CBCS SCHEME

USN | | | | | | | | | | |

18MAT31

Third Semester B.E. Degree Examination, June/July 2023
Transform Calculus, Fourier Series and Numerical Techniques

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Find $L\left(\frac{\cos at - \cos bt}{t}\right)$. **(06 Marks)**

b. Express the function in terms of unit step function and hence find Laplace transform of

$$f(t) = \begin{cases} \sin t & 0 < t < \frac{\pi}{2} \\ \cos t & \frac{\pi}{2} < t < \pi \end{cases}$$ **(07 Marks)**

c. Solve $y''(t) + 4y'(t) + 3y(t) = e^t$, $y(0) = y'(0) = 1$ by using Laplace transform method. **(07 Marks)**

OR

2 a. Find : (i) $L^{-1}\left(\log\left(\frac{s+b}{s+a}\right)\right)$ (ii) $L^{-1}\left(\frac{s+3}{s^2-4s+13}\right)$ **(06 Marks)**

b. Find $L^{-1}\left(\frac{s}{(s^2+a^2)^2}\right)$ by using convolution theorem. **(07 Marks)**

c. Given $f(t) = \begin{cases} t & 0 < t < a \\ 2a - t & a < t < 2a \end{cases}$

where f(t) = f(t + 2a) then show that $L(f(t)) = \frac{1}{s^2}\tan h\left(\frac{as}{2}\right)$ **(07 Marks)**

Module-2

3 a. Obtain Fourier series for $f(x) = \frac{\pi - x}{2}$, $0 < x < 2\pi$. **(06 Marks)**

b. Find Fourier series for $f(x) = 2x - x^2$, $0 < x < 2$. **(07 Marks)**

c. Find half range Fourier cosine series for

$$f(x) = \begin{cases} x, & 0 < x < \frac{\pi}{2} \\ \pi - x, & \frac{\pi}{2} < x < \pi \end{cases}$$ **(07 Marks)**

OR

4 a. Find Fourier series for $f(x) = |x|$, $-\pi < x < \pi$. **(06 Marks)**

b. Obtain Fourier series for $f(x) = \begin{cases} 0 & -2 < x < 0 \\ 1 & 0 < x < 2 \end{cases}$. **(07 Marks)**

c. Find the Fourier series upto first harmonic from the following table:

x	0	1	2	3	4	5
y = f(x)	4	8	15	7	6	2

(07 Marks)

Module-3

5 a. Find Fourier transform of f(x), given:

$$f(x)=\begin{cases}1, & |x|\le 1\\ 0, & |x|>1\end{cases}$$ and hence deduce that $\int_0^\infty \frac{\sin x}{x}dx=\frac{\pi}{2}$. **(06 Marks)**

b. Find the Fourier cosine transform of

$$f(x)=\begin{cases}4x & 0<x<1\\ 4-x & 1<x<4\\ 0 & x>4\end{cases}$$ **(07 Marks)**

c. Solve $u_{n+2}+4u_{n+1}+3u_n=3^n$, given $u_0=0$, $u_1=1$ using Z - transform. **(07 Marks)**

OR

6 a. Find the Fourier sine transform of $e^{-|x|}$ and hence evaluate $\int_0^\infty \frac{x\sin mx}{1+x^2}dx$. **(06 Marks)**

b. Find Z-transform of $\cos n\theta$ and $a^n\cos n\theta$. **(07 Marks)**

c. Obtain the inverse Z-transform of $\frac{2z^2+3z}{(z+2)(z-4)}$. **(07 Marks)**

Module-4

7 a. Find the value of y at x = 0.1 and x = 0.2 given $\frac{dy}{dx}=x^2y-1$, y(0) = 1 by using Taylor's series method. **(06 Marks)**

b. Compute y(0.1), given $\frac{dy}{dx}=\frac{y-x}{y+x}$, y(0) = 1 taking h = 0.1, by using Runge-Kutta 4th order method. **(07 Marks)**

c. Find the value of y at x = 0.4, given $\frac{dy}{dx}=2e^x-y$ with initial conditions y(0) = 2, y(0.1) = 2.010, y(0.2) = 2.04, y(0.3) = 2.09 by using Milne's predictor and corrector method. **(07 Marks)**

OR

8 a. Using modified Euler's method, find the value of y at x = 0.1, given $\frac{dy}{dx}=-xy^2$, y(0) = 2 taking h = 0.1. **(06 Marks)**

b. Solve $\frac{dy}{dx}=3e^x+2y$, y(0) = 0 at x = 0.1 taking h = 0.1, by using Runge-Kutta 4th order method. **(07 Marks)**

c. Find the value y at x = 0.8 given $\frac{dy}{dx}=x-y^2$ and

x	0	0.2	0.4	0.6
y	0	0.0200	0.0795	0.1762

By using Adam's Bashforth predictor and corrector method. **(07 Marks)**

Module-5

9 a. Solve $\frac{d^2y}{dx^2} = x\left(\frac{dy}{dx}\right)^2 - y^2$ for x = 0.2 given x = 0, y = 1 and $\frac{dy}{dx} = 0$ by using Runge-Kutta method. **(07 Marks)**

b. Derive Euler's equation in the standard form $\frac{\partial f}{\partial y} - \frac{d}{dx}\left(\frac{\partial f}{\partial y'}\right) = 0$. **(06 Marks)**

c. Find the extremal of the function $\int_0^1 [(y')^2 + 12xy]dx$ with y(0) = 0 and y(1) = 1. **(07 Marks)**

