Application Number **R**

KPCL (Mechanical Engineering – AE)

GENERAL INSTRUCTIONS

Time: 2 hrs **Max. Marks: 100**

EXAMPLE Wrong Methods				
1	A	B	C	D
2	A	B	C	D
3	A	B	C	D
4	A	B	C	D
CORRECT METHOD				
1	A	B	C	D

1. **Completely darken only one oval corresponding to the answer of your choice.**
2. **Use Black ink Ball-Point Pen only, to darken the oval to indicate your choice. Oval should be darkened completely so that the alphabet inside the oval is not visible**
3. **Mark your answer as shown in the example.**

1. The question paper contains 100 objective questions, each carrying **ONE** mark.
2. Answer all the questions. There is no negative marking.
3. Questions must be answered on a special machine gradable **O**bjective **R**esponse **S**heet (ORS) by darkening the appropriate oval (marked A, B, C, D). **See box above**.
4. Enter your application number on the left top side of the **ORS** by darkening the appropriate oval with a Black ink Ball-Point Pen.
5. Write your name and the application number on the right top side of the **ORS** in the specified locations in black ink and affix your signature in the box provided.
6. No charts or tables are provided in the examination hall. Calculators, cell phones and other types of electronic gadgets are strictly forbidden in the examination hall.
7. Use the blank pages provided at the end of the question paper for rough work. No extra sheets will be provided.
8. After completing the examination, you must hand over both the question paper and the **ORS** answer sheet to the invigilator.
9. A candidate found violating the instructions given above and/or those given by the invigilator, will be disqualified. Furthermore, a candidate giving assistance to any other candidate or seeking/receiving help from any source in answering questions or copying in any manner in the test, will forfeit his/her chance of being considered for selection.

1. The infinite series $1+x+\frac{x^2}{1.2}+\frac{x^3}{1.2.3}+\cdots$ corresponds to the following function:

(A) $\sin x$ (B) $\cos x$ (C) $\ln x$ (D) $\exp(x)$

2. An implicit relation between x and y is written $f(x,y) = 0$. It is known that $\partial f / \partial x = x^2 - ay$ and $\partial f / \partial y = y^2 - ax$. Then, $dy/dx =$

(A) $\frac{x^2 - ay}{y^2 - ax}$ (B) $\frac{x^2 - ay}{y^2 - ax}$ (C) $-\frac{x^2 - ay}{y^2 - ax}$ (D) $-\frac{y^2 - ax}{x^2 - ay}$

3. The slope of the tangent to the circle $x^2 + y^2 = a^2$ at the point (1,1) is:

(A) -1 (B) 0 (C) 1 (D) $\sqrt{3}$

4. The parametric equations $x = a\cos\theta$ and $y = b\sin\theta$ represent:

(A) a parabola (B) an ellipse (C) a hyperbola (D) a cycloid

5. If the function $f(x)$ is odd, then $\int_{-a}^{a} f(x)dx =$

(A) $2\int_{0}^{a} f(x)dx$ (B) $2\int_{a}^{0} f(x)dx$ (C) 0 (D) $2\int_{a}^{-a} f(x)dx$

6. The rank of the matrix $\begin{bmatrix} 2 & 4 & 8 \\ 1 & 2 & 1 \end{bmatrix}$ is:

(A) 0 (B) 1 (C) 2 (D) 3

7. The eigenvalues of the matrix $\begin{bmatrix} 1 & 3 \\ 2 & 2 \end{bmatrix}$ are:

(A) 1,-4 (B) -1,4 (C) 1,2 (D) 1,3

8. The solution of the differential equation $\frac{d^2y}{dx^2} + 4\frac{dy}{dx} + 4y = 0$ (with A and B denoting constants) is:

(A) $(A+Bx)\exp(-2x)$ (B) $(A+Bx)\exp(-2/x)$

(C) $(A+Bx)\exp(2x)$ (D) $(A+Bx^2)\exp(2x)$

9. The cartesian coordinates x and y are related to the plane polar coordinates r and θ as $x = r\cos\theta$ and $y = r\sin\theta$. The Jacobian of transformation from cartesian to polar coordinates is:

(A) $\cos\theta$ (B) $\sin\theta$ (C) $\tan\theta$ (D) r

10. The Laplace transform of $\sin(kt)$, with usual notation, is:

(A) $\frac{k}{s^2 - k^2}$ (B) $\frac{k^2}{s^2 - k^2}$ (C) $\frac{k}{s^2 + k^2}$ (D) $\frac{s}{s^2 - k^2}$

11. The Gauss divergence theorem relates a volume integral to a:
(A) surface integral (B) line integral (C) contour integral (D) differential

12. The unit of electrical capacitance is:
(A) amperes (B) volts (C) joules (D) farads

13. Of the following solid fuels, the fuel having the largest calorific value is:
(A) wood (B) anthracite coal (C) bituminous coal (D) peat

14. One of the measuring instruments recommended by the ITS (International Temperature Scale)-90 for calibration of temperature is the:
(A) NTC thermistor (B) platinum resistance thermometer
(C) copper-constantan thermocouple (D) mercury-in-glass thermometer

15. The pressure ratio obtained from a constant volume ideal gas thermometer between steam and ice points is 1.3661. If the absolute temperature difference between the steam point and ice points is divided into 100 degrees, the ice-point in K in this two fixed points method is:
(A) 273.149 (B) 273.160 (C) 373.149 (D) 373.160

16. An ideal gas undergoes compression in a compressor. The compression is irreversible due to the presence of friction. If γ is the ratio of specific heats and n is the polytropic index of compression, then:
(A) $\gamma=1.4n$ (B) $n=\gamma$ (C) $n<\gamma$ (D) $n>\gamma$

17. Methane gas is stored in a cylinder of capacity 80 litres at a temperature of 300 K and an absolute pressure of 250 bar. Assuming ideal gas behaviour, the mass of the gas contained in the cylinder in kg is:
(A) 12 (B) 24 (C) 36 (D) 48

18. The thermodynamic cycle of a device is 1-2-3-4-1, the numerals denoting the various state points. The heat interactions in kJ are 0, -100, 0 and 50 in the processes 1-2, 2-3, 3-4 and 4-1, respectively. The device is a:
(A) perpetual motion machine-1 (B) perpetual motion machine-2
(C) heat engine (D) refrigerator

19. The ratio of specific heats of a perfect gas is γ. The gas undergoes a reversible polytropic process, the polytropic exponent being n. The relation between heat input Q and the work output W in the process is:
(A) $Q=\frac{\gamma-n}{\gamma-1}W$ (B) $W=\frac{\gamma-n}{\gamma-1}Q$ (C) $Q=\frac{n-\gamma}{\gamma-1}W$ (D) $W=\frac{n-\gamma}{\gamma-1}Q$

20. A three-stage reciprocating air compressor with perfect intercooling between the stages has an overall pressure ratio of 64. For minimum work input, the pressure ratio of each stage is:
(A) 2 (B) 4 (C) 8 (D) 16

21. In a jet-propulsion engine of an airplane flying at a speed of 900 kmph, the flow rate of the combustion gases to the nozzle is 40 kg/s. The gases leave the nozzle with a velocity of 500 m/s. Neglecting the mass of fuel, the thrust on the plane in kN is:
(A) 10 (B) 25 (C) 40 (D) 900

22. Natural gas that does not contain hydrogen sulphide is often called:
(A) dry gas (B) sour gas (C) sweet gas (D) wet gas

23. In an Orsat apparatus used for flue gas analysis, the alkaline solution of pyrogallic acid acts as:
(A) CO absorber (B) CO_2 absorber (C) O_2 absorber (D) N_2 absorber

24. A flue gas analyzer shows the presence of 80% N_2 and 10% CO_2 by volume. If the fuel is known to contain 82.5% carbon by mass, the air-fuel ratio is:
(A) 10 (B) 15 (C) 20 (D) 25

25. The air standard efficiency of an Otto cycle with a compression ratio of 8 is:
(A) 36.5% (B) 46.5% (C) 56.5% (D) 66.5%

26. A better basis of comparison for a modern high-speed oil engine is:
(A) Diesel cycle (B) Dual cycle (C) Stirling cycle (D) Otto cycle

