III ME, CV (5)

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10MAT31

Third Semester B.E. Degree Examination, June/July 2015

Engineering Mathematics - III

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Expand f(x) = x sin x as a Fourier series in the interval $(-\pi, \pi)$, Hence deduce the following:

i) $\frac{\pi}{2} = 1 + \frac{2}{1.3} - \frac{2}{3.5} + \frac{2}{5.7}$

ii) $\frac{\pi-2}{4} = \frac{1}{1.3} - \frac{1}{3.5} + \frac{1}{5.7} - + \ldots$ **(07 Marks)**

b. Find the half–range Fourier cosine series for the function

$$f(x) = \begin{cases} kx, & 0 \le x \le \ell/2 \\ k(\ell - x), & \ell/2 < x \le \ell \end{cases}$$

Where k is a non-integer positive constant. **(06 Marks)**

c. Find the constant term and the first two harmonics in the Fourier series for f(x) given by the following table.

x :	0	$\pi/3$	$2\pi/3$	π	$4\pi/3$	$5\pi/3$	2π
F(x) :	1.0	1.4	1.9	1.7	1.5	1.2	1.0

(07 Marks)

2 a. Find the Fourier transform of the function $f(x) = xe^{-a|x|}$ **(07 Marks)**

b. Find the Fourier sine transforms of the

Functions $f(x) = \begin{cases} \sin x, & 0 < x < a \\ 0, & x \ge a \end{cases}$ **(06 Marks)**

c. Find the inverse Fourier sine Transform of

$F_s(\alpha) = \frac{1}{\alpha} e^{-a\alpha}$ a > 0. **(07 Marks)**

3 a. Find various possible solution of one dimensional wave equation $\frac{\partial^2 u}{\partial t^2} = C^2 \frac{\partial^2 u}{\partial x^2}$ by separable variable method. **(07 Marks)**

b. Obtain solution of heat equation $\frac{\partial u}{\partial t} = C^2 \frac{\partial^2 u}{\partial t^2}$ subject to condition u(0,t) =0, u (ℓ,t) = 0, u (x, 0) = f(x). **(06 Marks)**

c. Solve Laplace equation $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ subject to condition u (0, y) = u(ℓ,y) =0, u (x, 0) = 0, u (x, a) = $\sin\left(\frac{\pi x}{\ell}\right)$. **(07 Marks)**

4 a. The pressure P and volume V of a gas are related by the equation $PV^r = K$, where r and K are constants. Fit this equation to the following set of observations (in appropriate units)

P :	0.5	1.0	1.5	2.0	2.5	3.0
V:	1.62	1.00	0.75	0.62	0.52	0.46

(07 Marks)

b. Solve the following LPP by using the Graphical method :

Maximize : $Z = 3x_1 + 4x_2$

Under the constraints $4x_1 + 2x_2 \le 80$

$2x_1 + 5x_2 \le 180$

$x_1, x_2 \ge 0$. **(06 Marks)**

c. Solve the following using simplex method

Maximize : $Z = 2x + 4y$, subject to the

Constraint : $3x + y \le 2z$, $2x + 3y \le 24$, $x \ge 0$, $y \ge 0$. **(07 Marks)**

PART – B

5 a. Using the Regular – Falsi method, find a real root (correct to three decimal places) of the equation $\cos x = 3x - 1$ that lies between 0.5 and 1 (Here, x is in radians). **(07 Marks)**

b. By relaxation method

Solve : $-x + 6y + 27z = 85$, $54x + y + z = 110$, $2x + 15y + 6z = 72$. **(06 Marks)**

c. Using the power method, find the largest eigen value and corresponding eigen vectors of the matrix $A = \begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$

taking $[1, 1, 1]^T$ as the initial eigen vectors. Perform 5 iterations. **(07 Marks)**

6 a. From the data given in the following Table ; find the number of students who obtained (i) Less than 45 marks ii) between 40 and 45 marks.

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

(07 Marks)

b. Using the Lagrange's formula, find the interpolating polynomial that approximates to the function described by the following table:

x	0	1	2	3	4
f(x)	3	6	11	18	27

Hence find $f(0.5)$ and $f(3.1)$. **(06 Marks)**

c. Evaluate $\int_0^1 \frac{x}{1+x^2}dx$ by using Simpson's $\left(3/8\right)^{th}$ Rule, dividing the interval into 3 equal parts.