OR

10 a. Find the value of y at x = 0.8, given $\frac{d^2y}{dx^2} = 2y\frac{dy}{dx}$ and

x	0	0.2	0.4	0.6
y	1	0.2027	0.4228	0.6841
y′	1	1.041	1.179	1.468

by using Milne's method. **(07 Marks)**

b. Prove that the shortest between two points in a plane is a straight line. **(06 Marks)**

c. Find the curve on which the functional $\int_0^1 [x + y + (y')^2]dx$ with y(0) = 1, y(1) = 2. **(07 Marks)**

* * * * *

CBCS SCHEME

USN | | | | | | | | | | |

18MATDIP31

Third Semester B.E. Degree Examination, June/July 2023
Additional Mathematics - I

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. Express the complex number $\frac{(3+i)(1-3i)}{2+i}$ in the form x + iy. Also find its magnitude. **(06 Marks)**

b. Find the cube roots of ℓ - i and represent them in an argand plane. **(07 Marks)**

c. If $\vec{a} = 2\hat{i} + 3\hat{j} - 4\hat{k}$ and $\vec{b} = 8\hat{i} - 4\hat{j} + \hat{k}$ then show that $\vec{a}$ is perpendicular to $\vec{b}$, also find $|\vec{a} \times \vec{b}|$. **(07 Marks)**

OR

2 a. Find the modulus and amplitude of 1 – cos α + i sin α. **(06 Marks)**

b. If $\vec{a} = \hat{i} + \hat{j} - \hat{k}$; $\vec{b} = 2\hat{i} - \hat{j} + 2\hat{k}$ and $\vec{c} = 3\hat{i} - \hat{j} - \hat{k}$, find

i) $\vec{a} \cdot (\vec{b} \times \vec{c})$ ii) $\vec{b} \times (\vec{a} \times \vec{c})$. **(07 Marks)**

c. Prove that $[\vec{a} \times \vec{b}, \vec{b} \times \vec{c}, \vec{c} \times \vec{a}] = [\vec{a}\ \vec{b}\ \vec{c}]^2$. **(07 Marks)**

Module-2

3 a. Using Maclaurin's series, prove that $\sqrt{1+\sin 2x} = 1 + x - \frac{x^2}{2} - \frac{x^3}{6} + \frac{x^4}{24} - - - -$. **(06 Marks)**

b. If $u = \tan^{-1}\left(\frac{x^3+y^3}{x-y}\right)$, prove that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = \sin 2u$. **(07 Marks)**

c. If u = 1 – x , v = x(1-y) , w = xy(1-z), find $\frac{\partial(u,v,w)}{\partial(x,y,z)}$. **(07 Marks)**

OR

4 a. Obtain the Maclaurin's expansion of the function $\log(1 + e^x)$. **(06 Marks)**

b. If u = f(x-y , y-z , z-x), Prove that $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} + \frac{\partial u}{\partial z} = 0$. **(07 Marks)**

c. If u = x + y + z , w = y + z , z = uvw, find $\frac{\partial(x,y,z)}{\partial(u,v,w)}$. **(07 Marks)**

Module-3

5 a. A particle moves along a curve C with parametric equations $x = t - \frac{t^3}{3}$, $y = t^2$ and $z = t + \frac{t^3}{3}$, where t is the time. Find the velocity and acceleration and any time t and also find their magnitudes at t = 3. **(06 Marks)**

b. Find div $\vec{F}$ and Curl $\vec{F}$, where $\vec{F} = \nabla(x^3 + y^3 + z^3 - 3xyz)$. **(07 Marks)**

c. Find the directional derivative of $\phi = x^2yz^3$ at (1, 1, 1) in the direction of $\hat{i} + \hat{j} + 2\hat{k}$. **(07 Marks)**

OR

6 a. Show that the vector field $\vec{F} = yz\,\hat{i} + xz\,\hat{j} + xy\,\hat{k}$ is solenoidal vector field. **(06 Marks)**

b. If $\vec{F} = (x + y + 1)\,\hat{i} + \hat{j} - (x + y)\,\hat{k}$, show that $\vec{F} \cdot \text{curl } \vec{F} = 0$. **(07 Marks)**

c. Find the constants a , b , c such that $\vec{F} = (x + y + az)\,\hat{i} + (x + cy + 2z)\,\hat{k} + (bx + 2y - z)\,\hat{j}$ is irrotational. **(07 Marks)**

Module-4

7 a. Obtain the Reduction formula for $\int_0^{\pi/2} \cos^n x\, dx$. **(06 Marks)**

b. Evaluate $\int_0^1 \int_x^{\sqrt{x}} (x^2 + y^2)\, dy\, dx$. **(07 Marks)**

c. Evaluate $\int_0^1 \int_0^1 \int_0^1 (x + y + z)\, dx\, dy\, dz$. **(07 Marks)**

OR

8 a. Evaluate $\int_1^2 \int_0^{3-y} xy\, dx\, dy$. **(06 Marks)**

b. Evaluate $\int_0^1 \int_0^1 \int_0^1 e^{x+y+z}\, dx\, dy\, dz$. **(07 Marks)**

c. Obtain the Reduction formula $\int \sin^m x \cos^n x\, dx$. **(07 Marks)**

Module-5

9 a. Solve : $(x^2 + y)\, dx + (y^3 + x)\, dy = 0$. **(06 Marks)**

b. Solve : $x \log x \dfrac{dy}{dx} + y = 2 \log x$. **(07 Marks)**

c. Solve : $\dfrac{dy}{dx} + \dfrac{y}{x} = y^2 x$. **(07 Marks)**

OR

10 a. Solve : $y e^y\, dx = (y^3 + 2x e^y)\, dy$. **(06 Marks)**

b. Solve : $(x^2 - y^2)\, dx = 2xy\, dy$. **(07 Marks)**

c. Solve : $[1 + (x + y) \tan y] \dfrac{dy}{dx} + 1 = 0$. **(07 Marks)**

* * * * *

CBCS SCHEME

USN | | | | | | | | | | |

18ME32

Third Semester B.E. Degree Examination, June/July 2023
Mechanics of Materials

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Explain with neat sketch, stress-strain diagram of mild steel indicating it's salient points. **(06 Marks)**

b. Define : (i) Hooke's law (ii) Modulus of rigidity (iii) Volumetric strain (iv) Poisson's ratio **(04 Marks)**

c. A steel bar ABCD of varying sections is subjected to axial forces as shown in Fig. Q1 (c). Find the value of 'P' necessary for equilibrium. If E = 210 kN/mm^2, determine
(i) Stress in various segments
(ii) Total elongation of bar
(iii) Total strain in the bar.

