(C) 3	(D) 4
28	The structure of Zeise's is	
	(A) square planar	(B) Octahedral
	(C) tetrahedral	(D) trigonal bipyramidal
29	A plug flow reactor is characterised by	
	(A) No axial mixing	(B) Back mixing
	(C) No radial mixing	(D) Complete mixing
30	Identify the secondary air pollutant	
	(A) Carbon monoxide	(B) Sulfur dioxide
	(C) Particulate matter	(D) Photochemical smog
31	The formation of a carbocation is characteristic of	
	(A) SN^1 reaction	(B) SN^2 reaction
	(C) $SNAr$ reaction	(D) Benzyne mechanism
32	From the methods given below, identify the method that converts biodegradable waste to a biofertilizer	
	(A) Incineration	(B) Landfilling
	(C) Aerobic composting	(D) Pyrolysis
33	Which one of the following is a non-reducing sugar?	
	(A) Maltose	(B) Lactose
	(C) Sucrose	(D) Glucose
34	How many moles are there in 500g of oxygen	

	(A) 31.25	(B) 15.625
	(C) 9.41×10^{24}	(D) 22.4×10^3
35	Which of the following is not an electrokinetic phenomenon	
	(A) Electrophoresis	(B) Electro osmosis
	(C) Streaming potential	(D) Donnan membrane equilibrium
36	What could be the enthalpy for a system where the internal energy = 500 kJ, Pressure = 2 bar, and Volume = 0.5m^3	
	(A) 500KJ	(B) 501KJ
	(C) 700KJ	(D) 600KJ
37	Transfer of heat by molecular collision is called	
	(A) Conduction	(B) Convection
	(C) Radiation	(D) All of these
38	The pre exponential term in the Arrhenius equation depends on	
	(A) temperature	(B) Concentration
	(C) Temperature and concentration	(D) None of these
39	Insufficient liquid delivery by a centrifugal pump may be caused by	
	(A) Air leaks in suction piping	(B) High suction lift
	(C) Clogged suction strainer	(D) All of these
40	The unit of diffusion coefficient is	
	(A) m^2/s	(B) m/s
	(C) $\text{mole}/\text{m}^2\text{s}$	(D) none of these
41	The metal used in Sandmeyer reaction is	
	(A) Cu(II)	(B) Ag(I)
	(C) Hg(II)	(D) Cu(I)

42	The ratio of the quantity of the desired product actually produced to its maximally obtainable quantity is known as			
	(A)	Selectivity	(B)	Conversion
	(C)	Yield	(D)	Stoichiometric ratio
43	Reynolds Number is the ratio of			
	(A)	Viscous force to gravity forces	(B)	Inertial force to viscous forces
	(C)	Viscous force to inertial force	(D)	Inertial force to gravity force
44	Which of the following species is paramagnetic?			
	(A)	H ₂	(B)	N ₂
	(C)	O ₂	(D)	O ₂ ²⁻
45	The following type of bonding is strongly directional in solids			
	(A)	Metallic bonding	(B)	Ionic bonding
	(C)	Covalent bonding	(D)	Van der Waals bonding
46	The Nitrogen content of urea			
	(A)	46% N by weight	(B)	26% N by weight
	(C)	56 % N by Weight	(D)	None of these
47	The existence of two different coloured complexes of [Co(NH ₃) ₄ Cl ₂] is due to			
	(A)	linkage isomerism	(B)	optical isomerism
	(C)	coordination isomerism	(D)	geometrical isomerism
48	In excited hydrogen atom when electron drops from n=4,5,6 to n=1, there is emission of			
	(A)	visible light	(B)	UV-light
	(C)	IR-light	(D)	X-rays
49	One mole of benzene is mixed with one mole of toluene at 300 K. The Gibbs free energy of mixing assuming ideal solution is approximately			

	(A) 0	(B) 1.8 kJ
	(C) -1.8 KJ	(D) 6J
50	Among the followong, which is not isoelectronic?	
	(A) CN^-	(B) N_2
	(C) O_2^{2+}	(D) NO^-
51	Which three elements constitute the “Fire Triangle”	
	(A) Fuel, Nitrogen, Heat	(B) Fuel, Oxygen, Heat
	(C) Carbon, Oxygen, Spark	(D) Fuel, CO_2 , Ignition
52	The rate of reaction generally increases rapidly even for small temperature increase because of a rapid increase in	
	(A) Collision frequency	(B) Fraction of molecules with energies in excess of activation energy
	(C) Activation Energy	(D) Average kinetic energy of the molecule
53	The fire extinguisher ideal for electrical fires	
	(A) DCP extinguisher	(B) Foam extinguisher
	(C) CO_2 extinguisher	(D) Water
54	Which of the following has highest pKa value	
	(A) Acetic acid	(B) Chloroacetic acid
	(C) Bromo acetic acid	(D) Formic acid
55	The Air (Prevention and control of pollution) Act was enacted in the year	
	(A) 1981	(B) 1996
	(C) 2000	(D) 1974
56	Radioactive solid nuclear wastes are disposed off by	

