CBCS SCHEME

USN

17MAT31

Third Semester B.E. Degree Examination, Dec.2019/Jan.2020

Engineering Mathematics – III

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. Find the Fourier series expansion of $f(x) = x - x^2$ in $(-\pi, \pi)$, hence deduce that $\frac{\pi^2}{12} = \frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + - - - -$. **(08 Marks)**

b. Find the half range cosine series for the function $f(x) = (x-1)^2$ in $0 \le x \le 1$. **(06 Marks)**

c. Express y as a Fourier series upto first harmonics given :

x	0	60°	120°	180°	240°	300°
y	7.9	7.2	3.6	0.5	0.9	6.8

(06 Marks)

OR

2 a. Obtain the Fourier series for the function :

$$f(x) = \begin{cases} 1 + \frac{4x}{3} & \text{in } \frac{-3}{2} < x \le 0 \\ 1 - \frac{4x}{3} & \text{in } 0 \le x < \frac{3}{2} \end{cases}$$

Hence deduce that $\frac{\pi^2}{8} = \frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + - - -$. **(08 Marks)**

b. If $f(x) = \begin{cases} x & \text{in } 0 < x < \pi/2 \\ \pi - x & \text{in } \pi/2 < x < \pi \end{cases}$

Show that the half range sine series as

$$f(x) = \frac{4}{\pi}\left[\sin x - \frac{\sin 3x}{3^2} + \frac{\sin 5x}{5^2} - - - -\right].$$

(06 Marks)

c. Obtain the Fourier series upto first harmonics given :

x	0	1	2	3	4	5	6
y	9	18	24	28	26	20	9

(06 Marks)

Module-2

3 a. Find the complex Fourier transform of the function :

$f(x) = \begin{cases} 1 & \text{for } |x| \le a \\ 0 & \text{for } |x| > a \end{cases}$ and hence evaluate $\int_0^\infty \frac{\sin x}{x} dx$. **(08 Marks)**

b. Find the Fourier cosine transform of e^{-ax}. **(06 Marks)**

c. Solve by using z – transforms $u_{n+2} - 4u_n = 0$ given that $u_0 = 0$ and $u_1 = 2$. **(06 Marks)**

OR

4 a. Find the Fourier sine and Cosine transforms of : $f(x)=\begin{cases} x & 0<x<2 \\ 0 & \text{elsewhere} \end{cases}$. **(08 Marks)**

b. Find the Z – transform of : i) n^2 ii) ne^{-an}. **(06 Marks)**

c. Obtain the inverse Z – transform of $\dfrac{2z^2+3z}{(z+2)(z-4)}$. **(06 Marks)**

Module-3

5 a. Obtain the lines of regression and hence find the co-efficient of correlation for the data :

x	1	3	4	2	5	8	9	10	13	15
y	8	6	10	8	12	16	16	10	32	32

(08 Marks)

b. Fit a parabola $y = ax^2 + bx + c$ in the least square sense for the data :

x	1	2	3	4	5
y	10	12	13	16	19

(06 Marks)

c. Find the root of the equation $xe^x - \cos x = 0$ by Regula – Falsi method correct to three decimal places in (0, 1). **(06 Marks)**

OR

6 a. If $8x - 10y + 66 = 0$ and $40x - 18y = 214$ are the two regression lines, find the mean of x's, mean of y's and the co-efficient of correlation. Find σ_y if $\sigma_x = 3$. **(08 Marks)**

b. Fit an exponential curve of the form $y = ae^{bx}$ by the method of least squares for the data :

No. of petals	5	6	7	8	9	10
No. of flowers	133	55	23	7	2	2

(06 Marks)

c. Using Newton–Raphson method, find the root that lies near x = 4.5 of the equation tanx = x correct to four decimal places. **(06 Marks)**

Module-4

7 a. From the following table find the number of students who have obtained marks : i) less than 45 ii) between 40 and 45.