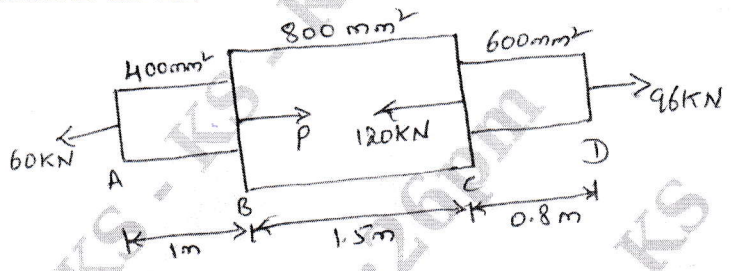

Fig. Q1 (c) **(10 Marks)**

OR

2 a. Derive a relation between young's modulus (E) and modulus of rigidity (G). **(10 Marks)**

b. A composite bar shown in Fig. Q2 (b) is 0.2 mm short a distance between the rigid supports at room temperature. What is maximum temperature rise which will not produce stress in the bar? Find stresses induced when temperature rise is 40 °C. Given $\alpha_s = 12\times10^{-6}$ per °C, $\alpha_C = 17.5\times10^{-6}$ per °C, $E_S = 2\times10^5$ N/mm^2, $E_C = 1.2\times10^5$ N/mm^2, $A_S : A_C = 4 : 3$

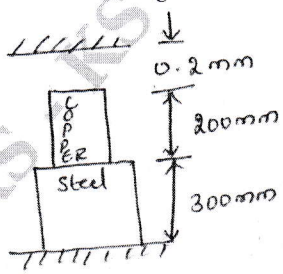

Fig. Q2 (b) **(10 Marks)**

Module-2

3 a. Derive an expression for normal stress, shear stress and resultant stress on an oblique plane inclined at an angle 'θ'. With vertical axis (x-plane) in a bi-axial stress system subjected to σ_1 and σ_2 also find angle of obliquity ϕ. **(10 Marks)**

b. A point in a strained material, the stress on two planes at right angles to each other are 80 N/mm^2(tensile) and 40 N/mm^2 (tensile). Each of above stresses is accompanied by a shear stress of 60 N/mm^2. Determine (i) Normal stress, shear stress and resultant stress on an oblique plane inclined at an angle of 45° to the axis of minor tensile stress. Also find major principal stress , minor principal stress and their location, maximum shear stress and its location.

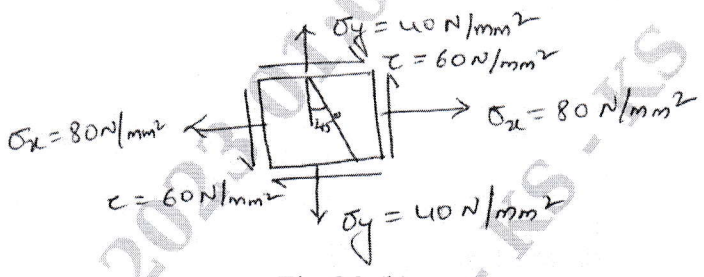

Fig.Q3 (b) **(10 Marks)**

OR

4 a. Derive expression for hoop stress and longitudinal stress for thin cylinder subjected to internal fluid pressure. **(10 Marks)**

b. A thick cylindrical pipe of outside diameter 300 mm and internal diameter 200 mm is subjected to an internal fluid pressure of 20 N/mm^2 and external fluid pressure of 5 N/mm^2. Determine the maximum hoop stress developed. Draw the variation of hoop stress and radial stress across the thickness indicating the values at every 25 mm interval. **(10 Marks)**

Module-3

5 a. Deduce the relationship between relating load (W), Shear Force (F) and Bending moment (M). **(06 Marks)**

b. For the beam shown in Fig. Q5 (b), draw SFD and BMD. Locate the point of contraflexure, if any.

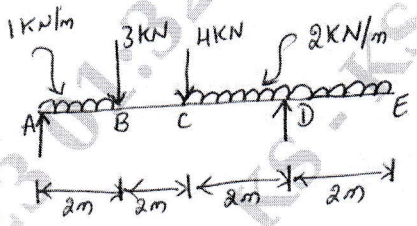

Fig. Q5 (b) **(14 Marks)**

OR

6 a. Prove that in case of a rectangular section of a beam the maximum shear stress is 1.5 times the average shear stress. **(08 Marks)**

b. A beam of an I-section consists of 180mm ×15mm flanges and a web of 280 mm depth ×15 mm thickness.
It is subjected to a bending moment of 120 kN-m and a shear force of 60 kN. Sketch the bending and shear stress distributions along the depth of the section.

