[1,69,320 प्रतियाँ]

Roll No. 1933315701011

Code No. : 2041(A)

[Total No. of Pages : 8

Sl. No. 079540

ODD SEMESTER EXAMINATION DECEMBER - 2018

[First Semester] Three Years Diploma Course in Civil Engineering [322]

[First Semester] Three Years Diploma Course in Civil Engg. (Environmental Pollution & Control) [323]

[First Semester] Three Years Diploma Course in Electrical Engineering [328]

[First Semester] Three Years Diploma Course in Electrical Engineering (Industrial Control) [329]

[First Semester] Three Years Diploma Course in Electronics Engineering [330]

[First Semester] Three Years Diploma Course in Electronics Engg. (Modern Consumer Electronics Appliances) [331]

[First Semester] Three Years Diploma Course in Electronics Engg. (Advance Micro Processor & Interface) [332]

[First Semester] Three Years Diploma Course in Electronics Engineering (Micro Electronics) [333]

[First Semester] Three Years Diploma Course in Instrumentation & Control Engg. [338]

[First Semester] Three Years Diploma Course in Mechanical Engineering (Automobile) [341]

[First Semester] Three Years Diploma Course in Mechanical Engineering (Computer Aided Design) [342]

[First Semester] Three Years Diploma Course in Mechanical Engineering (Production) [343]

[First Semester] Three Years Diploma Course in Mechanical Engineering (RAC) [344]

[First Semester] Three Years Diploma Course in Mechanical Engineering (Maintenance) [345]

[First Semester] Three Years Diploma Course in Chemical Engineering [352]

[First Semester] Three Years Diploma Course in Computer Science and Engineering [355]

[First Semester] Three Years Diploma Course in Information Technology [356]

[1,69,320 प्रतियाँ] Code No. : 2041(A)

APPLIED MATHEMATICS - I

Time : 2.30 Hours] [Maximum Marks : 50
[Minimum Marks : 17

NOTES :

i) Attempt all questions.

ii) Students are advised to specially check the Numerical Data of question paper in both versions. If there is any difference in Hindi Translation of any question, the students should answer the question according to the English version.

iii) Use of Pager and Mobile Phone by the students is not allowed.

Q1) Answer any ten parts of the following from parts a to e select the correct choice in the following. **[10 × 1 = 10]**

a) The sum of 10 terms of the series $4 + 8 + 12 + ...$

i) 110 ii) 220

iii) 330 iv) None

b) If $f(x) = \tan x$ then the value of $f(60°)$ is

i) $\sqrt{3}$ ii) $\frac{1}{\sqrt{3}}$

iii) ∞ iv) 1

c) If $\bar{a} = 2\hat{i} + 3\hat{j} + \hat{k}$ then $|\bar{a}|$ is

i) $\sqrt{12}$ ii) $\sqrt{14}$

iii) $\sqrt{11}$ iv) None

d) The value of $\sin^2\alpha + \cos^2\alpha$ is

i) 0 ii) 1

iii) -1 iv) None

e) The value of $\frac{d^2y}{dx^2}$ is

i) $\frac{1}{x}$ ii) $\frac{1}{x^2}$

iii) $-\frac{1}{x^2}$ iv) None

where $y = \log x$

f) Evaluate $\begin{vmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{vmatrix}$.

g) Evaluate $\lim_{x \to 3} \frac{x^2 - 9}{x - 3}$.

h) Find the differential coefficient of $x \log x$.

i) Change into Polar form $-1 + i$.

j) Find the equation of tangent to ellipse $\frac{x^2}{9} + \frac{y^2}{4} = 1$ at point (1, 2).

k) If $\bar{a} = \hat{i} + \hat{j} - 2\hat{k}$ and $\bar{b} = 3\hat{i} + 2\hat{j} - \hat{k}$ then find the value of $\bar{a} . \bar{b}$.

l) If $y = x^3 + 3x^2 - 7x + 9$ then find $\frac{d^3y}{dx^3}$

[1,69,320 प्रतियाँ]

