

Question Paper

Exam Date & Time: 28-Feb-2024 (10:00 AM - 12:30 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

FIRST SEMESTER B.Sc. HEALTH SCIENCE DEGREE EXAMINATION-FEBRUARY 2024
SUBJECT: BHS - 1103- PRE-CALCULUS
(NEW SCHEME - MAKEUP)

Marks: 40

Duration: 120 mins.

Answer ALL questions

- 2A) For the inequality $-1 < 2x + 3 \leq 5$ find all real numbers x . (2)
- 2B) Find center and radius of the circle $x^2 - 2x + y^2 + 4y = 4$ (2)
- 2C) Find the area of triangle, the co-ordinates of the mid points of whose sides are $(-1,0)$, $(2,4)$ and $(3,1)$. (2)
- 2D) Determine the nature of the function $f : \mathbb{R} \rightarrow \mathbb{R}$ defined by $f(x) = x^2 - 1$ (2)
- 2E) Find the equation of the line which passes through $(-2, 3)$ and is parallel to the x -axis. (2)
- 2F) If $f(x) = \frac{1}{x-1}$ and $g(x) = \frac{x+1}{x-1}$ find $f \circ g$ and $g \circ f$, (2)
- 3A) Find the value of $\sin 150^\circ \cos 300^\circ + \cos 660^\circ \sin 135^\circ$ (3)
- 3B) solve the equation for x . $\ln x + \ln(x - 1) = \ln 2$ (3)
- 3C) R be a relation from N to N defined by $R = \{(a, b) : a, b \in N \text{ and } ab \in N\}$.
Is R equivalence relation on N ? Justify your answer. (3)
- 3D) Find the quotient $Q(x)$ and remainder $R(x)$ when the polynomial $P(x)$ is divided by the polynomial $D(x)$. $P(x) = x^3 + x^2 - 3x + 5$, $D(x) = x - 1$. (3)
- 3E) (3)
- Prove that $\frac{\cos x}{1 - \tan x} + \frac{\sin x}{1 - \cot x} = \sin x + \cos x$
- 3F) For the parabola $y^2 = -8x$ find the following (3)

- i) vertex,
- ii) focus,
- iii) axis of the parabola,
- iv) equation of the directrix
- v) length of the latus rectum.

4A) The angles of a triangle be α , β , and γ , with opposite sides of length a, b, and c, respectively. (5)
find the remaining side and one of the other angles. If $\beta = 30^\circ$, $a = 25$, $c = 32$

4B) Find the equation of the circle passing through the points (4,1) and (6,5) and (5)
whose centre is on the line $4x + y = 16$.

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