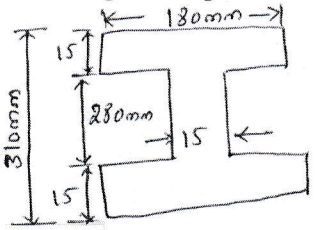

Fig. Q6 (b) **(12 Marks)**

Module-4

7 a. Write a note on the following :
(i) The maximum principal stress theory.
(ii) The maximum shear stress theory. **(08 Marks)**

b. A solid circular shaft is subjected to a bending moment of 9000 Nm and a twisted moment of 12000 Nm. In a simple uniaxial tensile test of the same material, it gives the following particulars. Stress at yield point 300 N/mm^2. Assume factor of safety = 3. Estimate the least diameter required using, (i) Maximum principal stress theory
(ii) Maximum shear stress theory. **(12 Marks)**

OR

8 a. Derive the torsion equation with usual notation $\frac{T}{J} = \frac{G\theta}{L} = \frac{\tau}{R}$. State the assumption made in the derivation. **(10 Marks)**

b. A solid circular shaft has to transmit a power of 1000 kW at 120 rpm. Find the diameter of the shaft, if the shear stress of the material must not exceed 80 N/mm^2. The maximum torque 1.25 times of its mean. What percentage of saving in material would be obtained, if the shaft is replaced by a hollow one whose internal diameter is 0.6 times its external diameter, the length, material and maximum shear stress being same? **(10 Marks)**

Module-5

9 a. State the assumption made while deriving Euler's column formula. Also derive Euler's expression of buckling load, for column with both ends fixed. **(10 Marks)**

b. A 1.5 m long columns has a circular cross section of 50 mm diameter. One of the ends of the column is fixed in direction and position and other end is free. Taking factor of safety as 3. Calculate the safe load using :

(i) Rankine's formula, take yield stress $\sigma_c = 560$ N/mm^2 and $\alpha = \frac{1}{1600}$ for pinned ends.

(ii) Euler's formula, young's modulus for CI = 1.2×10^5 N/mm^2 **(10 Marks)**

OR

10 a. Explain the following :
(i) Castigliano's Ist and IInd theorem.
(ii) Strain energy due to bending and torsion
(iii) Strain energy due to shear. **(15 Marks)**

b. The bar with circular cross section as shown in Fig. Q10 (b) is subjected to a load of 10 kN. Determine the strain energy stored in it. Take E = 2.1×10^5 N/mm^2.

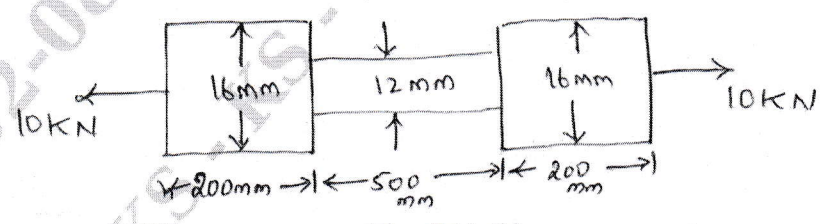

Fig. Q10 (b) **(05 Marks)**

* * * * *

CBCS SCHEME

USN | | | | | | | | | | |

18ME33

Third Semester B.E. Degree Examination, June/July 2023
Basic Thermodynamics

Time: 3 hrs. Max. Marks: 100

Note: 1. ***Answer any FIVE full questions, choosing ONE full question from each module.***
2. ***Use of Thermodynamics handbook is permitted.***

Module-1

1 a. Define the following :
i) Closed system ii) Open system iii) Isolated system iv) Thermodynamics state **(08 Marks)**

b. State the Zeroth law of Thermodynamic and briefly explain its significance. **(04 Marks)**

c. The reading t_A and t_B of two Celsius thermometers A and B agree at the ice point (0°C) and the steam point (100°C) and are related by the equations $t_A = \ell + mt_B + t_B^2$. Between these two point ℓ, m, n are constants. When both are immersed in an oil bath. A indicates 55°C and B indicates 50°C. Determine the value of ℓ, m, n and also find the reading on A if B reads 25°C. **(08 Marks)**

OR

2 a. Mention the characteristics of thermodynamic properties. **(04 Marks)**

b. Classify the differences between microscopic and macroscopic approaches. **(06 Marks)**

c. The temperature t on a certain Celsius thermometer scale is given by means of a property through a relations $t = a \ln(P) + b$ where a and b are constant P is the property of the fluid. If, at the ice point and steam points the values of P are found to be 4 and 20 respectively. What will be temperature reading corresponding to a reading of P = 16? **(10 Marks)**

Module-2

3 a. List the difference between work and heat. **(06 Marks)**

b. Explain the path function and point functions. **(06 Marks)**

c. A stationary mass of a gas is compressed in a friction less way from 1 bar and $0.1m^3$ to 5 bar and $0.03m^3$. Assuming that the pressure and volume are related by Pr^n = constant, find the workdone on the gas. **(08 Marks)**

OR

4 a. Show that energy is a property of system. **(06 Marks)**

b. Derive the steady flow energy equations [SFEE] for a single stream of fluid entering and a single stream of fluid leaving the control volume. **(06 Marks)**

c. Air flows steadily through a rotary compressor. At entry the air is 20°C and 101KPa at exit the some air is at 200°C and 600KPa. Assuming the flow to be adabatic i) Evaluate the work done per unit mass of air if the velocities at inlet and exit are negligible ii) What would be the increase in work input if the velocities at inlet and exit are 50m/s and 110m/s. **(08 Marks)**

Module-3

5 a. State the limitation of first law of thermodynamics illustrate with example. **(04 Marks)**

b. State the Kelvin – Planks and Claudius statement of the second law of thermodynamics and prove their equivalence. **(08 Marks)**

c. A reversible heat engine operates between two reservoirs at temperature of 600°C and 40°C the engine drives a reversible refrigerator, which operates between 40°C and 20°C. The heat transfer to the engine is 2000kJ and network output from combined engine and refrigerator system is 360kJ. Calculate heat transfer and net heat transfer to the reservoir at 40°C. **(08 Marks)**