Marks	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80
No. of students	31	42	51	35	31

(06 Marks)

b. Using Newton's divided difference formula construct an interpolating polynomial for the following data :

x	4	5	7	10	11	13
f(x)	48	100	294	900	1210	2028

and hence find f(8). **(08 Marks)**

c. Evaluate $\int_0^1 \frac{dx}{1+x}$ taking seven ordinates by applying Simpson's $\frac{3}{8}^{th}$ rule. **(06 Marks)**

OR

8 a. In a table given below, the values of y are consecutive terms of a series of which 23.6 is the 6th term. Find the first and tenth terms of the series by Newton's formulas.

x	3	4	5	6	7	8	9
y	4.8	8.4	14.5	23.6	36.2	52.8	73.9

(08 Marks)

b. Fit an interpolating polynomial of the form x = f(y) for data and hence find x(5) given :

x	2	10	17
y	1	3	4

(06 Marks)

c. Use Simpson's $\frac{1}{3}^{\text{rd}}$ rule to find $\int_0^{0.6} e^{-x^2}dx$ by taking 6 sub-intervals. **(06 Marks)**

Module-5

9 a. Verify Green's theorem in the plane for $\phi_C(3x^2 - 8y^2)dx + (4y - 6xy)dy$ where C is the closed curve bounded by $y = \sqrt{x}$ and $y = x^2$. **(08 Marks)**

b. Evaluate $\int_C xydx + xy^2dy$ by Stoke's theorem where C is the square in the x – y plane with vertices (1, 0)(–1, 0)(0, 1)(0, –1). **(06 Marks)**

c. Prove that Catenary is the curve which when rotated about a line generates a surface of minimum area. **(06 Marks)**

OR

10 a. If $\vec{F} = 2xy\,\hat{i} + yz^2\,\hat{j} + xz\,\hat{k}$ and S is the rectangular parallelepiped bounded by x = 0, y = 0, z = 0, x = 2, y = 1, z = 3 evaluate $\iint_S \vec{F}\cdot\hat{n}\,ds$. **(08 Marks)**

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

c. Find the external of the functional $I = \int_0^{\pi/2}(y^2 - y^{12} - 2y\sin x)dx$ under the end conditions y(0) = y(π/2) = 0. **(06 Marks)**

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CBCS SCHEME

USN ☐☐☐☐☐☐☐☐☐☐ **17ME32**

Third Semester B.E. Degree Examination, Dec.2019/Jan.2020

Material Science

Time: 3 hrs. Max. Marks: 100

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

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-1

1 a. Explain crystal imperfections with necessary diagrams. **(12 Marks)**

b. Draw the neat sketches of HCP and FCC structures. Also find out APF of the above structures. **(08 Marks)**

OR

2 a. Explain R.R. MOORE Fatigue testing technique with neat diagram and plot S-N curves for MS, Aluminium and Copper. **(10 Marks)**

b. Explain three stages of creep with the help of creep curve and also explain creep properties. **(10 Marks)**

Module-2

3 a. Explain types of solid solutions and factors governing the formation of best substitutional solid solutions (Hume-Rothery Rules). **(10 Marks)**

b. Explain Gibb's phase rule and lever rule with the help of suitable examples. **(10 Marks)**

OR

4 a. What is meant by homogeneous and heterogeneous nucleations? Derive the equation for critical radius in homogeneous nucleation. **(10 Marks)**

b. Draw the Iron-carbon diagram, mark all the pahses on it, write invariant reactions and invariant points. **(10 Marks)**

Module-3

5 a. Draw the T-T-T diagram with the help of transformation curves. Explain the structure of Martensite, Bainite and Retained Austenite. **(12 Marks)**

b. Explain Annealing and normalizing with the help of necessary graphs and diagrams. **(08 Marks)**