Hence find an approximate value of $\log\sqrt{2}$. **(07 Marks)**

7 a. Solve the one – dimensional wave equation $\frac{\partial^2 u}{\partial x^2} = \frac{\partial^2 u}{\partial t^2}$

Subject to the boundary conditions u (0, t) = 0, u (1, t) = 0, $t \ge 0$ and the initial conditions $u(x, 0) = \sin \pi x$, $\frac{\partial u}{\partial t}(x, 0) = 0$, $0 < x < 1$. **(07 Marks)**

b. Consider the heat equation $2\dfrac{\partial^2 u}{\partial x^2} = \dfrac{\partial u}{\partial t}$ under the following conditions:

i) $u(0, t) = u(4, t) = 0, \ t \geq 0$

ii) $u(x, 0) = x(4 - x), \ 0 < x < 4$.

Employ the Bendre – Schmidt method with $h = 1$ to find the solution of the equation for $0 < t \leq 1$. **(06 Marks)**

c. Solve the two – dimensional Laplace equation $\dfrac{\partial^2 u}{\partial x^2} = \dfrac{\partial^2 u}{\partial y^2} = 0$ at the interior pivotal points of the square region shown in the following figure. The values of u at the pivotal points on the boundary are also shown in the figure. **(07 Marks)**

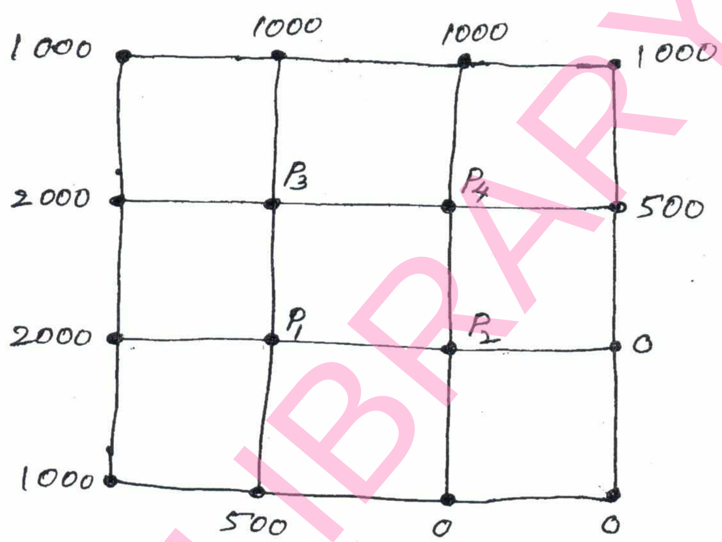

Fig. Q7 (c)

8 a. State and prove the recurrence relation of Z – Transformation hence find $Z_T(n^p)$ and $Z_T\left[\cosh\left(\dfrac{n\pi}{2} + \theta\right)\right]$. **(07 Marks)**

b. Find $Z_T^{-1}\left[\dfrac{z^3 - 20z}{(z-2)^3(z-4)}\right]$ **(06 Marks)**

c. Solve the difference equation

$y_{n+2} - 2y_{n+1} - 3y_n = 3^n + 2n$

Given $y_0 = y_1 = 0$. **(07 Marks)**

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Third Semester B.E. Degree Examination, June/July 2015
Building Materials and Construction Technology

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Explain various types of shallow foundations. **(05 Marks)**

b. What is subsoil exploration? Explain any one method. **(05 Marks)**

c. Design a strip footing for a brick wall 230mm thick, and 3.2m high above ground level. The wall carries a superimposed load of 100kN per metre run. The soil has unit weight of 18 kN/m^3, angle of repose 30°, SBC of 180 kN/m^2. The footing is provided with cement concrete base which has unit weight of 24 kN/m^3 and modulus of rupture of 480 kn/m^2. Take unit weight of brick masonry as 19.5 kN/m^3. **(10 Marks)**

2 a. Explain with sketches various types of closer bricks. **(05 Marks)**

b. Sketch plans of consecutive two layers of English bond for one and half brick thick wall. Also show the elevation of wall. **(10 Marks)**

c. Explain with a neat sketch Ashlar chamfered stone masonry. **(05 Marks)**

3 a. Explain with neat sketches, various types of Lintels. **(10 Marks)**

b. What are the advantages of arch over a lintel? **(05 Marks)**

c. What are the loads coming over a lintel and how they are estimated? **(05 Marks)**

