

[49,620 प्रतियाँ]

Roll No

Code No. : 2041(B)

Sl. No.

[Total No. of Pages : 8

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] <https://www.bteuonline.com>
[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 (R.A.C) [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]

[49,620 प्रतिष्ठा]

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 11th term of the series 3, 6, 9, is
- | | |
|---------|----------|
| i) 63 | ii) 36 |
| iii) 93 | iv) None |

- b) If $f(x) = \sin x$ then the value of $f\left(\frac{\pi}{2}\right)$ is
- | | |
|---------|----------|
| i) 1 | ii) 0 |
| iii) -1 | iv) None |

- c) If $\vec{a} = \hat{i} + \hat{j} + \hat{k}$ and $\vec{b} = -2\hat{i} + 2\hat{j} - 2\hat{k}$ then the value of $\vec{a} \cdot \vec{b}$ is
- | | |
|--------|----------|
| i) 2 | ii) -2 |
| iii) 0 | iv) None |

- d) The value of $\sec^2\theta - \tan^2\theta$ is
- | | |
|--------|----------|
| i) 0 | ii) -1 |
| iii) 2 | iv) None |

[49,620 प्रतियाँ]

Code No. : 2041(B)

e) If $y = \sqrt{x}$ then the value of $\frac{dy}{dx}$ is

i) $\frac{1}{2\sqrt{x}}$

ii) $\frac{2}{\sqrt{x}}$

iii) $\frac{\sqrt{x}}{2}$

iv) None

f) Evaluate with out expanding

$$\begin{vmatrix} 2 & 1 & 5 \\ 4 & 2 & 6 \\ 6 & 3 & 7 \end{vmatrix}$$

g) Evaluate $\lim_{x \rightarrow 2} \frac{x^2 - 4}{x - 2}$.

h) Find the differential coefficient of $y = x^m + 3x$.

i) Represent into Polar form $1 + i$.

j) Find the equation of tangent of curve $x^2 + y^2 = 4$ at point (4, 5).

k) If $\vec{a} = 2\hat{i} + 3\hat{j} + 4\hat{k}$ and $\vec{b} = \hat{i} - \hat{j} + \hat{k}$ then find the angle between them.

l) If $y = x^4 + 3x^3 - 5x$ then find $\frac{d^2y}{dx^2}$

Q2) Answer any five parts of the following :

[5 × 2 = 10]

a) Evaluate $\frac{(\cos\theta + i\sin\theta)^3}{(\cos\theta - i\sin\theta)^7}$

b) Find the sum of the series

$$\sqrt{3} + 3 + 3\sqrt{3} + \dots + 729$$

c) $\frac{3+7i}{4-3i}$ Represent into $a + ib$ form.

[49,620 प्रतिबा]

Code No. : 2041(B)

d) Find the differential coefficient of $\log(\log x)$

e) Prove that in ΔABC

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

f) If $y = \sqrt{\tan x + \sqrt{\tan x + \sqrt{\tan x + \dots \infty}}}$ then prove that $(2y-1) \frac{dy}{dx} = \sec^2 x$

g) Prove that $\left[i^{18} + \left(\frac{1}{i} \right)^{25} \right]^3 = 2 - 2i$.

Q3) Answer any two parts of the following :

[2 × 5 = 10]

- Find the middle term in the expansion of $\left(x^3 + \frac{1}{x} \right)^4$.
- Solve the equation $x^4 + 1 = 0$ using Demovires theorem.
- Show that the angle between the vectors

$$\vec{a} = \hat{i} + \hat{j} + \hat{k} \text{ and } \vec{b} = 2\hat{i} + 2\hat{j} \text{ is } \theta = \sin^{-1} \left(\frac{1}{\sqrt{3}} \right).$$

Q4) Answer any two parts of the following :

[2 × 5 = 10]

- Solve the equations using Cramer's rule $x + y + z = 6$, $x - y + z = 2$, $2x + y - z = 1$.
- Find the differential coefficient of $\sqrt{\sin x}$ from the first principle.
- If $y = (\cos x)^{(\cos x)^{(\cos x)^{\dots \infty}}}$ then prove that $\frac{dy}{dx} = \frac{-y^2 \tan x}{1 - \log \cos x}$.

[49,620 प्रतियाँ]

Code No. : 2041(B)

Q5) Answer any two parts of the following :-

[2 × 5 = 10]

a) Find the differential coefficient of $\frac{\sqrt{a} + \sqrt{x}}{\sqrt{a} - \sqrt{x}}$.

b) Prove that $\left(\frac{1 + \sin \phi + i \cos \phi}{1 + \sin \phi - i \cos \phi}\right)^n = \cos\left(\frac{n\pi}{2} - n\phi\right) + i \sin\left(\frac{n\pi}{2} - n\phi\right)$.

c) Find the equation of tangent of the curve $\frac{x^2}{9} + \frac{y^2}{16} = 1$ at point (1, 2).



