

Quarterly Examination - 2017-2018

Mathematics

Time : 2 Hrs. + 15 min.

F. M. : 50

Std. : XI

(Candidates are allowed additional 15 minutes for only reading the paper.
They must NOT start writing during this time)

(All working, including rough work, should be done on the same sheet as, and adjacent
to the rest of the answer.)

The intended marks for questions or parts of questions are given in brackets []

SECTION A (80 Marks)

1 solve $\frac{\sqrt{2x^2+1}}{\sqrt{x^2-1}} + 6\frac{\sqrt{x^2-1}}{\sqrt{2x^2+1}} = 5$ [2]

2 If $\cos x = 12/13$, and x is not in the first quadrant, find the values of $\tan x$, and $\operatorname{cosec} x$ [2]

3 Evaluate $\operatorname{cosec}\left(\frac{-20}{3}\pi\right)$ [2]

4 Find the equation of the line passing through the intersection of the line $2x+5y-4=0$. And the line $2x+3y-4=0$. And parallel to the line $3x+5y-2=0$ [2]

5 Find the angle between the lines line $2x-5y-4=0$. line $2x+4y-4=0$. [2]

6 Prove that $\frac{\sin A - \sin 3A}{\cos 2A} = 2 \sin A$ 2

7 Prove that $\sin 80^\circ \sin 60^\circ \sin 40^\circ \sin 20^\circ = \frac{3}{16}$ 2

8 Find the values of k so that the equations $2x^2 + kx - 5 = 0$ and $x^2 - 3x - 4 = 0$ may have a common root. Find the common root. 4

9 If $\sin x = \frac{4}{5}$, $\cos y = \frac{12}{13}$, $0 < x < \frac{\pi}{2}$, $\frac{3\pi}{2} < y < 2\pi$ find the values of $\sin(x-y)$ and $\cot(x+y)$ 4

10 Show that $\frac{\sin x \cos 2x + \sin 3x \cos 6x}{\sin x \sin 2x + \sin 3x \sin 6x} = \cot 5x$ 4

11 Prove that $\tan 7\theta - \tan 5\theta - \tan 2\theta = \tan 7\theta \cdot \tan 5\theta \cdot \tan 2\theta$ 4

12 If one root of the equation $ax^2 + bx + c = 0$ is the square of the other, prove that 4

$$b^3 + ac(c + a) = 3abc$$

13 Prove that $\sqrt{\frac{1-\sin A}{1+\sin A}} = \tan\left(\frac{\pi}{4} - A\right)$ [4]

14 Find the equations of the straight lines passing through the point (3,2) and inclined at an angle 45° to the straight line $2x+3y-4=0$. [4]

15 Show that the expression $\frac{2x^2 + 4x + 1}{x^2 + 4x + 2}$ can have any real value if x is real. (4)

16 Reduce the equations of the lines $4x+3y-10=0$ and $12x-5y+20=0$ to normal form and find which line is farther from the origin 4

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