4 a. Sketch a Queen post truss made of timber, which has to support tile roofing. Name the components of the truss and nature of force in them. **(08 Marks)**

b. Explain the requirements of a good floor. **(06 Marks)**

c. Explain with a neat sketch flat slab flooring. **(06 Marks)**

PART – B

5 a. Draw a neat sketch of a wooden door with shutter, name the parts. **(08 Marks)**

b. Write notes on: i) Revolving door; ii) Collapsible door; iii) Rolling shutter. **(12 Marks)**

6 a. Briefly explain the requirements of a good stair. **(05 Marks)**

b. Write a note on different types of stairs. **(05 Marks)**

c. Plan a stair case for a residential building in which the room size for the staircase is 3m × 4.5m and height between floor finishes is 3.30m. Draw neat sketches. **(10 Marks)**

7 a. What are the objects of plastering and pointing? **(06 Marks)**

b. Explain different types of plaster finishes. **(06 Marks)**

c. Describe types of paints available in marker and their specific usage. **(08 Marks)**

8 Write short notes on:

a. Types of glasses.

b. Use of plastics in buildings.

c. Formworks.

d. Damp proofing in building. **(20 Marks)**

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10CV/EV/CT33

Third Semester B.E. Degree Examination, June/July 2015
Strength of Materials

Time: 3 hrs. Max. Marks:100

Note: ***1. Answer any FIVE full questions, selecting atleast TWO questions from each part.***
2. Missing data, if any, may be suitably assumed.

PART – A

1 a. Define: i) Stress ii) Strain. **(04 Marks)**

b. Derive the relation between modulus of rigidity and Young's modulus of Elasticity and define elastic constants. **(08 Marks)**

c. The modulus of rigidity for a material is 51GPa. A 10mm diameter rod of the material was subjected to an axial load of 10kN and the change in diameter was observed to be 3×10^{-3}mm. Calculate the Poisson's ratio and the modulus of elasticity. **(08 Marks)**

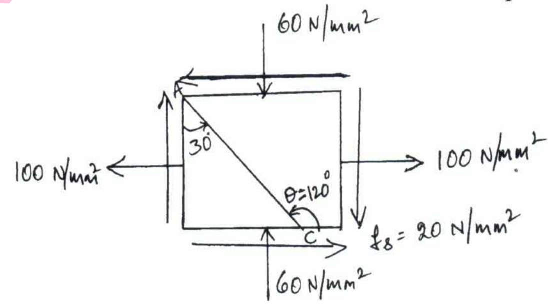
2 a. A reinforced concrete column 300mm × 300mm has 4 reinforcement bars of steel each 20mm in diameter. Calculate the safe load the column can take if the permissible stress in concrete 5.2 N/mm² and $\frac{E_{steel}}{E_{concrete}} = 18$. **(08 Marks)**

b. A compound bar made of steel plate 60mm wide and 10mm thick to which the copper plate 60mm wide and 5mm thick are rigidly connected to each other. The length of the bar is 0.7m. If the temperature is raised by 80°C. Determine the stress in each metal and the change in the length.
Take: $E_s = 200$ GPa $\alpha_s = 12 \times 10^{-6}/°C$
$E_{cu} = 100$ GPa $\alpha_{cu} = 17 \times 10^{-6}/°C$. **(12 Marks)**

3 a. Derive expressions for principal stresses and their planes for two dimensional stress systems. **(08 Marks)**

b. At a point in a strained material, the state of the stress is as shown in the Fig.Q.3(b). Calculate the normal and the shearing stress on the plane AC. Also find the principal stresses and their planes. Determine the maximum shear stress and their planes. **(12 Marks)**

Fig.Q.3(b)



4 a. Define: i) Shear force ii) Bending moment iii) Point of contra flexure. **(06 Marks)**

b. A beam ABCD, 8m long has supports at 'A' and at 'C' which is 6m from 'A'. The beam carries a UDL of 10kN/m between 'A' and 'C' at point B a 30kN concentrated load acts 2m from the support A and a point load of 15kN acts at the free end 'D'. Draw the SFD and BMD giving salient values. Also locate the point of contra-flexure if any. **(14 Marks)**

PART – B

5 a. Derive Bernoulli-Euler bending equation $\frac{M}{I} = \frac{f}{y} = \frac{E}{R}$. **(06 Marks)**

b. The cross section of a beam is shown in Fig.Q.5(b). The shear force on the section is 410kN. Estimate the shear stresses at various points and plot the shear distribution diagram. **(14 Marks)**