27. Cetane number is the percentage of cetane in a reference mixture of:
(A) cetane and methyl pyrrolidinone (B) cetane and acetylene
(C) cetane and α-methyl naphthalene (D) cetane and n-heptane

28. The volumetric efficiency of engines at high speeds can be improved by:
(A) stratification of charge (B) fuel injection
(C) the use of multiple cylinders (D) supercharging

29. In a dual-combustion cycle, combustion takes place partly at constant volume and partly at:
(A) constant temperature (B) constant pressure
(C) constant enthalpy (D) constant internal energy

30. The critical pressure ratio for a gas flowing through a convergent nozzle is 0.55. If the nozzle inlet pressure is10 bar, the back pressure required to choke the nozzle is:
(A) 5.5 kPa (B) 10 kPa (C) 100 kPa (D) 550 kPa

31. The mass flow rate of steam through a converging-diverging nozzle is measured to be more than that calculated with equilibrium flow assumption. This means that:
(A) wet steam flows through the nozzle (B) supersaturated expansion is occurring
(C) water droplets are freezing (D) fog formation is occurring

32. The ratio of the average load on a power plant over a certain period to the peak load during the same period is called:
(A) demand factor (B) capacity factor (C) load factor (D) common factor

33. The term "attemperation" refers to:
(A) tempering of superheater tubes (B) reduction of the steam temperature
(C) cleaning of flue gas (D) reduction in the flue gas temperature

34. The deaerator in a steam power plant reduces the oxygen in the feed water to a concentraton of:
(A) 0.005 mL/L (B) 0.05 mL/L (C) 0.5 mL/L (D) 5 mL/L

35. Supercritical boilers operate at an absolute pressure in excess of:
(A) 0.22 bar (B) 2.2 bar (C) 22 bar (D) 220 bar

36. From compactness considerations, the following type of air preheater is the most suitable:
(A) plate type (B) tubular type (C) rotary type (D) double-pipe type

37. The mass of cooling water in kg required in the condenser of a power plant per kg of steam condensed is typically in the range:
(A) 10-25 (B) 30-45 (C) 50-65 (D) 75-100

38. The absolute pressure in a steam condenser is 7 kPa and the saturation pressure of steam is 4 kPa. The mass of air per unit mass of steam is:
(A) 0.7 (B) 0.9 (C) 1.2 (D) 1.5

39. The pressure in a column of isothermal ideal gas in gravitational field varies with height in the following manner:
(A) quadratic (B) cubic (C) sinusoidal (D) exponential

40. In the troposphere, the variation of the pressure with height is such that:
(A) it decreases continuously (B) it first increases and then decreases
(C) it first decreases and then increases (D) it remains constant

41. A barge of weight 196.2 kN floats in water of density 1000 kg/m^3. The volume of water displaced in m^3 is:
(A) 1.962 (B) 10 (C) 20 (D) 196.2

42. In a vortex created in a real fluid, it is most likely that:

(A) the entire vortex is a forced vortex
(B) the entire vortex is a free vortex
(C) the central portion is a free vortex and the remaining portion is a forced vortex
(D) the central portion is a forced vortex and the remaining portion is a free vortex

43. In experimental work, the following method can be used to find the dimensionless numbers among which a functional relationship exists:

(A) Rayleigh's method (B) Weighted residuals method
(C) Finite element method (D) Sub-domain method

44. The flow of a liquid of density 1000 kg/m^3 in a pipe of 0.1 m diameter with an average velocity of 1 m/s is dynamically similar to a gas of density 1 kg/m^3 flowing in a 1.0 m diameter tube. The dynamic viscosities of the liquid and gas are respectively 10^{-3} Pa.s and 2×10^{-5} Pa.s. The average velocity of the gas in m/s is:

(A) 0.1 (B) 2 (C) 15 (D) 100

45. In a fully developed pipe flow, the boundary layer thickness is equal to the:

(A) diameter of the pipe (B) length of the pipe
(C) radius of the pipe (D) square of the pipe radius

46. A source of disturbance moves at supersonic speed in a medium. If the Mach number is M, the semi-angle of the Mach cone is:

(A) $\sin^{-1}(1/M)$ (B) $\sin^{-1}(M)$ (C) $\tan^{-1}(1/M)$ (D) $\tan^{-1}(M)$

47. The head available for a turbine is $H = H_g - h$, where H_g is the fixed gross head and $h=AQ^2$ is the friction head in the penstock, where A is a constant and Q is the volume flow rate of water through the system. The turbine water power $P=BQH$, where B is a constant. For maximum water power, the friction head should be:

(A) $H_g/5$ (B) $H_g/4$ (C) $H_g/3$ (D) $H_g/2$

48. In a Pelton turbine, the mean bucket speed is 30 m/s. The net head available for the turbine in m is approximately:

(A) 90 (B) 120 (C) 150 (D) 180

49. The operating speed of a turbine is 625 rpm. Its unit speed is 125 rpm. The turbine head in m is:

(A) 5 (B) 25 (C) 125 (D) 625

50. An axial flow turbine with variable pitch blades is:

(A) Kaplan turbine (B) Pelton wheel (C) Propeller turbine (D) Radial turbine

51. For a given power, speed and head, the shape of a hydraulic turbine runner is decided by the following quantity:
(A) head coefficient (B) flow coefficient
(C) specific speed (D) power coefficient

52. A centrifugal pump running at $1000\sqrt{2}$ rpm and handling 0.25 m^3/s of water against a head of 250 m, is to be replaced by four similar pumps in series. The speed of each pump in rpm is:
(A) 500 (B) 700 (C) 800 (D) 900

53. The principle which states that the stress distribution over the cross-section of a bar carrying direct loading can be considered uniform except at the extreme ends is:
(A) Tresca's principle (B) Unwin's principle
(C) Soderberg's principle (D) Saint Venant's principle

54. In a tensile test of a specimen of length 200 mm and cross-sectional area 125 mm^2, the relation between the load F (kN) and the elongation δ (mm) is found to be $F = 125\,\delta$. The Young's modulus of the material in kN/mm^2 is:
(A) 125 (B) 200 (C) 250 (D) 400

55. In a tensile test on a specimen with original cross-sectional area of 120 mm^2, the maximum load is found to be 60 kN. The cross-sectional area at the time of failure is 40 mm^2. The ultimate tensile strength of the material in kN/mm^2 is:
(A) 0.25 (B) 0.5 (C) 2.0 (D) 3.0

56. The following stress may be taken as representative of the elastic limit for copper:
(A) 0.2% proof stress (B) 10% of ultimate stress
(C) 0.1% of yield stress (D) 50% of failure stress

57. When a steel bar of cross-section 50 mm × 50 mm is subjected to a tensile loading, the side of the square decreases by 0.002 mm. If the Poisson's ratio is 0.25, the longitudinal strain is:
(A) 16×10^{-5} (B) 0.002 (C) 50 (D) 2500

58. A bar is held between rigid planes and is heated by 50°C. If the coefficient of linear expansion of the bar material is 10^{-5} per °C, the compressive strain in the bar is:
(A) 10^{-5} (B) 50×10^{-5} (C) 50 (D) 50×10^{5}

59. A bar with a cross-sectional area 400 mm^2 is subjected to an axial pull of 4000 N. The normal stress in N/mm^2 on a plane making an angle of 60° with the axis is:
(A) 2.5 (B) 400 (C) 2000 (D) 4000

60. A bar is subjected to an axial stress of 50 N/mm^2. The maximum shear stress in N/mm^2 that can occur on a plane inclined to the axis is:
(A) 12.5 (B) 25 (C) 50 (D) 100

61. A rectangular metal plate with its two sides parallel to x-axis and the other two sides parallel to y-axis is subjected to a tensile stress of 45 MPa in x-direction and to a compressive stress of 20 MPa in y-direction. If the Young's modulus for the plate material is 200×10^3 MPa and the strain in the x-direction is 25×10^{-5}, the Poisson's ratio is:
(A) 0.1 (B) 0.15 (C) 0.2 (D) 0.25

62. A compressed air cylinder has an internal diameter of 2 m and a wall thickness of 10 mm. If the allowable stress both in the longitudinal and circumferential directions is 50 MPa, the safe gauge pressure in MPa is:
(A) 0.5 (B) 2 (C) 10 (D) 50

