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10MAT31

Third Semester B.E. Degree Examination, Dec.2017/Jan.2018

Engineering Mathematics – III

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting at least TWO questions from each part.***

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.

PART – A

1 a. Find the Fourier series for the function $f(x) = x + x^2$ over the interval $-\pi \le x \le \pi$. Hence deduce that:

i) $\dfrac{\pi^2}{12} = \dfrac{1}{1^2} - \dfrac{1}{2^2} + \dfrac{1}{3^2} - \ldots\ldots$ ii) $\dfrac{\pi^2}{6} = \dfrac{1}{1^2} + \dfrac{1}{2^2} + \dfrac{1}{3^2} + \ldots\ldots$ **(07 Marks)**

b. Expand the function $f(x) = x(\pi - x)$ over the interval $(0, \pi)$ in half range Fourier cosine series. **(06 Marks)**

c. Find the constant term and the first two harmonics for the function $f(\theta)$ given by the following table: **(07 Marks)**

θ (in degrees)	0	60	120	180	240	300	360
$f(\theta)$	0.8	0.6	0.4	0.7	0.9	1.1	0.8

2 a. Show that the Fourier transform of the function

$$f(x) = \begin{cases} 1 - x^2, & |x| \le 1 \\ 0, & |x| > 1 \end{cases} \quad \text{is} \quad F(\alpha) = \frac{2\sqrt{2}}{\alpha^3\sqrt{\pi}}(\sin\alpha - \alpha\cos\alpha).$$

Hence deduce that $\displaystyle\int_0^\infty \frac{\sin x - x\cos x}{x^3}\,dx = \frac{\pi}{4}$. **(07 Marks)**

b. Find the Fourier cosine transform of $f(x) = \dfrac{1}{1 + x^2}$. **(06 Marks)**

c. If the Fourier sine transform of f(x) is given by $F_s(u) = \dfrac{\pi}{2}e^{-2u}$, find the function f(x). **(07 Marks)**

3 a. Find the various possible solutions of two-dimensional Laplace equation by method of separation of variables. **(07 Marks)**

b. Obtain the D'Alembert's solution of the wave equation $u_{tt} = c^2u_{xx}$ subject to the conditions $u(x, 0) = f(x)$ and $\dfrac{\partial u}{\partial t}(x,0) = 0$. **(06 Marks)**

c. Solve the one-dimensional heat equation $c^2u_{xx} = u_t$, $0 < x < \pi$ subject to the conditions $u(0, t) = 0$, $u(\pi, t) = 0$, $u(x,0) = u_0 \sin x$ where u_0 is a non-zero constant. **(07 Marks)**

4 a. Find a curve of the best fit of the form $y = ax^b$ to the following data: **(07 Marks)**

x	1	2	3	4	5
y	0.5	2	4.5	8	12.5

b. For conducting a practical examination, the chemistry department of a college requires 10, 12 and 7 units of 3 chemicals x, y and z respectively. The chemicals are available in 2 types of boxes: Box A and Box B. Box A contains 3, 2 and 1 units of x, y, z respectively and cost Rs.300. Box B contains 1, 2 and 2 units of x, y, z respectively and costs Rs.200. Find how many boxes of each type should be bought by the department so that the total cost is minimum. Solve graphically. **(06 Marks)**

c. Solve the following LPP by simplex method:

Maximize $z = 2x_1 + 4x_2 + 3x_3$

Subject to the constraints $3x_1 + 4x_2 + 2x_3 \le 60$ $\quad 2x_1 + x_2 + 2x_3 \le 40$

$x_1 + 3x_2 + 2x_3 \le 80$ $\quad x_1, x_2, x_3 \ge 0$ **(07 Marks)**

PART – B

5 a. Use Newton-Raphson method to find an approximate root of the equation $x \log_{10} x = 1.2$ correct to 5 decimal places that is near 2.5. **(07 Marks)**

b. Use Relaxation method to solve the following system of linear equations:

$8x + 3y + 2z = 13 \qquad x + 5y + z = 7 \qquad 2x + y + 6z = 9$ **(06 Marks)**

c. Find the numerically largest eigen value and the corresponding eigen vector of the matrix $A = \begin{bmatrix} 5 & 0 & 1 \\ 0 & -2 & 0 \\ 1 & 0 & 5 \end{bmatrix}$ by power method taking $X^{(0)} = [1 \quad 0 \quad 0]^T$. Perform 6 iterations. **(07 Marks)**