OR

6 a. Explain in detail the surface hardening like, carburizing, cyaniding, nitriding flame hardening and induction hardening. **(16 Marks)**

b. Explain the concept of Austempering and Martempering. **(04 Marks)**

Module-4

7 a. Write note on structure, properties and applications of ceramics. **(12 Marks)**

b. Write note on mechanical and electrical behavior of ceramics. **(08 Marks)**

OR

8 a. Explain two plastic processing methods with neat diagrams. (12 Marks)
b. Write note on smart materials and shape memory alloys. (08 Marks)

Module-5

9 a. Write note on matrix materials and reinforcement materials. (10 Marks)
b. Write advantages, limitations and applications of composites. (10 Marks)

OR

10 a. Write note on any two polymer matrix composites production methods with neat diagrams. (12 Marks)
b. Derive the equation to calculate Young's modulus in iso-strain condition. (08 Marks)

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CBCS SCHEME

USN ☐☐☐☐☐☐☐☐☐☐ **17ME33**

Third Semester B.E. Degree Examination, Dec.2019/Jan.2020
Basic Thermodynamics

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Thermodynamics Hand Book permitted.

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-1

1 a. Can you define and give examples to the following? i) Closed system, ii) open system, iii) isolated system. **(06 Marks)**

b. Can you distinguish between the following:
i) Microscopic and Macroscopic point of study
ii) Intensive and Extensive properties
iii) Work and Heat
iv) Path and Point functions. **(08 Marks)**

c. State and explain Zeroth law of thermodynamics. **(06 Marks)**

OR

2 a. Can you define thermodynamic definitions of work and heat? Write three important similarities between them. **(05 Marks)**

b. Can you derive expressions for work done of the following types of processes?
i) The process which follow the law, $P = C$
ii) The process which follow the law, $PV^{\gamma} = C$. **(06 Marks)**

c. Air at 1.02 bar, 22°C, initially occupying a cylinder volume of 0.015m^3, is compressed reversibly and adiabatically by a piston to a pressure of 6.8 bar. Calculate: i) The final temperature ii) The final volume iii) The work done. **(09 Marks)**

Module-2

3 a. Write the first law statements for a system undergoing:
i) a cycle ii) a process iii) a steady flow process. **(06 Marks)**

b. Prove that internal energy – a property. **(04 Marks)**

c. Air flows steadily at the rate of 0.4 kg/s through an air compressor, entering at 6 m/s with a pressure of 1 bar and a specific volume of $0.85\ \text{m}^3/\text{kg}$, and learning at 4.5 m/s with a pressure of 6.9 bar and a specific volume of $0.16\text{m}^3/\text{kg}$. The internal energy of air leaving is 88kJ/kg greater than that of the air entering. Cooling water in a jacket surrounding the cylinder absorbs heat from the air at the rate of 59 kJ/s. Calculate the power required to drive the compressor and the inlet and outlet pipe cross sectional areas. **(10 Marks)**

OR

4 a. Will you prove that two statements of second law of thermodynamics are equivalent? **(05 Marks)**

b. Can you explain carnot heat engine cycle with the help of P-V and T-S diagrams? **(07 Marks)**

c. A heat source S_1 can supply 6000 kJ/min at 300°C and another heat source S_2 can supply 60,000 kJ/min at 100°C. Which source between the two would you choose to supply energy to a carnot engine, that is to produce larger amount of power if the surroundings are at 27°C? Which engine is more efficient? **(08 Marks)**

Module-3

5 a. Can you define and give examples for reversible and irreversible processes? List the factors which makes the process irreversible. **(06 Marks)**

b. Will you prove that entropy a property of a system? **(06 Marks)**

c. A reversible heat engine converts one-sixth of the heat input into work. When the temperature of the sink is reduced by 62°C, its efficiency is doubled. Find the temperature of the source and the sink. **(08 Marks)**