	(A) High temperature incineration	(B) Pathological incineration
	(C) Pyrolysis	(D) Underground burial in concrete containers
57	Electrical conductivity of a semiconductorwith temperature	
	(A) increase	(B) Decrease
	(C) independent of	(D) initially increases then decreases
58	In a common effluent treatment plant (CETP) the function of the equalisation tank is to	
	(A) Kill pathogens	(B) Recover heat
	(C) Produce biogas	(D) Stabilise wastewater flow and concentration
59	If a solid-gas non catalytic reaction occurs at very high temperature, the rate controlling step is	
	(A) Film diffusion	(B) Ash layer diffusion
	(C) Pore diffusion	(D) None of these
60	For the reaction $2\text{NO} + \text{O}_2 \rightarrow 2\text{NO}_2$, the rate of the reaction is expressed as $k[\text{NO}]^2[\text{O}_2]$. Identify the order of the reaction.	
	(A) 0	(B) 1
	(C) 2	(D) 3
61	Which among the following is the most acidic	
	(A) Acetic acid	(B) Chloroacetic acid
	(C) Nitroacetic acid	(D) Propionic acid
62	The catalyst used in the DCDA process for the manufacture of sulphuric acid is	
	(A) V_2O_5	(B) $\text{Fe} + \text{Al}_2\text{O}_3/\text{K}_2\text{O}$
	(C) Mo	(D) Ni
63	Entropy change of a system is zero in	

	(A) Reversible process	(B) Adiabatic process
	(C) Reversible adiabatic process	(D) Isothermal process
64	Ratio of emissive power of a body to the emissive power of a perfectly black body, is called	
	(A) Emissivity	(B) Absorptivity
	(C) Transmissivity	(D) Reflectivity
65	The operating parameters of a cooling tower are water inlet at 40 °C, water outlet at 32°C, dry bulb temperature of 35°C, and wet bulb temperature of 27°C. The approach of the cooling tower is	
	(A) 8°C	(B) 3°C
	(C) 5°C	(D) 13°C
66	Energy in Einstein associated with radiation of wavelength 400nm is approximately	
	(A) 400kJ	(B) 300kJ
	(C) 200kJ	(D) 100kJ
67	For an adiabatic process	
	(A) Heat flows from the system to the surroundings	(B) No heat interaction between the system and surroundings
	(C) Heat flows from the surroundings to the system	(D) None of these
68	Cylinder dryers are used in	
	(A) Detergent industry	(B) Dairy industry
	(C) Pharmaceutical industry	(D) Paper industry
69	Identification of pipeline carrying different liquids and gases is done by _____ of the pipe	
	(A) Diameter	(B) Colour
	(C) Altitude	(D) None of these
70	The key difference between a DN100 Schedule 40 and a DN100 Schedule 60 pipe is	

	(A) Different OD	(B) Same ID, thicker wall for Sch 60
	(C) Same OD, Same thickness	(D) Same OD, thicker wall for Sch 60
71	To produce ammonia, 100 kmol of nitrogen and 300 kmol of hydrogen are fed to a reactor	
	(A) The reactants are fed in stoichiometric proportions	(B) Nitrogen is fed in excess
	(C) Hydrogen is fed in excess	(D) None of these
72	Vapour pressure of benzene and toluene at 600 °C are 385 and 139 Torr respectively. The mole fraction of toluene in the vapour for a binary solution with 0.6 mole fraction toluene is	
	(A) 0.4	(B) 0.6
	(C) 0.65	(D) 0.35
73	3 moles of NH_3 contains	
	(A) 18 g of hydrogen	(B) 42 g of nitrogen
	(C) Both a) and b)	(D) None of these
74	The number of absorptions in IR spectrum of CO_2 is	
	(A) 2	(B) 3
	(C) 4	(D) 6
75	Identify the correct statement	
	(A) An open system does not have any boundaries	(B) An open system does not exchange energy with its surroundings
	(C) An open system exchanges energy but not matter with its surroundings	(D) An open system exchanges both energy and matter with its surroundings
76	In a mercury manometer measuring the pressure of water in a pipe, the manometric rise is 0.2m. The specific gravity of mercury is 13.55. The water pressure in m of water is	
	(A) 14.55×0.2	(B) 12.55×0.2
	(C) 13.55×0.2	(D) 1.0×0.2