OR

6 a. State and prove Clasius inequality. **(06 Marks)**

b. Show that entropy is a property. **(06 Marks)**

c. $1.2m^3$ of air is heated reversibly at constant pressure from 300K and 600K and is then cooled reversibly at constant volume back to initial temperature. If the initial pressure is 1 bar, calculate net heat flow and overall change in entropy. Also represent the processes on T-S diagram. Take $C_p = 1.005kJ/Kg\ K$ and $R = 0.287kJ/Kg\ K$. **(08 Marks)**

Module-4

7 a. Explain briefly available and unavailable energies referred to a cyclic process. **(04 Marks)**

b. Derive an expression for available energy from a finite energy source at temperature T_1 when the surrounding temperature is T_0. **(08 Marks)**

c. A Carnot engine works between the temperature limits of 225°C and 25°C in which water issued as the working fluid, if heat is supplied to the saturated liquid water at 225°C until it is converted into saturated Vapoun, determine per Kg of water.

i) The amount of heat absorbed by the fluid
ii) The available energy
iii) The unavailable energy. **(08 Marks)**

OR

8 a. Draw a neat sketch of throttling calorimeter and explain how dryness fraction of steam is determined. Clearly explain its limitations. **(10 Marks)**

b. Define the following :
i) Triple point ii) Critical temperature iii) Dryness fraction iv) Saturation temperature v) Pure substances. **(10 Marks)**

Module-5

9 a. State and explain Amagat's law and Dalton's law of partial pressures. **(06 Marks)**

b. A tank of $0.1m^3$ capacity contains 1Kg of O_2, 0.9Kg of N_2, 1.5Kg CO_2, and 0.1 Kg of CO at 30°C. Determine :
i) The total pressure ii) Mole fractions of each gas iii) Gas constant "R" and Molecular weight M of the mixture. **(06 Marks)**

c. A gas mixture consists of 0.5Kg of Carbon monoxide and 1Kg of CO_2. Determine :
i) Mass fractions ii) Mole fraction of each component iii) The Avg. Molecular weight iv) the Gas constant of the mixture. **(08 Marks)**

OR

10 i) Compressibility factor
ii) Law of corresponding
iii) Compressibility chart
iv) Vender Waals equations of state
v) Beattie Bridge Man- equations. **(20 Marks)**

* * * * *

CBCS SCHEME

USN | | | | | | | | | | |

18ME34

Third Semester B.E. Degree Examination, June/July 2023
Material Science

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. Draw the neat sketch of BCC and FCC structure and also find the APF of both the structure. **(10 Marks)**

b. Explain points defects and Edge dislocation with necessary diagrams. **(10 Marks)**

OR

2 a. Explain linear and non-linear behavior of elastic properties of materials. **(10 Marks)**

b. Explain slip and twinning. **(05 Marks)**

c. Explain mechanisms of strengthening in metals. **(05 Marks)**

Module-2

3 a. Draw the S – N diagram for fatigue failure also explain mechanism of fatigue failure. **(10 Marks)**

b. Draw the creep curve and explain the different stages of creep curve. **(10 Marks)**

OR

4 a. Explain the rule of Hume – Rothery to form the substitutional solid solution. **(10 Marks)**

b. Draw the Iron carbon diagram and mark all the phases on it also explain ferrite and austenite structure. **(10 Marks)**

Module-3

5 a. Draw the T – T – T diagram and superimpose CCT diagram on it. Explain these two diagrams importance. **(10 Marks)**

b. Explain Annealing, normalizing and tempering process. **(10 Marks)**

OR

6 a. Explain austempering and martempering processes with neat diagrams. **(10 Marks)**

b. Explain carburizing, cyaniding and nitriding processes **(10 Marks)**

Module-4

7 a. Classify the composite based on matrix and reinforcement. Explain brief about the matrix and reinforcement. **(10 Marks)**

b. Any two methods of production of PMCs. **(10 Marks)**

OR

8 a. Any two methods of production CMCs. **(10 Marks)**

b. State the advantage and applications of composites. **(10 Marks)**

Module-5

9 a. Explain any two processing of plastics. **(10 Marks)**

b. Write note on thermal and optical material - IS **(10 Marks)**

OR

10 a. Explain shape memory alloys and fiber optic materials. **(10 Marks)**

b. Explain any two ceramics processing methods. **(10 Marks)**

* * * * *

CBCS SCHEME

USN | | | | | | | | | | |

18ME35A/MEA305

Third Semester B.E. Degree Examination, June/July 2023
Metal Cutting and Forming

Time: 3 hrs. Max. Marks: 100

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1 a. Differentiate between orthogonal and oblique cutting. **(04 Marks)**

b. Derive an expression for chip thickness ratio interm of rake angle for orthogonal cutting. **(10 Marks)**

c. In orthogonal turning of a steel bar of 65mm diameter on lathe a feed of 0.8mm was used. A continuous chip of 1.4 mm thickness was removed at rotational speed 85rpm of the work. Calculate the chip thickness ratio, chip reduction ratio and total length of the chip removed in one minute. **(06 Marks)**

OR

2 a. With a neat sketch, explain the construction of turret Lathe **(10 Marks)**

b. Explain the nomenclature of single point cutting tool. **(10 Marks)**

Module-2

3 a. Explain the construction of Horizontal milling machine with a neat sketch. **(10 Marks)**

b. Explain the following drilling operations with a neat sketch
i) Boring ii) Reaming iii) Counter sinking iv) Spot facing. **(10 Marks)**

OR

4 a. Explain the construction of shaping machine with a neat sketch. **(10 Marks)**

b. With a neat sketch, explain the construction and operation of centerless type grinding machine. **(10 Marks)**