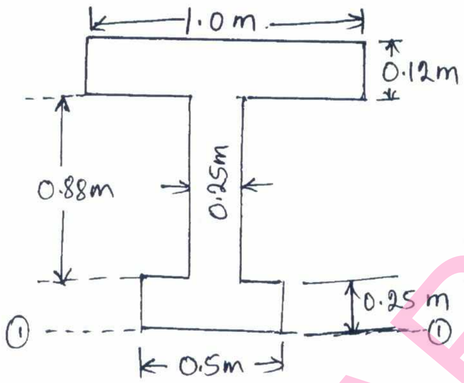


Fig.Q.5(b)

6 a. Derive the equation $EI\frac{d^2y}{dx^2} = M_x$ with usual notation. **(06 Marks)**

b. A beam of constant C/S 10m long is freely supported at its ends and loaded with 2 loads of 60kN each at 3m from either end. Find the slope at the support and the deflection under any one load. Take EI constant. **(14 Marks)**

7 a. List the assumptions made in the theory of pure torsion. **(04 Marks)**

b. Explain: i) Polar modulus; ii) Torsional rigidity; iii) Polar moment of inertia. **(06 Marks)**

c. A solid shaft is to transmit 340 kN-m at 120rpm. If the shear stress of the material should not exceed 80MPa. Find the diameter required. What percentage saving in weight would be obtained if this shaft is replaced by a hollow one whose $d_i = 0.6d_o$, the length, material and shear stress remaining same. **(10 Marks)**

8 a. Distinguish between short column and long column. **(04 Marks)**

b. Explain:
i) Effective length of column
ii) Slenderness ratio
iii) Buckling load. **(06 Marks)**

c. Determine the Euler's crushing load for a hollow cylindrical cast iron column 150mm external diameter and 20mm thick. If it is hinged at both the ends and 6m long compare this load with the crushing load as given by Rankine's formula. Use the constants:

$f_c = 550MPa$ $\quad \alpha = \frac{1}{1600}$ $\quad E = 80$ GPa. **(10 Marks)**

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Third Semester B.E. Degree Examination, June/July 2015
Surveying – I

Time: 3 hrs. Max. Marks:100

Note: ***1. Answer any FIVE full questions, selecting atleast TWO questions from each part.***
2. Missing data, if any, may be suitably assumed.

PART – A

1 a. List the different methods of surveying. What are their objectives or place of application? **(06 Marks)**
b. Bring out the difference between 'Precision' and 'Accuracy'. **(06 Marks)**
c. What is map? State the numbering method in a map. **(08 Marks)**

2 a. Brief the working principle of an EDM. **(06 Marks)**
b. With a neat sketch describe the concept of "Reciprocal Ranging". **(06 Marks)**
c. The length of a line measured with 20.0 m chain was 1341.0m. The same line when measured with 30.0 m chain which was 20 cm too short was found to be 1350.00 m. Determine the error in 20.00 m chain. **(08 Marks)**

3 a. Explain with a neat sketch, the working of and use of an "Optical Square". **(06 Marks)**
b. Write the procedure to overcome an obstacle for chain surveying when both vision and chaining is obstructed. **(06 Marks)**
c. Two stations 'P' and 'Q' were taken on southern side bank of a river flowing west to east pt. 'P' is wastewords of pt 'Q', at 75 m apart. The bearings of a tree 'R' on the northern side of the bank is observed to be equal to 38° and 338° respectively from 'P' and 'Q'. Calculate the width of the river. **(08 Marks)**

4 a. Distinguish between :
i) WCB and QB
ii) Dip and declination
iii) Magnetic bearing and true bearing with reference to compass surveying. **(06 Marks)**
b. State how 'Prismatic Compass" is different from 'Surveyors compass'. **(06 Marks)**
c. Following is a closed traverse ABCDA conducted clockwise. Fore bearings of the lines are as follows : determine the values of included angle and apply the check

Line	AB	BC	CD	DA
FB	40°	70°	210°	280°

(08 Marks)

PART – B

5 a. Explain 'Bowditch's rule' adopted for adjusting a closed traverse. **(08 Marks)**
b. The fore and book bearings of a closed traverse is given below. Correct the bearing for local attraction, by identifying the stations affected by local attraction. **(12 Marks)**

Line	AB	BC	CD	DA
FB	32° 30′	124° 30′	181° 0′	289° 30′
BB	214°30′	303° 15′	1° 0′	108° 45′

6 a. Define the following terms with respect to leveling. :
i) Bench mark ii) Backsight iii) Change point vi) Fore sight v) Reduced level vi) Height of collimation. **(06 Marks)**

b. What are the 'Temporary Adjustments' of a Dumpy level? **(06 Marks)**

c. Following observations refer to a 'Reciprocal Leveling'. Calculate the elevation of pt 'B' if that of 'A' is 100.150 m, by deterring the collimation error. **(08 Marks)**