77	Which of the following nuclei are not NMR active			
	(A)	^{14}N	(B)	^{16}O
	(C)	^{19}F	(D)	^{23}Na
78	Isocyanides can be prepared by heating a mixture of alkyl iodide and			
	(A)	Sodium cyanide	(B)	Potassium cyanide
	(C)	Silver cyanide	(D)	Hydrogen cyanide
79	Bernoulli's equation accounts for the			
	(A)	Various momentums	(B)	Various masses
	(C)	Different forms of mechanical energy	(D)	None of these
80	For a given principle level $n=4$, the energy of its sub shells is of the order			
	(A)	$s < d < f < p$	(B)	$s < p < d < f$
	(C)	$d < f < p < s$	(D)	$s < p < f < d$
81	Choose the wrong statement regarding surface catalysed reaction			
	(A)	It decreases the activation energy	(B)	It accelerates the rate of attainment of equilibrium
	(C)	It does not change the thermodynamic parameters of the reaction	(D)	It increases the rate of forward reaction only
82	A solution which resists change in its pH value on addition of small amounts of acid or alkali is classified as			
	(A)	Neutral solution	(B)	Saturated solution
	(C)	Standard solution	(D)	Buffer solution
83	The Double Contact Double Absorption process is the most recent process for the manufacture of			
	(A)	Sulphuric acid	(B)	Nitric acid
	(C)	Ammonium sulphate	(D)	Hydrochloric acid

84	Crystal symmetry is expressed conveniently using			
	(A)	Schoenflies symbol	(B)	Hermann Mauguin symbol
	(C)	Miller indices	(D)	Braggs equation
85	Fermentation of molasses to produce ethyl alcohol is done at			
	(A)	20-30°C	(B)	40-60°C
	(C)	100-150°C	(D)	250-300°C
86	Liquefied Petroleum Gas is mainly a mixture of			
	(A)	Propane and butane	(B)	High boiling olefins
	(C)	Methane and ethane	(D)	High boiling naphthenes
87	Phosphatic fertiliser is graded based on			
	(A)	P ₂ O ₃ Content	(B)	P ₂ O ₅ Content
	(C)	PCl ₅ Content	(D)	H ₃ PO ₄ Content
88	The GCV of a fuel can be estimated using			
	(A)	Redwood viscometer	(B)	Orsat apparatus
	(C)	Bomb calorimeter	(D)	Saybolt viscometer
89	If BOD of river water is high, then it implies that the river is			
	(A)	Polluted with pesticides	(B)	Not at all polluted
	(C)	Highly polluted with inorganic chemicals	(D)	Highly polluted with biodegradable organic chemicals
90	Which of the following is not a model of electrical double layer			
	(A)	Gibbs Helmholtz	(B)	Gouy Chapman
	(C)	Stern	(D)	Stern Volmer
91	Which type of cooling tower is most favoured in the chemical process industries			
	(A)	Induced draft	(B)	Hyperbolic tower
	(C)	Spray tower without fill	(D)	Forced draft

92	Which of the following is not a differential pressure flow meter			
	(A)	Rotameter	(B)	Flow nozzle
	(C)	Orificemeter	(D)	Venturimeter
93	If uncertainty in the position of an electron is zero, the uncertainty in its velocity would be			
	(A)	infinity	(B)	$h/4\pi$
	(C)	Zero	(D)	$ch/2\pi$
94	Which strategy most directly applies a core green chemistry principle			
	(A)	Use of supercritical CO ₂	(B)	Installing larger fume hoods
	(C)	Burning used solvents	(D)	Storing solvents in sealed containers
95	Identify the instrument that can be used to measure very low pressure			
	(A)	McLeod gauge	(B)	Diaphragm Gauge
	(C)	Bellows gauge	(D)	C-Type Bourdon tube
96	Among the following gases which is called 'Stranger Gas'?			
	(A)	Helium	(B)	Nitric oxide
	(C)	Methane	(D)	Xenon
97	Identify the fire extinguisher generally preferred for a Class D fire			
	(A)	Water	(B)	CO ₂
	(C)	Dry powder for metals	(D)	Foam
98	The metal used in Reformatsky reaction is			
	(A)	Sn	(B)	Mg
	(C)	Hg	(D)	Zn
99	What is the order of reaction which has a rate expression, $\text{rate} = k[A]^{3/2} [B]^{-1}$			
	(A)	3/2	(B)	1/2
	(C)	Zero	(D)	None of these

100	Identify the least stable ion among the following			
	(A)	Li^-	(B)	Be^-
	(C)	B^-	(D)	C^-





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