OR

6 a. Derive an expression for change in entropy during constant pressure process. **(06 Marks)**

b. Explain the principle of increase of entropy. **(06 Marks)**

c. In a shell and tube heat exchanger 45kg of water per minute is heated from 60°C to 115°C by hot gases which enter the heat exchanger at 225°C. If the flow rate of gases is 90 kg/min, find the net change of entropy of the universe. C_p (water) = 4.18 kJ/kg.K; C_p(gas) = 1 kJ/kg.k. Assume that there are no losses. **(08 Marks)**

Module-4

7 a. Define available and unavailable energy and prove that the available portion of heat Q withdrawn from an infinite source is $(Q-T_0\Delta s)$. Where T_0 is dead state temperature and ΔS is change in entropy during the process. **(07 Marks)**

b. Obtain an expression for availability of a non-flow process. **(06 Marks)**

c. One kg of air at pressure P_1 and temperature 900K is mixed with one kg of air at the same pressure but at 500K. Determine the loss in availability if the atmospheric temperature is 300K. **(07 Marks)**

OR

8 a. Explain P-T diagram for water. **(06 Marks)**

b. Explain the method of determining the dryness fraction of the given sample of stream using throttling calorimeter with a neat sketch. **(07 Marks)**

c. Determine the enthalpy and internal energy of 2kg of steam at a pressure of 15 bar and 0.85 dryness. Also determine the heat supplied at constant pressure if the final condition of the steam is 70°C of superheat. Take Cp_s (superheated) = 2.25 kJ/kg. **(07 Marks)**

Module-5

9 a. Define the following terms: Mass fraction, Mole fraction, Specific humidity, Dry Bulb Temperature, Dew Point Temperature. **(05 Marks)**

b. Derive and expression for molecular weight and gas constant of a mixture of ideal gases in terms of mass fractions. **(06 Marks)**

c. A vessel of $0.2m^3$ capacity contains 2kg of CO_2 and 1.5kg of N_2 at 300K. Determine: i) Pressure in the vessel ii) Mole fraction of each constituent iii) R and M of the mixture. **(09 Marks)**

OR

10 a. Explain the reasons for deviations of Van-der Waal's equation from ideal gas equation. **(06 Marks)**

b. Explain the following:
   i) Law of corresponding states
   ii) Compressibility factor
   iii) Gibbos-Dalton's law. **(06 Marks)**

c. A container of $3m^3$ capacity contains 10kg of CO_2 at 27°C. Estimate the pressure exerted by CO_2 by using:
   i) Perfect gas equation
   ii) Van-der Waal's equation
   iii) Beattie Bridgeman equation. **(08 Marks)**

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CBCS SCHEME

USN ☐☐☐☐☐☐☐☐☐☐ **17ME/MA34**

Third Semester B.E. Degree Examination, June/July 2019
Mechanics of Materials

Time: 3 hrs. Max. Marks: 100

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

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-1

1 a. State the Hooke's Law. Neatly draw the stress – strain diagram for steel indicating all salient points and zones on it. **(05 Marks)**

b. Derive an expression for the extension of uniformly tapering circular bar subjected to axial load. **(05 Marks)**

c. A steel bar ABCD of varying sections is subjected to the 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. **(10 Marks)**

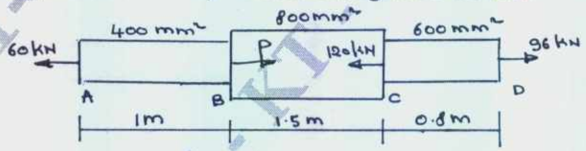


Fig.Q1(c)

OR

2 a. A compound bar is made up of a central aluminium plate 24mm wide and 6mm thick to which steel plates of 24mm wide and 9mm thick are connected rigidly on each side. The length of compound bar at temperature 20^{0}C is 100mm. If the temperature of the whole assembly is raised by 60^{0}C, determine the stress in each of the material. If at the new temperature a compressive load of 20kN is applied to the composite bar. What are the final stresses in steel and aluminum?