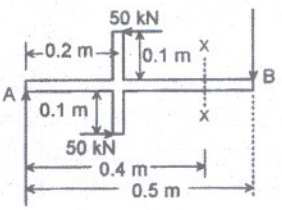
63. The relation between the sagging bending moment (in kN.m) and the distance x (in m) measured from one end of a loaded beam is given by $M = -(x^3/6)-5x^2+500(x/3)$. The magnitude of the intensity of loading in kN/m at x=10 m is:
(A) 10 (B) 15 (C) 20 (D) 25

64. The relation between the bending moment M and the shear force F for a loaded beam, with x measured along the length of the beam, is given by:
(A) $M=dF/dx$ (B) $M=d^2F/dx^2$ (C) $F=dM/dx$ (D) $F=d^2M/dx^2$

65. A simply supported beam with uniformly distributed load has equal overhangs at either end. The ratio of each overhang length to the beam length for the magnitudes of the bending moments at the supports and at the centre of the beam to be equal is about:
(A) one-third (B) one-fourth (C) one-fifth (D) one-sixth

66. A solid of cube shape is subjected to equal tensile stresses along three mutually perpendicular directions parallel to the sides. The strain in each direction is found to be 3×10^{-5}. If the side of the cube is 30 mm, the change in the volume of the solid is:
(A) 10^{-6} (B) 9×10^{-4} (C) 0.09 (D) 0.81

67. A beam loaded as shown in the figure is supported at A and B. With distance measured from the end A, the bending moment at the section XX in kN.m is:
(A) -10 (B) -5
(C) -2 (D) 10



68. The bending moment in the span x=0 to x=0.5L of a beam is 0.5Px. If the beam is supported at x=0 and has maximum deflection at x=0.5L, the deflection at x=0.5L, with usual notation, is:
(A) $PL^3/(16EI)$ (B) $PL^3/(24EI)$ (C) $PL^3/(36EI)$ (D) $PL^3/(48EI)$

69. The two ends of a long metallic strip of thickness 2 mm are bent and clamped together to form a circular ring of mean radius 0.8 m. If the Young's modulus of the material of the strip is 200 GPa, the maximum bending stress in the strip in MPa is:
(A) 200 (B) 250 (C) 450 (D) 500

70. A short concrete column of circular cross-section with diameter D carries a compressive load off-centre from the axis, at a radius R. If the column cannot withstand tensile stress, the maximum permissible value of R is:
(A) $D/64$ (B) $D/32$ (C) $D/16$ (D) $D/8$

71. The bending moment in the span $x=0$ to $x=0.5L$ of a beam is $0.5Px$. If the beam is supported at $x=0$ and has maximum deflection at $x=0.5L$, the slope at $x=0.5L$, with usual notation, is:
(A) $PL^2/(16EI)$ (B) $PL^2/(24EI)$ (C) $PL^2/(36EI)$ (D) $PL^2/(48EI)$

72. The area of the bending moment diagram for a loaded cantilever is 192 square units. The centroid of the diagram is at a distance of 3 units from the free end. If the flexural rigidity is EI, the deflection at the free end in consistent units is:
(A) $1/(576EI)$ (B) $1/(64EI)$ (C) $64/(EI)$ (D) $576/(EI)$

73. A circular shaft transmitting torque has solid cross-section for some length and hollow cross-section for the rest of the length. If subscripts 1 and 2 denote the solid and hollow portions, L is the length, J is the polar moment of inertia and G is the torsional modulus, the twist per unit torque is:
(A) $J_1/(L_1G_1)+J_2/(L_2G_2)$ (B) $G_1/(L_1J_1)+G_2/(L_2J_2)$
(C) $L_1/(J_1G_1)+L_2/(J_2G_2)$ (D) $L_2/(J_1G_1)+L_1/(J_2G_2)$