Q2) Answer any five parts of the following : **[5 × 2 = 10]**

a) Which term of series $1, \sqrt{3}, 3, \ldots\ldots$ is 81?

b) Find the sum of series $101 + 99 + 97 + \ldots\ldots + 47$.

c) $\frac{(2+3i)^2}{5-i}$ change into $a + ib$ form.

d) Find the differential coefficient of $\cos(\tan x^2)$

e) Prove that in ΔABC

$a(b\cos C - c\cos B) = (b^2 - c^2)$

f) If $y=\sqrt{\sin x+\sqrt{\sin x+\sqrt{\sin x+}}} \ldots\infty$ then prove that $\frac{dy}{dx}=\frac{\cos x}{2y-1}$

g) Prove that $(1+i)^4.\left(1+\frac{1}{i}\right)^4=16$.

Q3) Answer any two parts of the following : **[2 × 5 = 10]**

a) Find the independent term from x in the expansion of $\left(2x^4-\frac{1}{3x^7}\right)^{11}$

b) Solve the equation $x^3 - 1 = 0$ using Demoivres theorem.

c) Show that the angle between vectors $\bar{a}=3\hat{i}+\hat{j}+2\hat{k}$ and $\bar{b}=2\hat{i}-2\hat{j}+4\hat{k}$ is $\theta=\sin^{-1}\left(\frac{2}{\sqrt{7}}\right)$.

[1,69,320 प्रतियाँ] Code No. : 2041(A)

Q4) Answer any two parts of the following : [2 × 5 = 10]

a) Solve the equations using Cramer's rule $6x + y - 3z = 5$, $x + 3y - 2z = 5$ and $2x + y + 4z = 8$.

b) Find the differential coefficient of $\sqrt{\tan x}$ from the first principle.

c) If $y = a\cos(\log x) + b\sin(\log x)$ then prove that $x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} + y = 0$.

Q5) Answer any two parts of the following : [2 × 5 = 10]

a) Find the differential coefficient $\left(\frac{x+\cos x}{\tan x}\right)$

b) If vectors $\bar{a}, \bar{b}, \bar{c}$ are such that $\bar{a} + \bar{b} + \bar{c} = 0$ prove that $\bar{a} \times \bar{b} = \bar{b} \times \bar{c} = \bar{c} \times \bar{a}$.

c) Find the equation of Normal to the curve $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ at (x_1, y_1).

(P.T.O.)

Code No. : 2041(A)

[1,69,320 प्रतियाँ]

(हिन्दी अनुवाद)

नोट :- सभी प्रश्नों के उत्तर दीजिए ।

प्र.1) किन्हीं दस भागों को हल करो। निम्नलिखित में भाग अ से य तक सही विकल्प चुनिये ।[10 × 1 = 10]

अ) श्रेणी $4 + 8 + 12 + \ldots\ldots$ के दस पदो का योग होगा ।

i) 110 ii) 220

iii) 330 iv) कोई नही

ब) यदि $f(x) = \tan x$ तो $f(60°)$ का मान होगा ।

i) $\sqrt{3}$ ii) $\frac{1}{\sqrt{3}}$

iii) ∞ iv) 1

स) यदि $\bar{a} = 2\hat{i} + 3\hat{j} + \hat{k}$ तब $|\bar{a}|$ होगा ।

i) $\sqrt{12}$ ii) $\sqrt{14}$

iii) $\sqrt{11}$ iv) कोई नही

द) $\sin^2\alpha + \cos^2\alpha$ का मान होगा ।

i) 0 ii) 1

iii) –1 iv) कोई नही

य) $\frac{d^2y}{dx^2}$ का मान होगा ।

i) $\frac{1}{x}$ ii) $\frac{1}{x^2}$

iii) $-\frac{1}{x^2}$ iv) कोई नहीं

यदि $y = \log x$

[1,69,320 प्रतियाँ]

Code No. : 2041(A)

र) हल करो $\begin{vmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{vmatrix}$.