Given $E_S = 2 \times 10^5$ N/mm^2 , $E_A = \frac{2}{3} \times 10^5$ N/mm^2 , **(12 Marks)**

$\alpha_S = 12 \times 10^{-6} / {}^0C$ and $\alpha_A = 23 \times 10^{-6} / {}^0C$.

b. Establish a relationship between the modulus of elasticity and modulus of rigidity. **(08 Marks)**

Module-2

3 a. Define i) Principal stress ii) Principal strain. **(04 Marks)**

b. At a certain point in a strained material the stress condition shown in fig. Q3(b) exists. Find

i) Normal and shear stress on the inclined plane AB.
ii) Principal stresses and principal planes.
iii) Maximum shear stresses and their planes. **(16 Marks)**

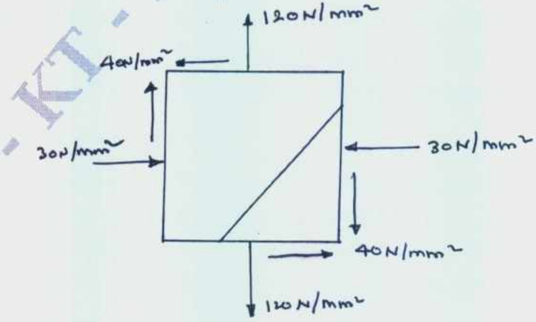


Fig.Q3(b)

OR

4 a. Derive an expression for circumferential stress and longitudinal stress for a thin cylinder subjected to an internal pressure. **(08 Marks)**

b. List the difference between thin and thick cylinders. **(02 Marks)**

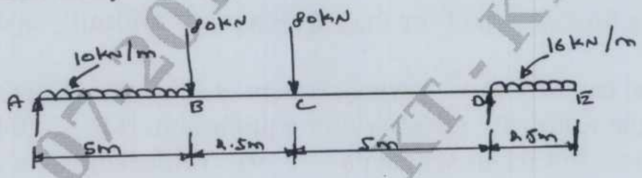
c. A thick cylinder pipe of outside diameter 300mm and internal diameter 200mm is subjected to an internal fluid pressure 20N/mm^2 and external fluid pressure of 5N/mm^2. Determine the maximum hoop stress developed. Draw the variation of hoop stress and radial stress across the thickness indicating the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

Module-3

5 a. What are different types of beams? Explain briefly. **(05 Marks)**

b. Draw shear force and bending moment diagrams for the beam shown in fig. Q5(b). Locate point of contra flexure if any. **(15 Marks)**

Fig.Q5(b)



OR

6 a. Prove the relation $\frac{M}{I}=\frac{\sigma}{Y}=\frac{E}{R}$ with usual notations. **(10 Marks)**

b. A cantilever has a length of 3m. Its cross – section is of T – section with flange 100mm × 20mm and web 200mm × 12mm, the flange is in tension. What is the intensity of UDL that can be applied if the maximum tensile stress is limited to 30N/mm^2? Also compute the maximum compressive stress. **(10 Marks)**

Module-4

7 a. What are the assumption made in theory of pure torsion? **(02 Marks)**

b. Derive torsion equation with usual notations. **(08 Marks)**

c. A solid circular shaft has to transmit a power of 1000 kW at 120 rpm. Find the diameter of the shatt, if the shear stress of the material must not exceed 80N/mm^2. The maximum torque 1.25 times of its mean. What percentage of saving in material would be obtained if the shatt 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)**

OR

8 a. Derive an expression for the critical load in a column subjected to compressive load, when both the ends are hinged. Also mention the assumptions made in the derivation. **(10 Marks)**

b. Design the section of a circular cast iron column that can safety carry a load of 1000kN. The length of the column is 6 meters. Rankine's constant is 1/1000 , factor of safety is 3. One end of the column is fixed and other end is free. Critical stress is 560 MPa. **(10 Marks)**