6 a. Find the interpolating polynomial for the function $y = f(x)$ given by $f(0) = 1$, $f(1) = 2$, $f(2) = 1$, $f(3) = 10$. Hence evaluate $f(0.75)$ and $f(2.5)$. **(07 Marks)**

b. Apply Lagrange's method to find the value of x corresponding to $f(x) = 15$ from the following data: **(06 Marks)**

x	5	6	9	11
f(x)	12	13	14	16

c. Evaluate $\int_0^1 \frac{dx}{1+x^2}$ by using Simpson's $\frac{3}{8}^{th}$ rule dividing the interval (0, 1) into 6 equal parts. Hence deduce the approximate value of π. **(07 Marks)**

7 a. Solve the wave equation $u_{tt} = 4u_{xx}$ subject to the conditions $u(0, t) = 0$, $u(4, t) = 0$, $u_t(x, 0) = 0$ and $u(x, 0) = x(4 - x)$ by taking $h = 1$, $k = 0.5$ upto four steps. **(07 Marks)**

b. Find the numerical solution of the equation $u_{xx} = u_t$ when $u(0, t) = 0$, $u(1, t) = 0$, $t \ge 0$ and $u(x,0) = \sin \pi x$, $0 \le x \le 1$. Carryout computations for two levels taking $h = \frac{1}{3}$ and $k = \frac{1}{36}$. **(07 Marks)**

c. Solve Laplace's equation $u_{xx} + u_{yy} = 0$ for the following square mesh with boundary values as shown in the following Fig.Q7(c).

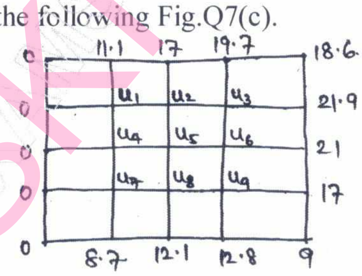

Fig.Q7(c) **(06 Marks)**

8 a. Find the z-transform of $5n^2 + 4\cos\frac{n\pi}{2} - 4^{n+2}$ and $\sinh n\theta$. **(06 Marks)**

b. Obtain in inverse z-transform of $\frac{z(2z+3)}{(z+2)(z-4)}$. **(07 Marks)**

c. Using z-transforms, solve $u_{n+2} + 3u_{n+1} + 2u_n = 3^n$ given $u_0 = 0$, $u_1 = 1$. **(07 Marks)**

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10CV32

Third Semester B.E. Degree Examination, Dec.2017/Jan.2018

Building Materials and Construction Technology

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting at least TWO questions from each part.***

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.

PART – A

1 a. What are the functions of foundations? **(05 Marks)**

b. Explain the causes for foundation failures. **(05 Marks)**

c. Design a rectangular combined footing for columns A and B spaced at 3200 mm c/c for the following data:
Column A : 230 × 450 mm carries an axial load 1200 kN.
Column B : 230 × 600 mm carries an axial load 1800 kN.
Restrict the width of footing to 3200 mm. SBC of soil is 180 kN/m^2. **(10 Marks)**

2 a. Using sketches explain the terms:
i) Queen closer
ii) Quoin header
iii) Stretcher course
iv) Header course applied to brick masonry. **(06 Marks)**

b. What do you understand by reinforced brick masonry when do you use it? **(04 Marks)**

c. What are the types of joints used in stone masonry? Describe any four joint with neat sketch. **(10 Marks)**

3 a. What are the classifications of arches according to shapes? Explain any four in brief. **(10 Marks)**

b. Why the following are used and mention where they are provided in a building:
(i) Lintels (ii) Chejja (iii) Canopy (iv) Balcony. **(10 Marks)**

4 a. State the essential requirements of a good roofs and compare the merits and demerits of flat and pitches roof. **(10 Marks)**

b. Explain mosaic flooring and polished granite flooring. **(10 Marks)**

PART – B

5 a. What type of doors you suggest for the following building? Draw sketches of the same:
i) House ii) Restaurant iii) Godown iv) Offices **(10 Marks)**

b. Explain with sketches: i) Bay window, ii) Dormer window. **(10 Marks)**

6 a. Design a dog legged stair case for a room of size 2.5m × 5.5m for a floor height of 3.0 m. Draw a neat sketch of plan of a stair. **(10 Marks)**

b. Define following terms:
i) Flight ii) Pitch iii) Baluster iv) Newel port v) Head room **(10 Marks)**