Inst at	Staff reading on		Remarks
A	1.824	2.748	AB = 1000.00
B	0.928	1.606	

7 a. Enumerate the characteristics of contour lines. **(08 Marks)**

b. The following readings were taken with a dumpy level on a sloping ground at a common interval of 5.0 m. The RC of first point is 200.00. Rule out a page of level book and enter the readings. Calculate the reduced levels of all the points and the gradient between first and last point. 0.405, 1.990, 2.030, 3.120, 3.700, 0.910, 1.815, 2.750, 3.660, 0.430, 1.455. **(12 Marks)**

8 a. Explain the procedure adopted to measure the distance between two mutually inaccessible points by plane table surveying. **(06 Marks)**

b. State the importance of orientation in plane tabling. What are the methods available for orientation? **(06 Marks)**

c. Describe the method of 'Resection' by 'Bessels graphical method". **(08 Marks)**

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10CV35

Third Semester B.E. Degree Examination, June/July 2015
Fluid Mechanics

Time: 3 hrs. Max. Marks:100

Note:1. ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***
2. ***Assume missing data if any, suitably.***

PART - A

1 a. Write units and dimensions of power, viscosity and surface tension. **(06 Marks)**
b. What is the pressure corresponding to 25cm column of kerosene of relative density 0.8? What is the equivalent head of mercury corresponding to this pressure? $\gamma_{water} = 9.79 kN/m^3$. **(06 Marks)**
c. A 90N rectangular solid block slides down a 30^0 inclined plane. The plane is lubricated by a 3mm thick film of oil of relative density 0.9 and viscosity 0.8 pa.s. If the contact area is $0.3m^2$ estimate the terminal velocity of the block. **(08 Marks)**

2 a. State and prove Pascal's law. **(06 Marks)**
b. With a illustrative sketch, show relationships between pressures (Absolute, gaugue , vacuum etc). **(06 Marks)**
c. A simple U – tube manometer containing mercury is connected to a pipe in which an oil of specific gravity 0.8 is flowing. The pressure in the pipe is vacuum. The other end of the pipe is open to atmosphere. Find the vacuum pressure in pipe if the difference of mercury (RD = 13.6) level in the two limbs is 200mm and height of oil in the left limb from the centre of the pipe is 150mm below. **(08 Marks)**

3 a. A vertical isosceles triangular gate with its vertex up has a base width of 2m and a height of 1.5m. If the vertex of the gate is 1m below the free water surface, find the total pressure force and the position of the centre of pressure on one side of the plate $\gamma_{water} = 9.79kN/m^3$. **(10 Marks)**
b. Prove that for a plate kept horizontal in a liquid will have its centroid coinciding with centre of pressure. **(10 Marks)**

4 a. Show that in an inviscid irrotational flow the stream lines and equipotential lines cross each other at right angles. **(06 Marks)**
b. Verify whether $\phi = m \ln x$ is a valid potential function. **(04 Marks)**
c. For the two dimensional flow field given by $u = 4x^3$ and $v = -12x^2y$ evaluate the stream function Ψ and the velocity v at point (1, 2). Take $\Psi = 0$ @ x = 0 & y = 0. **(10 Marks)**

PART - B

5 a. In a Siphon pipe installed in a tank, the velocity of flow in the pipe is 5m/s. Taking the atmospheric pressure head as 10.3m and the vapour pressure head as 0.2m. Calculate the maximum height measured above the tank water surface at which the summit can be located without the Siphon action being disrupted (neglect friction and other losses). **(06 Marks)**
b. Write the assumptions in Bernoulli's equation. **(04 Marks)**
c. A pipe of 300mm diameter is conveying $0.3m^3/s$ of water has a right angled bend in horizontal plane. Find the resultant force exerted on the bend if the pressure at inlet and outlet of the bend are 24.525×10^4 p.a and 23.544×10^4 p.a respectively. **(10 Marks)**

6 a. A horizontal pipe of diameter D_1 has a sudden expansion to a diameter D_2. At what ratio D_1/D_2 would the differential pressure on either side of the expansion be maximum? What is the corresponding loss of head differential pressure head? **(12 Marks)**

b. A 0.5m diameter and 100m long pipeline carrying $0.5 m^3/s$ of water is fitted with a valve at the downstream end. Calculate the rise of pressure caused within the pipe due to valve closure if i) instantaneously and ii) in 1 second. Assume sonic velocity as 1430 m/s. **(08 Marks)**