Module-5

9 a. State Castiglione's theorem I and II. **(04 Marks)**

b. Derive an expression for strain energy due to normal stress. **(08 Marks)**

c. Determine the strain energy of the simply supported prismatic beam , subjected to UDL of 25kN/m over total span 10m. Assume $I = 195.3 \times 10^3$ mm^4 , $E = 2 \times 10^5$ MPa. **(08 Marks)**

OR

10 a. Explain Maximum principal stress theory and Maximum shear stress theory. **(10 Marks)**

b. The stress induced at a critical point in a machine component made of steel are as follows : $\sigma_x = 100$N/mm^2 , $\sigma_y = 40$N/mm^2 , $\tau_{xy} = 80$N/mm^2. Calculate the factor of safety by
i) Maximum shear stress theory ii) Maximum normal stress theory. **(10 Marks)**

CBCS SCHEME

USN ☐☐☐☐☐☐☐☐☐☐ **17MATDIP31**

Third Semester B.E. Degree Examination, Dec.2019/Jan.2020

Additional Mathematics – I

Time: 3 hrs. Max. Marks: 100

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

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-1

1 a. Find the modulus and amplitude of $\frac{3+i}{2+i}$ **(07 Marks)**

b. If $x = \cos\theta + i\sin\theta$, then show that $\frac{x^{2n}-1}{x^{2n}+1} = i\tan n\theta$. **(07 Marks)**

c. Simplify $\frac{(\cos 3\theta + i\sin 3\theta)^4(\cos 4\theta + i\sin 4\theta)^5}{(\cos 4\theta + i\sin 4\theta)^3(\cos 5\theta + i\sin 5\theta)^{-4}}$ **(06 Marks)**

OR

2 a. Find the sine of the angle between $\vec{A} = 2\hat{i} + 2\hat{j} - \hat{k}$ and $\vec{B} = 6\hat{i} - 3\hat{j} + 2\hat{k}$. **(07 Marks)**

b. Find the value of λ, so that the vectors $\vec{a} = 2\hat{i} - 3\hat{j} + \hat{k}$, $\vec{b} = \hat{i} + 2\hat{j} - 3\hat{k}$ and $\vec{c} = \hat{i} + \lambda\hat{k}$ are coplanar. **(07 Marks)**

c. Prove that $\vec{a}\times(\vec{b}\times\vec{c}) + \vec{b}\times(\vec{c}\times\vec{a}) + \vec{c}\times(\vec{a}\times\vec{b}) = 0$. **(06 Marks)**

Module-2

3 a. Find the n^{th} derivative of $e^{ax}\cos(bx + c)$. **(07 Marks)**

b. If $y = a\cos(\log x) + b\sin(\log x)$ prove that $x^2 y_{n+2} + (2n+1)xy_{n+1} + (n^2+1)y_n = 0$. **(07 Marks)**

c. If $u = \sin^{-1}\left(\frac{x^2+y^2}{x+y}\right)$, prove that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = \tan u$. **(06 Marks)**

OR

4 a. Find the pedal equation of $r^n = a^n \cos n\theta$. **(07 Marks)**

b. Expand $\log_e(1 + x)$ in ascending powers of x as for as the term containing x^4. **(07 Marks)**

c. If $x = r\cos\theta$, $y = r\sin\theta$, find $\frac{\partial(x,y)}{\partial(r,\theta)}$ **(06 Marks)**

Module-3

5 a. Evaluate $\int_0^1 \int_{y^2}^{y} (1 + xy^2)\,dx\,dy$ **(07 Marks)**

b. Evaluate $\int_0^{2\pi} \sin^4 x \cos^6 x \,dx$ **(07 Marks)**

c. Evaluate $\int_0^2 \frac{x^4}{\sqrt{4-x^2}}\,dx$ **(06 Marks)**

OR

6 a. Evaluate $\int_1^2 \int_3^4 \left(xy + e^y\right) dydx$ **(07 Marks)**

b. Evaluate $\int_0^{\pi} x \sin^8 x \, dx$ **(07 Marks)**

c. Evaluate $\int_1^2 \int_0^1 \int_{-1}^1 (x^2 + y^2 + z^2)\, dxdydz$ **(06 Marks)**