74. Torque is transmitted to different machines from the two ends of shaft, while the drive torque is applied at an intermediate section. If subscripts 1 and 2 denote the circular shaft portions on either side of the intermediate section, L is the length and J is the polar moment of inertia, the condition for the transmitted torques to be equal is:
(A) $J_1/J_2=(L_1/L_2)^{0.5}$ (B) $J_1/J_2=L_1/L_2$
(C) $J_1/J_2=(L_1/L_2)^2$ (D) $J_1/J_2=(L_1/L_2)^4$

75. Two helical springs of the same material have the same number of coils and the same coil diameter. The wire diameter of the first spring is twice that of the second. The ratio of the deflection of the first spring to that of the second, for the same load, is:
(A) 1/16 (B) 1/8 (C) 8 (D) 16

76. A helical spring undergoes a deflection of 10 mm under a load of 50 kN. A second spring undergoes a deflection of 5 mm for the same load. The stiffness in kN/mm of the series combination of the springs is:
(A) 3.3 (B) 5.0 (C) 10.0 (D) 15.8

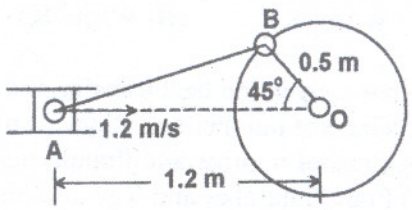
77. In a tension test, a specimen of gauge length 50 mm with original cross-sectional area 120 mm^2 fails at a load of 60 kN. The cross-sectional area at the time of failure is 40 mm^2. The ultimate tensile strength of the material in kN/mm^2 is:
(A) 0.5 (B) 1.5 (C) 2.0 (D) 3.0

78. A truck negotiates a curve of mean radius R. The coefficient of friction between the wheels and the road is μ. If g is the gravitational acceleration and the plane of the road is horizontal, the speed of the truck above which the truck skids is:
(A) $(\mu gR)^{0.25}$ (B) $(\mu gR)^{0.5}$ (C) μgR (D) $(\mu gR)^2$

79. The mean transverse distance between the tyres of a car is 1.2 m and the centre of gravity of the car is 1.6 m above the plane of the road. If, during negotiating a curve at high speed, skidding of the car is preferable to overturning, the coefficient of friction between the tyres and road should be less than:
(A) 0.56 (B) 0.75 (C) 1.33 (D) 1.77

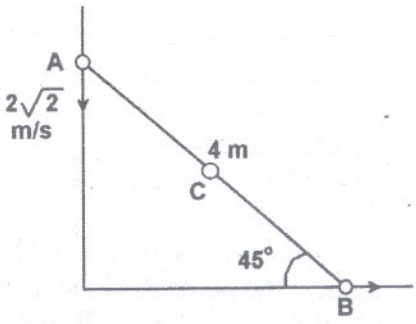
80. A rope fastened to a mass of M kg is passed over a pulley and is drawn such that the mass accelerates upwards with an acceleration of a m/s^2. The gravitational acceleration is g m/s^2. The tension in the rope in N is:
(A) $Mg(g-a)/a$ (B) $Ma(a+g)/g$ (C) $M(a+g)$ (D) $M(a-g)$

81. The figure shows a reciprocating engine mechanism with the required data. The rotational speed of the crank OB in rpm is:



(A) 5 (B) 23
(C) 230 (D) 500

82. In the figure shown, AB is a link of length 4 m, with the ends A and B constrained to move along the vertical and horizontal directions, respectively. If at a certain instant, the velocity of A is $2\sqrt{2}$ m/s downwards as shown, the magnitude of the velocity in m/s of C, which is the mid-point of AB, is:



(A) 1 (B) 2
(C) $2\sqrt{2}$ (D) 4

83. The mean rotational speed of a flywheel of 200 $kg.m^2$ mass moment of inertia is $300/\pi$ revolutions per minute. If the coefficient of speed fluctuation is 5%, the energy fluctuation of the flywheel in kJ is:
(A) 2 (B) 2π (C) $200\,\pi$ (D) 300

84. A vertical screw for raising weights has a single-start square thread, a pitch of 10 mm and a mean diameter of 50 mm. If the coefficient of friction is 0.15, the ratio of the force applied at the mean thread radius to the weight raised is:
(A) 0.055 (B) 0.11 (C) 0.22 (D) 0.44

