



Kerala Public Enterprises (Selection and Recruitment) Board

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Version: A

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	Which three elements constitute the “Fire Triangle”			
	(A)	Fuel, Nitrogen, Heat	(B)	Fuel, Oxygen, Heat
	(C)	Carbon, Oxygen, Spark	(D)	Fuel, CO ₂ , Ignition
2	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

3	The fire extinguisher ideal for electrical fires			
	(A)	DCP extinguisher	(B)	Foam extinguisher
	(C)	CO ₂ extinguisher	(D)	Water
4	Which of the following has highest pKa value			
	(A)	Acetic acid	(B)	Chloroacetic acid
	(C)	Bromo acetic acid	(D)	Formic acid
5	The Air (Prevention and control of pollution) Act was enacted in the year			
	(A)	1981	(B)	1996
	(C)	2000	(D)	1974
6	Radioactive solid nuclear wastes are disposed off by			
	(A)	High temperature incineration	(B)	Pathological incineration
	(C)	Pyrolysis	(D)	Underground burial in concrete containers
7	Electrical conductivity of a semiconductorwith temperature			
	(A)	increase	(B)	Decrease
	(C)	independent of	(D)	initially increases then decreases
8	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
9	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
10	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
11	Which among the following is the most acidic	
	(A) Acetic acid	(B) Chloroacetic acid
	(C) Nitroacetic acid	(D) Propionic acid
12	The catalyst used in the DCDA process for the manufacture of sulphuric acid is	
	(A) V_2O_5	(B) $Fe+Al_2O_3/K_2O$
	(C) Mo	(D) Ni
13	Entropy change of a system is zero in	
	(A) Reversible process	(B) Adiabatic process
	(C) Reversible adiabatic process	(D) Isothermal process
14	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
15	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
16	Energy in Einstein associated with radiation of wavelength 400nm is approximately	
	(A) 400kJ	(B) 300kJ
	(C) 200kJ	(D) 100kJ
17	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
18 Cylinder dryers are used in				
	(A)	Detergent industry	(B)	Dairy industry
	(C)	Pharmaceutical industry	(D)	Paper industry
19 Identification of pipeline carrying different liquids and gases is done by _____ of the pipe				
	(A)	Diameter	(B)	Colour
	(C)	Altitude	(D)	None of these
20 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
21 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
22 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
23 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

24	The number of absorptions in IR spectrum of CO ₂ is			
	(A)	2	(B)	3
	(C)	4	(D)	6
25	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
26	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 x 0.2	(B)	12.55 x 0.2
	(C)	13.55 x 0.2	(D)	1.0 x 0.2
27	Which of the following nuclei are not NMR active			
	(A)	¹⁴ N	(B)	¹⁶ O
	(C)	¹⁹ F	(D)	²³ Na
28	Isocyanides can be prepared by heating a mixture of alkyl iodide and			
	(A)	Sodium cyanide	(B)	Potassium cyanide
	(C)	Silver cyanide	(D)	Hydrogen cyanide
29	Bernoulli's equation accounts for the			
	(A)	Various momentums	(B)	Various masses
	(C)	Different forms of mechanical energy	(D)	None of these
30	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
31	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
32	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
33	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
34	Crystal symmetry is expressed conveniently using	
	(A) Schoenflies symbol	(B) Hermann Mauguin symbol
	(C) Miller indices	(D) Braggs equation
35	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
36	Liquefied Petroleum Gas is mainly a mixture of	
	(A) Propane and butane	(B) High boiling olefins
	(C) Methane and ethane	(D) High boiling naphthenes
37	Phosphatic fertiliser is graded based on	
	(A) P_2O_3 Content	(B) P_2O_5 Content
	(C) PCl_5 Content	(D) H_3PO_4 Content
38	The GCV of a fuel can be estimated using	

	(A) Redwood viscometer	(B) Orsat apparatus
	(C) Bomb calorimeter	(D) Saybolt viscometer
39	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
40	Which of the following is not a model of electrical double layer	
	(A) Gibbs Helmholtz	(B) Gouy Chapman
	(C) Stern	(D) Stern Volmer
41	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
42	Which of the following is not a differential pressure flow meter	
	(A) Rotameter	(B) Flow nozzle
	(C) Orificemeter	(D) Venturimeter
43	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) $ch/2\pi$
44	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
45	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