7 a. What are the objects of plastering the surfaces? Briefly explain stucco plastering. **(10 Marks)**

b. Explain the constituents of paints and their function. **(10 Marks)**

8 Write short notes for the following:
a. Under pinning
b. Form work details for RCC columns
c. Causes of dampness
d. Scaffolding **(20 Marks)**

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10CV/EV33

Third Semester B.E. Degree Examination, Dec.2017/Jan.2018

Strength of Materials

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting at least TWO questions from each part.***

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.

PART – A

1 a. Define: (i) Yielding, (ii) Hooke's law. **(04 Marks)**

b. Derive an expression for the deformation of tapering plate of uniform thickness subjected to axial force F. **(06 Marks)**

c. A brass tube 100 mm internal diameter and 10 mm thick is enclosed in a steel tube 120 mm internal diameter and 10 mm. Both the tubes are rigidly fixed to each other and carries an axial load of 3000 kN. The tubes are of same length of 3m. Determine the load carried, stress induced in each material. Also determine the amount by which it shortens. Given $E_S = 200\ kN/mm^2$, $E_B = 100\ kN/mm^2$. **(10 Marks)**

2 a. Define: (i) Lateral strain, (ii) Bulk modulus. **(04 Marks)**

b. Derive the relationship between Young's modulus and shear modulus. **(06 Marks)**

c. A steel bar 25 mm in diameter is enclosed in a brass tube 25 mm internal diameter and 50 mm external diameter. Both the bars are of length 1m and rigidly fixed to each other. The composite bar is subjected to rise in temperature of 60°C. Determine the stresses due to temperature change.
If in addition to temperature change the bar is subjected to a pull of 60 kN, determine resultant stresses $E_B = 100\ kN/mm^2$, $E_s = 200\ kN/mm^2$, $\alpha_s = 12 \times 10^{-6}/°C$, $\alpha_B = 18 \times 10^{-6}/°C$. **(10 Marks)**

3 a. Define:
i) Principal stresses,
ii) Critical planes,
iii) Principal planes. **(06 Marks)**

b. The stresses on a strained element are as shown in Fig.Q3(b). Determine:
i) Stresses when the element is rotated through an angle of 30° as shown.
ii) Principal plane and principal stresses.
Sketch the planes.

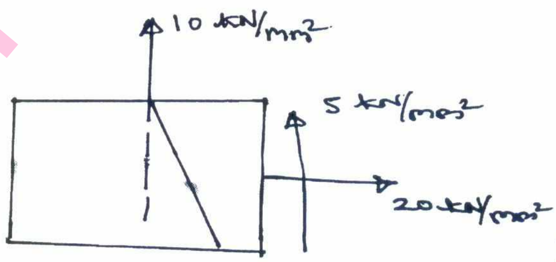

Fig.Q3(b) **(14 Marks)**

4 a. Define:
i) Hogging bending moment
ii) Sagging bending moment
iii) Point of contraflexure. **(06 Marks)**

b. Draw SFD and BMD for the beam shown in Fig.Q4(b) showing salient features.

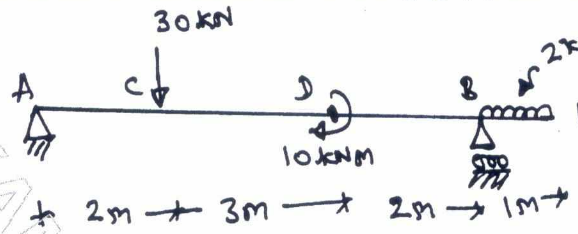

Fig.Q4(b) **(14 Marks)**

PART – B

5 a. Prove that maximum shear stress in a rectangular section of width b and depth d is equal to 1.5 times of its average shear stress. **(05 Marks)**

b. State the assumptions made in the theory of pure bending. **(05 Marks)**

c. A rolled I section of size 75 mm × 50 mm is used as a beam with an effective span of 3m. The flanges are 5 mm thick and web 3.7 mm thick. Calculate the uniformly distributed load the beam can carry if the maximum shear stress is 40 N/mm^2. **(10 Marks)**