85. A conical pivot type thrust bearing is in the form of a frustum of a cone with a semi-cone angle of 60° and with the inner and outer radii 100 mm and 200 mm, respectively. The pressure in kPa, considered to be uniform over the bearing surface, when the bearing supports a load of 30 kN, is:
(A) 100.0 (B) 283.7 (C) 300.0 (D) 318.3

86. Two geometrically identical slabs have the same heat flux across their thickness. The thermal conductivity of slab-1 is four times that of slab-2. The ratio of the temperature difference in slab-1 to that in slab-2 is:
(A) 1/4 (B) 1/2 (C) 2 (D) 4

87. LMTD in case of counter flow heat exchanger as compared to parallel flow heat exchanger:
(A) is higher (B) is lower
(C) is the same (D) depends on the area of heat exchanger

88. The units of Stefan-Boltzmann constant are:
(A) $W/(m^2 K)$ (B) $W/(m^4 K)$ (C) $W^2/(m K^4)$ (D) $W/(m^2 K^4)$

89. In free convection heat transfer, the Nusselt number is a function of :
(A) Grashof number and Reynold number
(B) Grashof number and Prandtl number
(C) Prandtl number and Reynold number
(D) Grashoff number, Prandtl number and Reynold number

90. A common process by which food cans are produced is:
(A) blanking (B) spinning (C) deep-drawing (D) machining

91. Typical deformation velocities in m/s in a forging process are of the order of:
(A) 0.005 (B) 0.05 (C) 0.5 (D) 5

92. The true density of a moulding sand is 2650 kg/m^3 and the bulk density is 1600 kg/m^3. The porosity of the moulding sand is:
(A) 0.3 (B) 0.4 (C) 0.5 (D) 0.6

93. The blow holes in a solidified steel ingot are caused by the release of the following gas:
(A) CO (B) CO_2 (C) N_2O (D) NO_2

94. Nitriding of an alloy steel is:
(A) an annealing process (B) a tempering process
(C) a case hardening process (D) a recrystallization process

95. The operation of producing a conical surface at the end of a hole is called:
(A) end cutting (B) countersinking (C) counterboring (D) fractional drilling

96. If the recommended cutting speed to drill a 10 mm hole in a material 25 m/min, then the rotational speed of the drill in revolutions per minute is:
(A) 100 (B) 250 (C) 564 (D) 625

97. A tap is used for producing:
(A) gear teeth (B) internal threads (C) tapered holes (D) square holes

98. The main advantage of a horizontal band saw is:
(A) the good surface finish (B) the smaller amount of heat produced
(C) the minimum wastage of material (D) the minimum maintenance cost

99. The process by which material is removed by feeding a workpiece against a rotating multiple-tooth cutting tool is called:
(A) milling (B) drilling (C) boring (D) reaming

100. With reference to a grinding wheel, the term wheel structure refers to the:
(A) diameter of the wheel (B) spacing of the abrasive grains
(C) thickness of the wheel (D) shape of the wheel

End of the Question Paper

A.E. (Mech)

'R' Series

Answer Key of AEM-

QNO.	ANS	QNO.	ANS	QNO.	ANS	QNO.	ANS
1	D	26	D	51	C	76	A
2	C	27	C	52	A	77	B
3	A	28	D	53	D	78	B
4	B	29	B	54	B	79	B
5	C	30	D	55	B	80	C
6	C	31	B	56	A	81	B
7	B	32	C	57	A	82	B
8	A	33	B	58	D	83	A
9	D	34	A	59	A	84	B
10	C	35	D	60	A	85	D
11	A	36	C	61	D	86	A
12	D	37	D	62	A	87	A
13	B	38	C	63	C	88	D
14	B	39	D	64	A	89	B
15	A	40	A	65	C	90	C
16	D	41	C	66	D	91	D
17	A	42	D	67	C	92	B
18	D	43	A	68	D	93	A
19	C	44	B	69	B	94	C
20	B	45	C	70	D	95	B
21	A	46	A	71	D	96	C
22	C	47	C	72	D	97	B
23	C	48	D	73	C	98	C
24	D	49	B	74	B	99	A
25	C	50	A	75	A	100	B

Verified with original

Cmys