<https://www.bteuonline.com>

Whatsapp @ 9300930012

Send your old paper & get 10/-

अपने पुराने पेपर्स भेजे और 10 रुपये पायें,

Paytm or Google Pay से

(हिन्दी अनुवाद)

नोट :- सभी प्रश्नों के उत्तर दीजिए ।

प्र.1) किन्हीं दस भागों को हल कीजिये । निम्नलिखित में भाग अ से य तक सही विकल्प चुनिये ।

[10 × 1 = 10]

अ) श्रेणी 3, 6, 9, का 11 वाँ पद होगा ।

i) 63

ii) 36

iii) 93

iv) कोई नहीं

ब) यदि $f(x) = \sin x$ तो $f\left(\frac{\pi}{2}\right)$ का मान होगा ।

i) 1

ii) 0

iii) -1

iv) कोई नहीं

स) यदि $\vec{a} = \hat{i} + \hat{j} + \hat{k}$ और $\vec{b} = -2\hat{i} + 2\hat{j} - 2\hat{k}$ तो $\vec{a} \cdot \vec{b}$ का मान होगा ।

i) 2

ii) -2

iii) 0

iv) कोई नहीं

द) $\sec^2\theta - \tan^2\theta$ का मान होगा ।

i) 0

ii) -1

iii) 2

iv) कोई नहीं

य) यदि $y = \sqrt{x}$ तो $\frac{dy}{dx}$ का मान होगा ।

i) $\frac{1}{2\sqrt{x}}$

ii) $\frac{2}{\sqrt{x}}$

iii) $\frac{\sqrt{x}}{2}$

iv) कोई नहीं

[49,620 प्रतिर्षी]

Code No. : 2041(B)

र) बिना प्रसार किये हल करो

$$\begin{vmatrix} 2 & 1 & 5 \\ 4 & 2 & 6 \\ 6 & 3 & 7 \end{vmatrix}$$

ल) हल करो $\lim_{x \rightarrow 2} \frac{x^2 - 4}{x - 2}$

व) $y = x^m + 3x$ का अवकल गुणांक ज्ञात करो ।

त) $1 + i$ को ध्रुवीय रूप में बदलो ।

थ) वक्र $x^2 + y^2 = 4$ की बिन्दु (4, 5) पर स्पर्श रेखा का समीकरण ज्ञात करो ।

द) यदि $\vec{a} = 2\hat{i} + 3\hat{j} + 4\hat{k}$ और $\vec{b} = \hat{i} - \hat{j} + \hat{k}$ तब उनके बीच का कोण ज्ञात करो ।

ध) यदि $y = x^4 + 3x^3 - 5x$ तो $\frac{d^2y}{dx^2}$ का मान ज्ञात करो ।

प्र.2) किन्हीं पाँच भागों को हल कीजिये ।

[5 × 2 = 10]

अ) $\frac{(\cos \theta + i \sin \theta)^3}{(\cos \theta - i \sin \theta)^7}$ को सरल करो ।

ब) श्रेणी $\sqrt{3} + 3 + 3\sqrt{3} + \dots + 729$ का योगफल ज्ञात करो ।

स) $\frac{3+7i}{4-3i}$ को $a + ib$ रूप में बदलो ।

द) फलन $\log(\log x)$ का अवकल गुणांक ज्ञात करो

य) ΔABC में सिद्ध करो ।

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

र) यदि $y = \sqrt{\tan x + \sqrt{\tan x + \sqrt{\tan x + \dots \infty}}}$ तो सिद्ध करो $(2y-1) \frac{dy}{dx} = \sec^2 x$

ल) सिद्ध करो $\left[i^{18} + \left(\frac{1}{i} \right)^{25} \right]^3 = 2 - 2i$

[49,620 प्रतिर्षा]

Code No. : 2041(B)

प्र.3) किन्हीं दो भागों को हल कीजिये ।

[2 × 5 = 10]

अ) $\left(x^3 + \frac{1}{x}\right)^4$ के प्रसार में मध्य पद ज्ञात करो ।

ब) समीकरण $x^3 + 1 = 0$ को डिमावयवर प्रमेय की सहायता से हल करो ।

स) सदिशो $\vec{a} = \hat{i} + \hat{j} + \hat{k}$ तथा $\vec{b} = 2\hat{i} + 2\hat{j}$ तो सिद्ध करो उनके बीच कोण

$$\theta = \sin^{-1}\left(\frac{1}{\sqrt{3}}\right) \text{ है ।}$$

प्र.4) किन्हीं दो भागों को हल कीजिये ।

[2 × 5 = 10]

अ) क्रमेर नियम से निम्न समीकरण हल करो

$$x + y + z = 6, x - y + z = 2, 2x + y - z = 1$$

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

स) यदि $y = (\cos x)^{(\cos x)^{(\cos x) \dots}}$ तो सिद्ध करो $\frac{dy}{dx} = \frac{-y^2 \tan x}{1 - \log \cos x}$

प्र.5) किन्हीं दो भागों को हल कीजिये ।

[2 × 5 = 10]

अ) $\frac{\sqrt{a} + \sqrt{x}}{\sqrt{a} - \sqrt{x}}$ का अवकल गुणांक ज्ञात करो ।

ब) सिद्ध करो कि $\left(\frac{1 + \sin \phi + i \cos \phi}{1 + \sin \phi - i \cos \phi}\right)^n = \cos\left(\frac{n\pi}{2} - n\phi\right) + i \sin\left(\frac{n\pi}{2} - n\phi\right)$

स) वक्र $\frac{x^2}{9} + \frac{y^2}{16} = 1$ के बिन्दु (1, 2) पर स्पर्श रेखा का समीकरण ज्ञात करो ।