6 a. Derive an expression for slope at support and maximum deflection for a simply supported beam subjected to point load at midspan. **(08 Marks)**

b. Distinguish between nature of slope and deflection of a simply supported beam and a cantilever beam. **(04 Marks)**

c. A cantilever beam of uniform cross section carries UDL of 30 kN/m over entire span of 3m. Given $I = 5 \times 10^8$ mm^4 and deflection at free end 3.04 mm, determine Young's modulus of elasticity of beam material. **(08 Marks)**

7 a. Prove that a hollow shaft is stronger and stiffer than the solid shaft of same material, length and weight. **(08 Marks)**

b. Determine the diameter of the solid shaft transmitting 120 kW at 120 rpm if the permissible shear stress is 80 N/mm^2. What would be the diameter of a hollow shaft of same length having external diameter twice the internal diameter to transmit same power at same rate of revolution. What is the percentage saving in weight by changing over to hollow shaft? **(12 Marks)**

8 a. State the assumptions made in Euler's theory for long columns. Also state limitations of Euler's formula. **(06 Marks)**

b. Derive an expression for Euler's buckling load with both ends hinged. **(06 Marks)**

c. Calculate the safe compressive load on a hollow cast iron column one end rigidly fixed and other end hinged of 150 mm external diameter and 110 mm internal diameter. The column is 10m in length. Use Euler's formula with a factor of safety of 5 and E = 100 kN/mm^2. **(08 Marks)**

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10CV35

Third Semester B.E. Degree Examination, Dec.2017/Jan.2018

Fluid Mechanics

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. How are fluids classified based on property of viscosity? Explain with examples for each types. **(10 Marks)**

b. A liquid has a specific gravity of 0.72. Find its density and specific weight. Find also the weight per liter of liquid. **(05 Marks)**

c. The left and right limbs of capillary U-tube are 1.25 mm and 2.50 mm in diameter. The tube contains a liquid of surface tension 0.05 N/m. Assuming the contact angle to be zero, find the specific weight and density of the liquid if the difference in the liquid levels in the two limbs is 10 mm. **(05 Marks)**

2 a. Explain the working principles of electronic pressure gauge. List the types of electronic pressure gauge. Explain any one type. **(08 Marks)**

b. With a neat sketch, of "U" tube manometer, explain the principle of writing manometric equation. **(04 Marks)**

c. The right and left limb of a "U" tube is of diameter 20 mm and 5 mm respectively. The left limb contains liquid of sp.gravity 0.9 while left limb consists of liquid of sp.gravity 1.35. The positions of the liquid level in the two limbs are shown in Fig. Q2 (c). What pressure should be applied on surface of the heavier liquid in order to rise the level in the limb containing lighter liquid by 10 mm. **(08 Marks)**

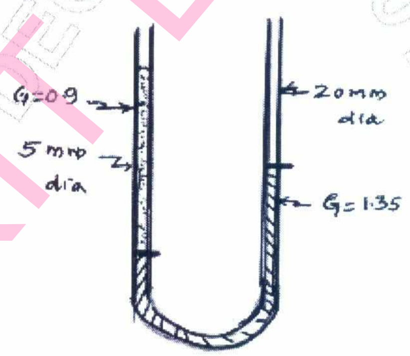

Fig. Q2 (c)

3 a. With Usual notation, derive expression for the force exerted on a submerged inclined plane surface by the static fluid and locate the position of centre of pressure. Also prove that the total pressure exerted by a static liquid on an inclined plane submerged surface is the same as the force exerted on a vertical plane surface as long as the depth of centre of gravity of the surface is unaltered. **(10 Marks)**

b. A square pipe whose two edges parallel to the ground surface is of edge dimension 1.5 m. It carries oil of specific gravity 0.9 under pressure (measured at the centre) 250 kN/m^2. Find the force exerted by the oil on the gate valve at the end of the pipe and also find the position of the centre of pressure. **(10 Marks)**