10]

ल) $\lim_{x \to 3} \frac{x^2-9}{x-3}$ का मान ज्ञात करो ।

व) $x \log x$ का अवकल गुणांक ज्ञात करो ।

त) $-1 + i$ को ध्रुवीय रूप में बदलो ।

थ) दीर्घवृत्त $\frac{x^2}{9}+\frac{y^2}{4}=1$ के बिन्दु (1, 2) पर स्पर्श रेखा का समीकरण ज्ञात करो ।

द) यदि $\bar{a}=\hat{i}+\hat{j}-2\hat{k}$ और $\bar{b}=3\hat{i}+2\hat{j}-\hat{k}$ तो $\bar{a}.\bar{b}$ का मान ज्ञात करो ।

ध) यदि $y = x^3 + 3x^2 - 7x + 9$ तो $\frac{d^3y}{dx^3}$ का मान ज्ञात करो ।

प्र.2) किन्हीं पाँच भागों को हल कीजिये । **[5 × 2 = 10]**

अ) श्रेणी $1, \sqrt{3}, 3, \ldots\ldots$ का कौन सा पद 81 होगा?

ब) श्रेणी $101 + 99 + 97 + \ldots\ldots + 47$ का योगफल ज्ञात करो ।

स) $\frac{(2+3i)^2}{5-i}$ को $a + ib$ रूप में बदलो ।

द) अवकल गुणांक ज्ञात करो $\cos(\tan x^2)$

य) ΔABC में सिद्ध करो ।
$a(b\cos C - c\cos B) = (b^2 - c^2)$

र) यदि $y=\sqrt{\sin x+\sqrt{\sin x+\sqrt{\sin x+}}}\ldots\infty$ तो सिद्ध करो $\frac{dy}{dx}=\frac{\cos x}{2y-1}$

ल) सिद्ध करो $(1+i)^4.\left(1+\frac{1}{i}\right)^4=16$.

[1,69,320 प्रतियाँ]

प्र.3) किन्हीं दो भागों को हल कीजिये । **[2 × 5 = 10]**

अ) $\left(2x^4-\frac{1}{3x^7}\right)^{11}$ के प्रसार में x से स्वतन्त्र पद ज्ञात करो ।

ब) डिमाँयवर प्रमेय से $x^3 - 1 = 0$ को हल करो ।

स) यदि $\bar{a}=3\hat{i}+\hat{j}+2\hat{k}$ और $\bar{b}=2\hat{i}-2\hat{j}+4\hat{k}$ तो सिद्ध करो उनके बीच का कोण है $\theta=\sin^{-1}\left(\frac{2}{\sqrt{7}}\right)$.

प्र.4) किन्हीं दो भागों को हल कीजिये । **[2 × 5 = 10]**

अ) क्रेमर नियम से निम्न समीकरण हल करो $6x + y - 3z = 5$, $x + 3y - 2z = 5$ तथा $2x + y + 4z = 8$.

ब) प्रथम सिद्धान्त से $\sqrt{\tan x}$ का अवकल गुणांक ज्ञात करो ।

स) यदि $y = a\cos(\log x) + b\sin(\log x)$ तो सिद्ध करो $x^2\frac{d^2y}{dx^2}+x\frac{dy}{dx}+y=0$.

प्र.5) निम्नलिखित में दो भाग हल करो । **[2 × 5 = 10]**

अ) $\left(\frac{x+\cos x}{\tan x}\right)$ का अवकल गुणांक ज्ञात करो ।

ब) यदि $\bar{a},\bar{b},\bar{c}$ तीन सदिश इस प्रकार है $\bar{a}+\bar{b}+\bar{c}=0$ सिद्ध करो कि $\bar{a}\times\bar{b}=\bar{b}\times\bar{c}=\bar{c}\times\bar{a}$.

स) वक्र $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ को बिन्दु (x_1, y_1) पर अभिलम्ब का समीकरण ज्ञात करो ।