Module-3

5 a. Explain tool wear mechanisms. **(08 Marks)**

b. Explain the function of cutting fluids. **(06 Marks)**

c. Explain the effect of machining parameters on surface finish. **(06 Marks)**

OR

6 a. Explain Tylor's tools life equation and tool failure criteria. **(10 Marks)**

b. Explain choice of cutting speed and feed for maximum tool life. **(05 Marks)**

c. A tool life of 80 minutes obtained at a speed of 30mpm and 8 minutes at 60mpm. Determine the tool life equation. **(05 Marks)**

Module-4

7 a. Explain the classification of forming process. **(06 Marks)**
b. Explain the typical forging defects. **(06 Marks)**
c. Explain with neat sketch the operation and working of double acting steam hammer. **(08 Marks)**

OR

8 a. With a neat sketch, explain different types of rolling mills. **(10 Marks)**
b. With a neat sketch, explain wire drawing operation. **(05 Marks)**
c. Explain with a neat sketch direct and indirect extrusion processes. **(05 Marks)**

Module-5

9 a. Define the following :
i) Blanking ii) Punching iii) Piercing iv) Drawing v) Drawing ratio. **(10 Marks)**
b. With a neat sketch, explain progressive die. **(10 Marks)**

OR

10 a. Explain compound and combination die with a neat sketches. **(10 Marks)**
b. Define the following :
i) Bending allowance ii) Angle of bend iii) Bending force. **(10 Marks)**

* * * * *

USN | | | | | | | | | | |

Question Paper Version : A

Third/Fourth Semester B.E Degree Examination, June/July 2023
Constitution of Indian, Professional Ethics and Cyber Law
(COMMON TO ALL BRANCHES)

Time: 2 hrs.] [Max. Marks: 100

INSTRUCTIONS TO THE CANDIDATES

1. Answer all the hundred questions, each question carries **ONE mark**.
2. Use only **Black ball point pen** for writing / darkening the circles.
3. **For each question, after selecting your answer, darken the appropriate circle corresponding to the same question number on the OMR sheet.**
4. Darkening two circles for the same question makes the answer invalid.
5. **Damaging/overwriting, using whiteners** on the **OMR** sheets are strictly prohibited.

---

1. The constitution of India was enacted by a constitution assembly set up,
   a) Union Cabinet mission plan 1946.
   b) Under Indian Independence Act 1947
   c) Under resolution of provincial government.
   d) By Indian National Congress.

2. On December 11, 1946 the Constituent Assembly elected _____ as its permanent chairman.
   a) Jawaharlal Nehru
   b) Dr. Rajendra prasad
   c) Dr. B. R. Ambedkar
   d) K. M. Munshi

3. The drafting committee of the constitution including the chairman comprised of,
   a) 7 members
   b) 9 members
   c) 11 members
   d) 5 members

4. The constitution of India is,
   a) Rigid
   b) Flexible
   c) Partly rigid partly flexible
   d) Very very rigid

5. The preamble of constitution declares India to be,
   a) Sovereign democratic republic
   b) Socialist democratic republic
   c) Sovereign, Socialist, Secular democratic and Republic
   d) None of these

6. In which case did the supreme court give a ruling preamble was part of the constitution.
   a) Berubari case
   b) Golaknath case
   c) Keshavananda Bharathi case
   d) None of these

7. What is the chief source of political powers in the country?
   a) The constitution
   b) The people
   c) The legislature
   d) The parliament

8. The original constitution classified. The "Fundamental Rights" into seven categories but now there are.
   a) 4 categories
   b) 5 categories
   c) 6 categories
   d) 7 categories

9. Which one of the following fundamental Right was described by Dr.B.R. Ambedkar as "the heart and soul of constitution".
   a) Right to Equality
   b) Right to constitutional Remedies
   c) Right to Freedom
   d) Right to Religion

10. The main objective of cultural and educational right granted to the citizens is,
   a) To preserve rich cutlture and heritage of India.
   b) To evolve single integrated Indian culture
   c) To help minorities to conserve their culture.
   d) All the above

11. For enforcement of fundamental Right the court can issue,
   a) A Decree
   b) An ordinance
   c) A writ
   d) A notification

12. Which of the following literally means you may have the body,
   a) A Mandomus
   b) Habeaus corpus
   c) Prohibition
   d) Quo-warranto

13. "Equal work for equal pay" is a
   a) Fundamental Right
   b) Directive principle
   c) Fundamental duty
   d) Statutory provision is labour law

14. 73rd and 74th amendment is pertaining to
   a) Stalehood of Goa
   b) Extention of reservation to SC and ST
   c) Local self government
   d) Land reforms

15. The enforcement of Directive principles depends upon,
   a) The resources available with the Government
   b) The president
   c) The Court
   d) Chief justice of India

16. Common Civil code means,
   a) Common civil procedure code
   b) Common civil law applicable to all
   c) Civil law applicable to common man
   d) None of the above

17. The concept of DPSP is borrowed from the constitution of,
   a) Ireland
   b) Russia
   c) Great Britain
   d) USA

18. The constitution of India adopted fundamental duty from,
a) America b) Russia c) Ireland d) Britain

19. Fundamental duties did not form to be original part of Indian constitution they were added under _____ amendment.
a) 42nd Amendment Act b) 44th Amendment Act
c) 86th Amendment Act d) None of these

20. At present how many "Fundamental duties" are their in the constitution of India.
a) 6 duties b) 8 duties c) 10 duties d) 11 duties

21. Article 370 which gave special status to Jammu and Kashmir existed in the Indian constitution because of the agreement between,
a) Jawaharlal and Farukh Abdullah b) Jawaharlal and Maharaja Hari sing
c) Vallabh bhai Patel and Maharaj Harising d) Mohammed Ali Jinnah and J.L.Nehru

