

246917

OEMT211

Reg. No.

--	--	--	--	--	--	--	--

II Semester B.Sc. Degree Examination, September - 2023

MATHEMATICS

Mathematics - II

(Open Elective)

(NEP Scheme)



Time : 2½ Hours

Maximum Marks : 60

*Instructions to Candidates:*

Answer All Questions.

## PART-A

I. Answer any Five Questions.

(5×3=15)

1. Find the quotient and remainder obtained when dividing  $3x^3 - 4x^2 + 2x + 1$  by  $x - 3$ .

2. State factor theorem.

3. If  $\alpha, \beta$  are roots of equation  $x^2 - 2x + 4 = 0$  then find

i.  $\sum \frac{1}{\alpha^2}$ .

ii.  $\sum \alpha^3$ .

4. If  $u = x^2 + y^2$ , find  $u_x, u_y, u_{xy}$ .5. Find  $\frac{du}{dt}$  if  $u = x^2 y^3$  where  $x = 2t^3$  and  $y = 3t^2$  by using partial differentiation.6. If  $x = u(1+v)$ ,  $y = v(1+u)$  then P.T.  $\frac{\partial(x,y)}{\partial(u,v)} = 1+u+v$ .7. Evaluate  $\int_c [5xydx + y^2dy]$  where 'c' is the curve  $y = 2x^2$  in the xy plane from (0,0) to (1,2).8. Evaluate  $\int_0^1 \int_0^{x^2} (x^2 + y^2) dy dx$ .9. Evaluate  $\int_0^1 \int_0^2 \int_1^2 x^2 yz dx dy dz$ .

[P.T.O.]



(2)

OEMT211

PART - B

UNIT - I

II. Answer any Three questions.

(3×5=15)

10. Solve the equation

$$3x^3 - 26x^2 + 52x - 24 = 0 \text{ given that the roots are in G.P.}$$

11. Solve  $x^3 - 5x^2 - 2x + 29 = 0$  the product of two of its roots being 12.

12. Solve the equation

$$x^4 - 2x^3 - 10x^2 + 6x + 45 = 0 \text{ given that } -2+i \text{ is a root.}$$

13. If  $\alpha, \beta, \gamma$  are the roots of the equation  $3x^3 - 7x^2 + 6x + 5 = 0$  then find

i)  $\sum \frac{1}{\alpha}$

ii)  $\sum \alpha\beta$

iii)  $\sum \frac{\alpha}{\beta}$

14. Find the multiple roots of  $3x^4 + 16x^3 + 24x^2 - 16 = 0$ .

UNIT - II

III. Answer any Three questions.

(3×5=15)

15. State and prove Euler's theorem.

16. If  $u = 2xy$   $v = x^2 - y^2$  and  $x = r \cos \theta$   $y = r \sin \theta$  P.T  $\frac{\partial(u,v)}{\partial(r,\theta)} = -4r^3$ .

17. Expand  $e^x \cos y$  in powers of  $x$  and  $y$  up to second degree term using Taylor's theorem about  $(1, \pi/4)$ .

18. Expand  $\cos(x+y)$  in powers of  $x$  and  $y$  up to 3<sup>rd</sup> degree using Maclaurins series expansion.

19. Find the extreme values of  $f(x, y) = 2x^2 - xy + y^2 + 7x$ .



(3)

OEMT211

UNIT - III

IV. Answer any Three questions.

(3×5=15)

20. Evaluate  $\int_C [xydx + yzdy + zxdz]$  where 'c' is  $x=t, y=t^2, z=t^3$  and  $-1 < t < 1$ .

21. Evaluate  $\iint_R ydx dy$  where 'R' is the region bounded between the parabolas  $y^2=x$  and  $x^2=y$ .

22. Find the area of Ellipse  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$  by using double Integral.

23. Evaluate  $\int_0^1 \int_0^{x^2} \int_0^{x+y} (x-2y+z) dz dy dx$ .

24. Find the volume of the sphere  $x^2 + y^2 + z^2 = a^2$  by using Triple Integral.

---