1B3N22080 (Pages : 2) Reg. No:.....

Name: .....

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Third Semester B.Sc Degree Examination, November 2022

BMT3B03 - Theory of Equations and Number Theory

(2019 Admission onwards)

Time: 2 ½ hours Max. Marks : 80

Part A
All questions can be attended.
Each questions carries2 marks.

1. Show that $x^3 + x^2 - 5x + 3$ is divisible by $x + 3$.
2. Find the quotient and remainder when $6x^3 - 10x^2 + 5x + 3$ is divided by $x - 2$.
3. Write the cubic equation with the roots $1, 1 + i, 1 - i$.
4. Define symmetric function in n variables.
5. State well ordering principle.
6. Find the quotient and remainder when -23 is divided by 5.
7. Find all the positive factors of p^2q^2, where p and q are distinct primes.
8. If $(a, b) = d$, prove that $\frac{a}{d}$ and $\frac{b}{d}$ are relatively prime.
9. If $(a, b) = d$, and d' is any other common divisor of a and b, prove that $d'|d$.
10. Find the canonical decomposition of 2520.
11. State Dirichlet's Theorem.
12. If n positive integer such that $(n-1)! \equiv -1(mod\ n)$, show that n is prime.
13. Define Pseudoprime . Give an example.
14. Define Euler phi function.
15. Find $\tau(28)$, where τ is a tau function.

(ceiling 25marks)

Part B

All questions can be attended.
Each questions carries5 marks.

16. Divide $x^7 + 3x^6 - 2x^3 + 3x^2 - x + 1$by $x^4 - x + 1$, using the method of detached coefficients.

17. Solve $20x^3 - 30x^2 + 12x - 1 = 0$, if $\frac{1}{2}$ is a root.

18. Factorise into real linear and quadratic factors : $x^4 + x^3 + x^2 + x + 1$.

19. Solve the biquadratic equation $x^4 + x^3 - 2x^2 + 3x - 1 = 0$, whose roots are a, b, c, d and $ab = -1$.

20. Prove that $f_0 f_1 \cdots f_{n-1} = f_n - 2$,where $n \geq 1$ and f_i is the ith Fermat number.

21. Find the remainder when 16^{53} is divided by 7.

22. If $ac \equiv bc(mod\ m)$ and $(c, m) = 1$, prove that $a \equiv b(mod\ m)$.

23. Prove that there is infinite number of Pseudoprimes.

(ceiling 35marks)

Part C

Answer any two questions.
Each questions carries10 marks.

24. Solve $x^6 + 3x^5 - 36x^4 - 45x^3 + 93x^2 + 132x + 140 = 0$.

25. State and prove Fundamental theorem of algebra.

26. Prove that Euler's phi function is multiplicative.

27. (a) Prove that $\sum_{d|n} \varphi(d) = n$, where φ is Euler's phi function and n is a positive integer.

    (b) Solve the linear congruence $8x \equiv 3(mod\ 11)$.

(2x10=20 marks)

37

1B3N22081 (Pages : 2) Reg. No:.....

Name: .....

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Third Semester B.Sc Degree Examination, November 2020

BMT3C03 - Mathematics – 3

(2019 Admission onwards)

Time: 2 hours Max. Marks : 60

Section A
All questions can be attended.
Each question carries 2 marks. Overall ceiling 20

1. Find the level surface of $F(x,y,z) = x^2 + y^2 + z^2$ passing through (1,1,1)
2. Evaluate $\int_0^1 r(t)dt$, where $r(t) = t\hat{\imath} + 3t^2\hat{\jmath} + 4t^3\hat{k}$.
3. If $z = 4x^3y^2 + 4x^2 + y^6 + 1$, Find $\frac{\partial z}{\partial x}$ *and* $\frac{\partial z}{\partial y}$.
4. Find the directional derivative of $f(x,y) = 2x^2y^3 + 6xy$ at (1, 1) in the direction of a unit vector whose angle with the positive x-axis is $\pi/6$.
5. Find an equation of the tangent plane to the graph of
   $F(x,y,z) = \frac{1}{2}x^2 + \frac{1}{2}y^2 - z + 4$ at (1, -1, 5)
6. Evaluate the double $\iint_R e^{x+3y}dA$, over the region bounded by the graphs of
   $y = 1,\ y = 2,\ y = x$ *and* $y = -x + 5$.
7. State the Stokes Theorem.
8. Convert $(8, \frac{\pi}{3}, 7)$ in cylindrical coordinates to rectangular coordinates.
9. Express $z = 1 - \sqrt{3}i$ in polar form.
10. Show that the function $f(z) = z^2 + z$ is analytic for all z
11. Find all values of $\ln(-1 - i)$.
12. Evaluate $\int_C \bar{z}\,dz$, where C is given by $x = 3t, y = t^2, -1 \le t \le 4$.

Section B

All questions can be attended.
Each question carries 5 marks. Overall ceiling 30

13. If $z = u^2v^3w^4$ and $u = t^2,\ v = 5t - 8,\ w = t^3 + t$, find $\frac{dz}{dt}$

14. Let a be a constant vector and r = x i + y j + z k. Verify the given identity.

    (a) div r = 3 (b) curl r = 0

15. Find all values of z such that $e^z = \sqrt{3} + i$

16. Evaluate $\int_C (x^2 + iy^2)dz$ where C is the contour from $z = 0$ to $z = 1 + 2i$ through $z = 1 + i$

17. Given the flow $f(z) = (1 + i)z$, compute the circulation around and the net flow across, the circle C: $|z| = 1$.

18. Evaluate $\int_C cosz\ dz$, where C is the any contour with initial point $z = 0$ and terminal Point $z = 2 + i$.

19. Evaluate $\oint_C \frac{z}{z^2+9} dz$ where is the circle $|z - 2i| = 4$.

Part C

Answer any one of the question.
The question carries 10 marks.

20. Let S be the part of the cylinder $z = 1 - x^2$ for $0 \le x \le 1,\ -2 \le y \le 2$. Verify the Stokes theorem for the vector $F = xy\,\hat{\imath} + yz\,\hat{\jmath} + xz\,\hat{k}$. Assume S is oriented upward.

21. Let $F(x, y, z) = z\,\hat{\jmath} + z\,\hat{k}$ represents the flow of a liquid. Find the flux of F through the surface S given by that portion of the plane $z = 6 - 3x - 2y$ in the first octant oriented upward.

1B3N22087

(Pages : 1)

Reg. No:.....

Name: .....

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Third Semester BA Malayalam Degree Examination, November 2022

BJS3C03 – History of Mass Media

(2019 Admission onwards)

Time: 1½ hours

Max. Marks : 40

Section A

All questions may be answered. Each question carries 2 marks.

1. Bengal Gazette
2. Basel Mission Society
3. Kerala Mitram
4. Chenkulath Kunhirama Menon
5. Club FM
6. Akira Kurosawa
7. SITE

(Ceiling: 10 marks)

Section B

All questions may be answered. Each question carries 5 marks.

8. Briefly discuss the contributions of Serampore missionaries.
9. Examine the role of Mathrubhumi in the freedom struggle.
10. Swadeshabhimani Ramakrishna Pillai was a martyr of press freedom. Comment
11. Enlist various types of radio programmes.
12. Social media is the new narrative setter of politics. Argue

(Ceiling: 20 marks)

Section C (Essay)

Answer any one of the following questions.

13. Elucidate the contributions of Mahatma Gandhi as a journalist.
14. Write a profile of a master of world cinema of your choice.

(1 x 10=10 marks)