22. Which is the Indian constitution day?
a) Jan-26 b) August-15 c) November-26 d) April-20

23. Legislate means,
a) Make law b) Make constitutional amendment
c) Form government d) Put administrative machinery into action

24. The Parliamentary form of government in India is based on,
a) Great Britain b) Japan c) Russia d) France

25. What is the system used to elect the president of India?
a) Preferential system b) Secret Ballot
c) Direct election d) Proportional representation

26. Who discharge the duty of the president in the event of president and vice president being not available?
a) The prime minister b) The chief justice of India
c) The speaker of lok sabha d) Vice president

27. Who represents the nation but does not rule the nation?
a) President b) Attorney general c) Chief Justice of India d) Vice President

28. Which one of the following house is presided by a non member?
a) Rajya Sabha b) Lok Sabha c) Vidhana Sabha d) Vidhana parishad

29. Respite means,
a) Painless death b) Death due to drowning
c) Due to stragulation d) awarding lesser punishment

30. The total number of union council of minister including the prime minister shall not exceed.
a) 10% of loksabha strength b) 15% of loksabha strength
c) 18% of loksabha strength d) no such restriction

31. Uni-Cameral means,
a) Presence of no house in the state
b) Presence of one house in the state
c) Presence of two house in the state
d) Present of half house in the state

32. The age qualification for becoming the member of Rajya Sabha and Lok Sabha is,
a) 25 yrs and 30 yrs
b) 30 yrs and 25 yrs
c) 35 yrs and 30 yrs
d) 30 yrs and 40 yrs

33. The state legislative Assembly is prorogued by,
a) Governor
b) Chief minister
c) Speaker of assembly
d) Chief justice of High court

34. Which of the following statement is not correct?
a) Money bill cannot be introduced in legislative council
b) The money bill is presented by chief minister of the state
c) The legislative council has no right to change the money bill
d) All of the above

35. Power of the supreme court to decide the dispute between the centre and the state fall under its,
a) Constitutional jurisdiction
b) Appellate jurisdiction
c) Advisory jurisdiction
d) Original jurisdiction

36. The High court judge unless resign earlier retire at the age of,
a) 58 years
b) 60 years
c) 62 years
d) 65 years

37. A bill presented in the parliament becomes law.
a) If passed by both the houses
b) The prime minister has signed it
c) The supreme court has decided or declared it.
d) When the president gives his assent

38. The judges of Supreme Court after retirement are not permitted to carry on practice before.
a) Supreme Court of India
b) High Court
c) District and Session Court
d) Any of these

39. One third of Rajya Sabha member retires,
a) Every year
b) Every two year
c) Every three years
d) Every four years.

40. Which among following is not a standing committee?
a) Public Committee
b) Ethics Committee
c) Railway convention Committee
d) Business advisory Committee

41. Election to the local self government is conducted by,
a) State Election Commission
b) Regional EC
c) Election commission
d) Governor

42. The citizens of India have got a right to cast his vote after attaining the age of _____ years.
a) 16 years
b) 18 years
c) 21 years
d) 24 years

43. Election to Loksabha and Legislative Assembly in India are conducted on the basis of,
a) Single transferable vote
b) Proportional representation
c) Limited Suffarage
d) Audult franchise

44. The Election Commissioner hold office till,
a) For 5 years
b) For 6 years
c) During the pleasure of president
d) 6 years or 65 years whichever is early

45. This is not a ground to declare National Emergency.
a) Internal disturbance
b) War
c) External agression
d) Armed rebellion

46. How many times has a National Emergency has been declared so far?
a) Once
b) Twice
c) Thrice
d) Never

47. Break down of constitutional machinery in a state is popularly known as,
a) State Emergency
b) National Emergency
c) Financial Emergency
d) All of these

48. When National Emergency declared, the following Fundamental Right is suspended.
a) Right to Equality (Art 14)
b) Title (Art 18)
c) Right to Freedom (Art 19)
d) Right to life (Art 21)

49. Which type of emergency has not yet declared till now?
a) National Emergency
b) State Emergency
c) Financial Emergency
d) None of these

50. Who is considered to be a Vulnerable group?
a) Women and Children
b) SCs
c) STs
d) All of these

51. How many members will be nominated by President / Governor from Anglo Indian community?
a) 2 / 1
b) 1 / 2
c) 3 / 2
d) 2 / 3

52. Seats for SCs and STs are not reserved in,
a) Lok Sabha
b) Legislative Assembly
c) Rajya Sabha
d) All of these

53. Which of the Constitutional amendment reduced the voting right from 21 years to 18 years?
a) 54th Amendment
b) 36th Amendment
c) 62th Amendment
d) 61st Amendment

54. Which of the following amendment Act makes the Right to education as the fundamental right to all the children under the age of 6 to 14 years by inserting Art 21A to the constitution.
a) 86th Amendment Act 2002
b) 87th Amendment Act 2003
c) 88th Amendment Act 2003
d) 89th Amendment Act 2003

55. Which of the following amendment was passed during the emergency?
a) 42nd Amendment Act b) 44th Amendment Act
c) 47th Amendment Act d) 50th Amendment Act

56. In how many ways the constitutional amendments in India can take place?
a) 2 b) 3 c) 4 d) 5

57. The 7th Amendment of Indian constitution was done to implement recommendations of state on the basis of,
a) linguistic b) Religion c) Population d) All of these

58. Which constitutional Amendment is done to pass the GST bill?
a) 101st b) 120th c) 122nd d) 115th

59. The Ninety fourth Amendment of the constitution of India made provision for the appointment of minister in charge of tribal welfare in the state of,
a) Bihar b) Chattisgarh and Jarkhand
c) Madya Pradesh d) All the above

60. The 10th Amendment of the constitution of India Act 1961 incorporated _____ as seventh union territory of India.
a) Dadar & Nagar Haveli b) Daman & Diu
c) Andaman & Nicobar d) None of these