46	Among the following gases which is called 'Stranger Gas'?			
	(A)	Helium	(B)	Nitric oxide
	(C)	Methane	(D)	Xenon
47	Identify the fire extinguisher generally preferred for a Class D fire			
	(A)	Water	(B)	CO ₂
	(C)	Dry powder for metals	(D)	Foam
48	The metal used in Reformatsky reaction is			
	(A)	Sn	(B)	Mg
	(C)	Hg	(D)	Zn
49	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
50	Identify the least stable ion among the following			
	(A)	Li ⁻	(B)	Be ⁻
	(C)	B ⁻	(D)	C ⁻
51	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
52	A catalytic fluidized bed reactor is characterized by			
	(A)	Uniform temperature	(B)	High pressure drop
	(C)	Poor mixing	(D)	Fixed catalyst bed
53	The ratio of momentum diffusivity to thermal diffusivity is called			
	(A)	Nusselt number	(B)	Prandtl number
	(C)	Reynolds number	(D)	Grashof number

54	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
55	Identify the naturally occurring organometallic compound from the following			
	(A)	Haemoglobin	(B)	Chlorophyll
	(C)	Vitamin B ₁₂	(D)	Myoglobin
56	Safety valve is basically a			
	(A)	Gate valve	(B)	Globe valve
	(C)	Check valve	(D)	None of these
57	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
58	Water and Water vapour taken in a closed container is a			
	(A)	Homogeneous system	(B)	Heterogeneous system
	(C)	Isothermal system	(D)	Isolated system
59	Which petroleum fraction has the maximum H/C ratio			
	(A)	Gasoline	(B)	Naptha
	(C)	Kerosene	(D)	Diesel
60	The lanthanide which exhibits radioactivity is			
	(A)	Sm	(B)	Gd
	(C)	La	(D)	Pm
61	Poise is the unit of			

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

	(A) Enthalpy	(B) Entropy
	(C) Internal Energy	(D) Temperature
70	Which is the most stable conformation for 2-Fluoroethanol?	
	(A) Eclipsed	(B) Gauche
	(C) Anti	(D) Chair
71	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) $\text{CH}_3\text{CH}=\text{CHCH}_3$
72	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
73	The cleansing action of soap is due to the formation of	
	(A) Zwitterions	(B) Micelles
	(C) Chelates	(D) Crystals
74	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
75	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
76	When you perform Fehling's test, which among the following will give a positive result	

	(A) Sucrose	(B) Glucose
	(C) Lipids	(D) Proteins
77	Basicity of boric acid is	
	(A) 1	(B) 2
	(C) 3	(D) 4
78	The structure of Zeise's is	
	(A) square planar	(B) Octahedral
	(C) tetrahedral	(D) trigonal bipyramidal
79	A plug flow reactor is characterised by	
	(A) No axial mixing	(B) Back mixing
	(C) No radial mixing	(D) Complete mixing
80	Identify the secondary air pollutant	
	(A) Carbon monoxide	(B) Sulfur dioxide
	(C) Particulate matter	(D) Photochemical smog
81	The formation of a carbocation is characteristic of	
	(A) SN^1 reaction	(B) SN^2 reaction
	(C) $SNAr$ reaction	(D) Benzyne mechanism
82	From the methods given below, identify the method that converts biodegradable waste to a biofertilizer	
	(A) Incineration	(B) Landfilling
	(C) Aerobic composting	(D) Pyrolysis
83	Which one of the following is a non-reducing sugar?	
	(A) Maltose	(B) Lactose
	(C) Sucrose	(D) Glucose
84	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
85	Which of the following is not an electrokinetic phenomenon	
	(A) Electrophoresis	(B) Electro osmosis
	(C) Streaming potential	(D) Donnan membrane equilibrium
86	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
87	Transfer of heat by molecular collision is called	
	(A) Conduction	(B) Convection
	(C) Radiation	(D) All of these
88	The pre exponential term in the Arrhenius equation depends on	
	(A) temperature	(B) Concentration
	(C) Temperature and concentration	(D) None of these
89	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
90	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
91	The metal used in Sandmeyer reaction is	
	(A) Cu(II)	(B) Ag(I)
	(C) Hg(II)	(D) Cu(I)

92	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
93	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
94	Which of the following species is paramagnetic?			
	(A)	H ₂	(B)	N ₂
	(C)	O ₂	(D)	O ₂ ²⁻
95	The following type of bonding is strongly directional in solids			
	(A)	Metallic bonding	(B)	Ionic bonding
	(C)	Covalent bonding	(D)	Van der Waals bonding
96	The Nitrogen content of urea			
	(A)	46% N by weight	(B)	26% N by weight
	(C)	56 % N by Weight	(D)	None of these
97	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
98	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
99	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

100 Among the followong, which is not isoelectronic?

(A)	CN^-	(B)	N_2
(C)	O_2^{2+}	(D)	NO^-



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