Module-4

7 a. If particle moves on the curve $x = 2t^2$, $y = t^2 - 4t$, $z = 3t - 5$ where t is the time. Find the velocity and acceleration at $t = 1$. **(07 Marks)**

b. Find the angle between the tangents to the curve $\vec{r} = t^2\,\hat{i} + 2t\,\hat{j} - t^3\,\hat{k}$ at the point $t = \pm 1$. **(07 Marks)**

c. If $\vec{F} = (3x^2y - z)\,\hat{i} + (xz^3 + y^4)\,\hat{j} - 2x^3z^2\,\hat{k}$ find grad(div $\vec{F}$) at (2, –1, 0). **(06 Marks)**

OR

8 a. Find the directional derivative of $\phi = 4xz^3 - 3x^2y^2z$ at (2, –1, 2) along $2\hat{i} - 3\hat{j} + 6\hat{k}$ **(07 Marks)**

b. Find the unit normal to the surface $x^2y + 2xz = 4$ at (2, –2, 3). **(07 Marks)**

c. Show that $\vec{F} = (2xy^2 + yz)\hat{i} + (2x^2y + xz + 2yz^2)\hat{j} + (2y^2z + xy)\hat{k}$ is irrotational. **(06 Marks)**

Module-5

9 a. Solve $\dfrac{dy}{dx} = \sin(x + y)$ **(07 Marks)**

b. Solve $\dfrac{dy}{dx} + y\cot x = \cos x$ **(07 Marks)**

c. Solve $(x - y + 1)dy - (x + y - 1)dx = 0$ **(06 Marks)**

OR

10 a. Solve $\left(1 + e^{x/4}\right)dx + e^{x/y}\left(1 - \dfrac{x}{y}\right)dy = 0$. **(07 Marks)**

b. Solve $\left(x^3\cos^2 y - x\sin 2y\right)dx = dy$. **(07 Marks)**

c. Solve $\left(3x^2y^4 + 2xy\right)dx + \left(2x^3y^3 - x^2\right)dy = 0$ **(06 Marks)**

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CBCS SCHEME

17CPH39/49

USN

Question Paper Version : A

Third/Fourth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Constitution of India, Professional Ethics & Human Rights
(COMMON TO ALL BRANCHES)

Time: 2 hrs.] [Max. Marks: 30

INSTRUCTIONS TO THE CANDIDATES

1. Answer all the **thirty** 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.

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1. The 'Government', it meant a body that,
a) Makes law b) Implements laws made
c) Interprets the laws d) Carrying all these functions

2. Which one of the following is a features common to both the Indian Federation and the American Federation.
a) A single citizenship b) A federal supremecourt to interprete the constitution
c) Three lists in the constitution d) Dual judiciary

3. The preamble in the constitution of independent India is modified version of which of the following :
a) Bill of Rights in USA b) British MagnaCarta
c) Objectives resolution moved by Jawaharlal Nehru d) Ideals of communism

4. In the Indian constitution, the Right to Equality is granted by,
a) Article 16 – 20 b) Article 15 – 19
c) Article 14 – 18 d) Article 13 – 17

5. Uniform civil code is one of the,
a) Fundamental rights b) Directive principle of state policies
c) Fundamental duties d) None of these

6. Concept of fundamental duties copied from which country's constitution,

a) USSR b) USA

c) UK d) JAPAN

7. Who is said to be an integral part of the Union Legislature (Parliament)?

a) Speaker of LokSabha b) Chairman of Rajya Sabha

c) President d) Prime Minister

8. With reference to Vice-President, consider the following statements:

i) The removal proceedings of Vice-President can be begin in lower house of parliament.

ii) There is no specific provision in the Indian constitution regarding election of Vice-President.

Which of the statements given is/are correct?

a) (i) only b) (ii) only

c) Both (i) and (ii) d) Neither (i) nor (ii).