61. Engineering ethics is,
a) Scientifically developed ethics b) Preventive ethics
c) Developing ethics d) Natural ethics

62. A Fault tree is used to,
a) Improve safety b) Take free consent
c) Claim compensation d) Assess the risk involved

63. One of the characteristic of profession is
a) It demands hard work b) It is based on honesty
c) It is having taught competation d) usually its is having monopoly

64. One of impediment to responsibility is,
a) Rampant corruption at higher level b) Self defection
c) Interference by higher officers d) Interference by politicians

65. Good work means,
a) Superior work done with great care and skill
b) Work above and beyond the call of duty.
c) Responsible work
d) Work involving high risk

66. "Egocentric tendencies" means
a) Interpreting situation from limited view b) Superior complex
c) Arrogant and irresponsible behaviour d) habit of condemning the view of other

67. Tight couple means,
a) Erecting two pillars side by side
b) binding two beam tightly
c) Process tightly coupled
d) strong adhesive material

68. Lying is,
a) intentionally conveying false or misleading information
b) deception
c) False hood
d) None of these

69. Trimming is,
a) Smoothing of irregularities to make the data appear accurate and precise
b) Retaining the entire data
c) Consolidating the data
d) None of these

70. As applies to responsibility avoiding blame or being safe is the prime concern in,
a) Minimalistic approach
b) Considerable view
c) Good work view
d) Resonable care view

71. It is not a kind of trade mark.
a) symbols
b) designs
c) good will
d) sounds

72. Conflicts of interest may be,
a) potential
b) false
c) created
d) imaginary

73. The owner of patent right retains his patent right for _____ years.
a) 20 b) 50 c) 75 d) 100

74. _____ protects the expression of the Ideas but not the ideas themselves is,
a) Plagiarism b) Patent c) Copy right d) Trade mark

75. Risk estimation can be done by,
a) Cooking b) Trimming c) Event tree d) None of these

76. A compound measure of the probability and magnitude of adverse effect is known as,
a) benefit b) risk c) accident d) compensation

77. The formula for MTR sambar masala is example of,
a) Patent b) Copy right c) Trade mark d) Trade secret

78. Purpose of professional code is to,
a) Guide themselves
b) Educate the members
c) Discipline the members
d) All of these

79. What does NSPE stands for,
a)National science professional engineers
b) National society of professional engineers
c)National science personal ethics
d) National society of professional educator

80. The obligation and prerogatives associated with a specific role is referred to as,
a) duty b) responsibility c) role morality d) none of these

81. The first publicity available internet service in India was launched by _____ on 15th August 1995.
a) Bharath Sanchar Nigam limited
b) Videsh Sanchar Nigam limited
c) Indian Institute of technology
d) None of these

82. Which is the Act which provides legal frame work for e-Governance in India?
a) Indian Penal Code
b) IT (amendment) Act 2008
c) IT Act 2000
d) None of these

83. Which of the following is an example of Intellectual property?
a) Trade mark b) Copy right c) Patent d) All of the these

84. Which is the appeal court on the orders issued by cyber appealate tribunal?
a) Munciff court b) District court c) High court d) Supreme court

85. What are the types of cyber terror capability?
a) Simple unstructured
b) Simple unstructured and Advanced structured
c) Complex co-ordinated
d) Simple unstructured, Advanced structured, Complex co-ordinated

86. The mechanism for establishing net neutrality in India are at present mainly enforced by the,
a) Telecom Regulatory Authority of India (TRAI)
b) Bharatiya Sanchar Nigam Ltd. (BSNL)
c) Videshi Sanchar Nigam Ltd. (VSNL)
d) All the above

87. An attempt to harm damage or cause threat to a system or network is broadly termed as,
a) Cyber crime b) System hijacking c) Cyber attack d) Digital crime

88. Criminal minded individuals who work for terrorist organization and stean information if nation are,
a) State sponspored hackers
b) Cyber terrorist
c) Blue hat hackers
d) White hat hackers

89. Cyber crimes can be classified into,
a) 2 b) 3 c) 4 d) 5

90. What is the updated version of IT Act 2000?
a) IT Act 2007
b) IT Act 2008
c) Advanced IT Act 2002
d) Advanced IT Act 2001

91. TRAI has ruled in favour of,
a) Net neutrality b) Airtel zero c) Free basics d) None of the these

92. Which of the following is not a type of cyber crime,
a) Data theft
b) Forgery
c) Damage to Data and System
d) Installing antivirus for protection

93. The imaginary location where the word of the parties meet in conversation is referred to as,
a) cyber space b) Cyber net c) Space d) Cyber dyne

94. Nitizen means,
a) A person who is citizen of a country
b) A person who has dual citizenship
c) A person who uses internet
d) None of these

95. What is the punishment for hacking of computers?
a) Three years imprisonment or 10 lac rupees or both
b) Life imprisonment
c) Three lac rupees or 3 years imprisonment
d) Three years imprisonment or 5 lac rupees penalty or both

96. What is the proposed punishment for cyber Terrorism in IT Act?
a) 1 crore rupees penalty
b) Life imprisonment
c) 10 years imprisonment
d) 6 years imprisonment

97. What is the term of office of the presiding officer of cyber appellate tribunal?
a) 3 years
b) 4 years
c) 5 years
d) 6 years

98. What is the full form of ITA 2000?
a) Information tech act 2000
b) Indian technology act 2000
c) International technology act 2000
d) Information technology Act 2000

99. The first computer virus is,
a) I love you
b) Blaster
c) Sasser
d) Creeper

100. Who is usually against net neutrality,
a) Content providers
b) Consumers / end users
c) telecom companies
d) All of these

* * * * *