7 a. A pitot tube is inserted in a pipe of 300mm diameter. The static pressure of the tube is 100mm of mercury vacuum. The stagnation pressure at the centre of pipe recorded by the pitot tube is $1 \times 10^{-4} N/mm^2$. Calculate the rate of flow of water through the pipe. If the mean velocity of flow is 0.85 times the central velocity. Assume coefficient of the tube to be 0.98. $\gamma_{water} = 9.79 kN/m^3$. **(10 Marks)**

b. With a neat sketch, explain vertical staff gauge and sectional staff gauge. **(10 Marks)**

8 a. A 300mm × 150mm venturimeter is provided in a vertical pipe line carrying oil of Sp gravity 0.9,flow being upwards. The difference in elevation of the throat section and entrance section of the venturimeter is 300mm. The differential U – tube manometer shows a deflection of 250mm. Calculate i) the discharge of oil ii) pressure difference between entrance and throat section. Coefficient of meter = 0.98 and specific gravity of mercury = 13.6. **(12 Marks)**

b. A rectangular notch 40cm long is used for measuring a discharge of 30 ℓps. An error of 1.5mm was made while measuring the head over the notch. Calculate the percent error in the discharge $C_d = 0.6$. **(08 Marks)**

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MATDIP301

Third Semester B.E. Degree Examination, June/July 2015
Advanced Mathematics – I

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions.***

1 a. Express the complex number $\dfrac{(5-3i)(2+i)}{4+2i}$ in the form x + iy. **(06 Marks)**

b. Find the modulus and the amplitude of $1 + \cos\theta + i\sin\theta$. **(07 Marks)**

c. Find the cube roots of 1 + i. **(07 Marks)**

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

b. Find the n^{th} derivative of $\dfrac{x}{(x+1)(2x+3)}$. **(07 Marks)**

c. If x = tan (log y) prove that $(1 + x^2)\, y_{n+1} + (2nx - 1)\, y_n + n\,(n - 1)\, y_{n-1} = 0$. **(07 Marks)**

3 a. Find the angle of intersection of the curves $r^n = a^n \cos n\theta$, $r^n = b^n \sin n\theta$. **(06 Marks)**

b. Find the Pedal equation of the curve $r = a\,(1 - \cos\theta)$. **(07 Marks)**

c. Using Maclcaurin's series expand log(1 + x) upto the term containing x^4. **(07 Marks)**

4 a. If u = f(x + ct) + g(x – ct) show that $\dfrac{\partial^2 u}{\partial t^2} = c^2 \dfrac{\partial^2 u}{\partial x^2}$. **(06 Marks)**

b. If $u = f\left(\dfrac{x}{y}, \dfrac{y}{z}, \dfrac{z}{x}\right)$ prove that $xu_x + yu_y + zu_z = 0$. **(07 Marks)**

c. If u = x + y, v = y + z, w = z + x find the value of $\dfrac{\partial(u,v,w)}{\partial(x,y,z)}$. **(07 Marks)**

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

b. Evaluate $\displaystyle\int_0^a \frac{x^4}{\sqrt{a^2 - x^2}}\,dx$. **(07 Marks)**

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

6 a. Define beta and gamma functions and prove that $\Gamma(n + 1) = n\Gamma(n)$. **(06 Marks)**

b. Show that $\displaystyle\int_0^{\pi/2} \sqrt{\sin\theta}\, d\theta \times \int_0^{\pi/2} \frac{1}{\sqrt{\sin\theta}}\, d\theta = \pi$. **(07 Marks)**

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

7 a. Solve : $\frac{dy}{dx} = \cos(x + y + 1)$. **(06 Marks)**

b. Solve : $(x^2 - y^2)\,dx - xydy = 0$. **(07 Marks)**

c. Solve : $\frac{dy}{dx} + y\cot x = 4x\,\mathrm{cosec}\,x$. **(07 Marks)**

8 a. Solve : $(D^3 - 6D^2 + 11D - 6)\,y = 0$. **(06 Marks)**

b. Solve : $(D^2 + 2D + 1) = x^2 + e^{+x}$. **(07 Marks)**

c. Solve : $(D^2 + D + 1)y = \sin 2x$. **(07 Marks)**

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