9. The Supreme court of India tenders advice to the President on a matter of law or fact.

a) On its own initiative b) Only if he seeks such advice

c) Only if the matter relates to the extent of powers of the Union

d) Only if the issue relates to international treaty or agreement

10. Consider the following statements:

i) The oath of Governor is conducted by the Chief Minister of the respective state.

ii) The constitution does not fix any tenure for the post of Governor of a state.

Which of statements given above is / are correct?

a) (i) only b) Both (i) and (ii)

c) (ii) only d) Neither (i) or (ii)

11. When it comes to the passage of Money Bills, how is the situation in the Union Parliament different from that in the State Legislature?

a) At the Union level, Money Bill can be introduced only in the Lok-Sabha, but at the state level, it can be introduced either house of state Legislature.

b) The time limit within which the upper house can return a money bill is 14 days, in case of the Union and one month in State Legislature.

c) In Parliament, there is no provision for joint session in case of Money Bills, but there can be joint session over money Bill in State Legislature.

d) None of the above

12. Judge of the High Court can be impeached on the ground of,

a) Proved misbehaviour b) Corruption

c) High crimes d) Emergency

13. Nomination papers shall be submitted with,

a) The Chief Election Commissioner b) The Regional Election Commissioner

c) The Returning Officer d) None of these

14. 73rd Amendment provides establishment of,

a) High courts b) Rural local self Government

c) Lokayukta d) Start ups

15. A college student desires to get elected to the Municipal council of his city. The validation of his nomination would depend on the important condition, among others, that
a) He has attained the maturity
b) He is a member of a political party
c) His name figures in the Voter's list
d) He is the topper to the class

16. To declare emergency _________ consent is must.
a) Prime Minister
b) Cabinet headed by the Prime Minister
c) Speaker of Lok Sabha
d) Chief Justice of the Supreme Court

17. It is not the effect of State emergency,
a) State legislature can be dissolved
b) President assumes the state executive power
c) Parliament may make law over state list
d) Effects on state Judiciary

18. Which of following statements is / are correct in respect of co-operative societies:
i) Part IX-B of the constitution deals.
ii) Right to form a co-operative society is a fundamental under the constitution.
iii) Co-operative societies also mentioned under Directive Principles of state policy
Select the correct answer using the code given here.
a) (i) only
b) (ii) only
c) (i) and (iii) only
d) (i), (ii) and (iii)

19. What day do countries celebrate as Human Rights Day?
a) 1 January
b) 10 December
c) 2 March
d) 6 June

20. What does the International Bill of Human Rights provide?
a) A list of economic human rights.
b) The rights that all citizens hold
c) A list of indivisible human rights covering civil and political rights.
d) An authoritative list of universal human rights covering civil and political rights and economic, social and cultural rights.

21. ___________ is the watch dog of human rights in India.
a) High court
b) Parliament
c) National Human Rights Commission
d) None of these

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

23. For engineering profession _______ is considered as its foundation.
a) Honesty
b) Hard work
c) Sound common sence
d) None of these

24. A compound measure of the probability and magnitude of the adverse effect is known as,
a) Benefit
b) Compensation
c) Risk
d) Both (a) and (b)

25. 'Trimming' is,
a) Retaining the entire data b) Consolidating the data
c) Smoothing of irregularities to make the data to appear accurate and precise
d) All the above

26. A fault tree is used to,
a) Access the risk involved b) Improve safety
c) Take free consent d) Claim compensation

27. The formula of a soft drink is an example of,
a) Copyright b) Trade secret
c) Patent d) Trade mark

28. An author retains copyright of his book for,
a) 25 years b) 50 years
c) Life time + 60 years d) 100 years

29. This is not dishonesty in engineering,
a) Forging b) Blending
c) Cooking d) Trimming

30. This is not implement to responsibility,
a) Fear b) Self respect
c) Self deception d) Ignorance.

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