4 a. With new sketches, define and distinguish between streamline, path line and streak line. **(06 Marks)**

b. Derive with usual notation three dimensional continuity equation in Cartesian co-ordinates. **(08 Marks)**

c. The velocity components of a two dimensional incompressible flow are $u = x - 4y$ and $v = -y - 4x$. The flow is continuous. Find the velocity potential function and stream function. **(06 Marks)**

PART – B

5 a. State the assumptions made in the Bernoulli's equation. Derive the Bernoulli's equation from Euler's equation with usual form. **(08 Marks)**

b. What is kinetic energy correction factor, derive the expression for kinetic energy correction factor. How is it incorporated in Bernoulli's equation. **(06 Marks)**

c. A 400 m long pipe tapers from 1.20 m diameter at high end and 0.60 m diameter at the low end, the slope of the pipe being 1 in 100. The pipe conveys a discharge of 1025 cum/s. If the pressure at high end is 75 KPa, find the pressure at the low end, ignore losses. **(06 Marks)**

6 a. Derive expression for pressure rise due to instantaneous closure of valve for rigid and elastic pipes. **(10 Marks)**

b. A pipe line 2.50 km long 180 mm diameter conveys a discharge of 0.015 m^3/s. From high level tank to a low level tank. If it is planned to increase the discharge to the low level tank by 30% by attaching an additional pipe in parallel to the latter half length of the pipe, find the diameter of this pipe. Take f = 0.0075. **(10 Marks)**

7 a. How Floats and Currents meter are used to find the velocity in stream? Explain. **(08 Marks)**

b. A Pitot tube records a reading of 7.85 kPa as the stagnation pressure, when it is held at the centre of a pipe of 250 mm diameter conveying water. The static pressure in the pipe is 40 mm of mercury (vacuum). Calculate the discharge in the pipe assuming that the mean velocity of flow is 0.8 times the velocity at the centre. Take co-efficient of Pitot tube as 0.98. **(06 Marks)**

c. Following velocities are recorded in a stream with a current meter,

Depth above bed (m)	0	1	2	3	4
Velocity (m/s)	0	0.5	0.7	0.8	0.8

Find the discharge per unit width of stream near the point of measurement depth of flow at the point was 5 m. Use both single point and double point of assessment of discharge. **(06 Marks)**

8 a. Prove that discharge equation over Cipolletti notch is same as the equation of discharge over a suppressed rectangular notch. **(08 Marks)**

b. What are the advantages of triangular notch over rectangular notch? **(04 Marks)**

c. Find the Venturi head for a venturimeter which has its axis vertical. The inlet and throat diameters are 150 mm and 75 mm respectively. The throat is 225 mm above the inlet and petrol of sp. gravity 0.78 flows up through the meter at a rate of 0.029 ms/s. Take K = 0.96. Also find the pressure difference between inlet and the throat. **(08 Marks)**

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10CV36

Third Semester B.E. Degree Examination, Dec.2017/Jan.2018

Applied Engineering Geology

Time: 3 hrs. Max. Marks:100

Note: *Answer any FIVE full questions, selecting at least TWO questions from each part.*

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.

PART – A

1 a. Discuss the following physical properties of minerals Lustre, hardness and fracture. **(06 Marks)**

b. Discontinuities mark the interfaces separating the different layers of varying densities. Justify? **(08 Marks)**

c. Describe any two of the following minerals and add a note on their uses:
i) Agate ii) Chalcopyrite iii) Quartz **(06 Marks)**

2 a. What are the desirable properties required for the selection of building stones? **(06 Marks)**

b. Discuss the different igneous structures with neat sketches. **(08 Marks)**

c. Describe any two of the following rocks and add a note on their engineering use:
i) Granite ii) Marble iii) Slate **(06 Marks)**

3 a. Define soil. Give a brief account of soil groups of India. Add a note on soil erosion and its preventive measures. **(10 Marks)**

b. What is weathering? Write a note biological weathering. **(05 Marks)**

c. Define meanders. Add a note on base level of erosion. **(05 Marks)**

4 a. What is an earthquake? Give the different seismic zones of India. Add a note on the causes of an earthquake. **(10 Marks)**

b. Write a note on continental slope and tsunami. **(05 Marks)**

c. What are landslides? Add a note on precautionary measures of landslides. **(05 Marks)**

PART – B

5 a. What is unconformity, types and how it is recognized in the field? **(10 Marks)**

b. What are joints? Add a note on their importance in civil engineering projects. **(05 Marks)**

c. What is a fold? Describe the different parts of a fold with neat sketch. **(05 Marks)**

6 a. What is a dam? Describe the different geological considerations which lead to the success of dam. **(08 Marks)**

b. Critically examine any three of the following:
i) Sitting up of reservoir is a good sign for the safety of the dam.
ii) Dam located on rocks slopping downstream side.
iii) Bore wells are more advantageous than the dug well.
iv) A narrow gorge with enough catchment areas is not suitable as a reservoir. **(12 Marks)**

7 a. Write a note on geological and hydrological method of ground water exploration. **(08 Marks)**

b. What is an aquifer? Write a note on perched and confined aquifer. **(08 Marks)**

c. What is fluctuation of water table? Add a note on cone of depression. **(04 Marks)**

8 a. What is GIS? Write its application in civil engineering. **(06 Marks)**

b. Write a note on impact of dams on environment. **(06 Marks)**

c. What is remote sensing? Give a brief note on land sat imageries and stereoscope and their application in civil engineering. **(08 Marks)**

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USN | | | | | | | | | | | **MATDIP301**

Third Semester B.E. Degree Examination, Dec.2017/Jan.2018
Advanced Mathematics - I

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. Find the modulus and amplitude of $\frac{4+2i}{2-3i}$. **(06 Marks)**

b. Express the complex number $2 + 3i + \frac{1}{1-i}$ in the form a + ib. **(07 Marks)**

c. Simplify $\frac{(\cos 3\theta + i\sin 3\theta)^4(\cos 4\theta - i\sin 4\theta)^5}{(\cos 4\theta + i\sin 4\theta)^3(\cos 5\theta + i\sin 5\theta)^{-4}}$. **(07 Marks)**

2 a. Find the n^{th} derivative of $e^{ax}\sin(bx + c)$. **(06 Marks)**

b. Find the n^{th} derivative of $\frac{x^2}{2x^2+7x+6}$. **(07 Marks)**

c. If $y = e^{a\sin^{-1}x}$, prove that $(1-x^2)\,y_{n+2} - (2n+1)xy_{n+1} - (n^2 + a^2)y_n = 0$. **(07 Marks)**

3 a. If ϕ is the angle between the tangent and radius vector to the curve $r = f(\theta)$ at any point (r, θ), prove that $\tan\theta = \frac{rd\theta}{dr}$. **(06 Marks)**

b. Find the angle of intersection between the curves $r^n = a^n\cos n\theta$ and $r^n = b^n\sin n\theta$. **(07 Marks)**

c. Using Maclaurin's series, expand tan x up to the term containing x^5. **(07 Marks)**

4 a. If $Z = f(x + ct) + \phi(x - ct)$, prove that $\frac{\partial^2 z}{\partial t^2} = C^2\frac{\partial^2 z}{\partial x^2}$. **(06 Marks)**

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

c. 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)**

PART – B

5 a. Obtain the reduction formula for $\int \cos^n x\,dx$. **(06 Marks)**

b. Using reduction formula evaluate $\int_0^a \frac{x^7}{\sqrt{a^2 - x^2}}dx$. **(07 Marks)**

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

6 a. Evaluate $\int_0^1 \int_0^2 \int_1^2 x^2 yz \, dxdydz$. **(07 Marks)**

b. Prove that $\beta(m, n) = \dfrac{\Gamma(m)\Gamma(n)}{\Gamma(m+n)}$. **(07 Marks)**

c. Prove that $\Gamma\left(\frac{1}{2}\right) = \sqrt{\pi}$. **(06 Marks)**

7 a. Solve $3e^x \tan y \, dx + (1-e^x) \sec^2 y dy = 0$. **(06 Marks)**

b. Solve $(2x + 3y + 4)dx - (4x + 6y + 5)\, dy = 0$. **(07 Marks)**

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

8 a. Solve $\dfrac{d^2y}{dx^2} + 4\dfrac{dy}{dx} + 5y = -2 \cos hx$. **(06 Marks)**

b. Solve $(D^2 - 4D + 3)y = \sin 3x \cos 2x$. **(07 Marks)**

c. Solve $\dfrac{d^2y}{dx^2} + 4y = x^2 + \cos 2x$. **(07 Marks)**

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