EMS QUESTION BANK 2013-14

3MARKS

1) If f(x)=x3+x, find f(1)+f(2).
2) If f(x)=$\frac{1}{1-x}$ find f{$f(x)$}
3) State whether function is even or odd,f(x)=4x2+4cosx+xsinx+1
4) If f(x)=x3-5xcos x+x2sin x,Show that f(x)+f(-x)=0.
5) Express following as x+iy form:$\frac{2-3i}{1+2i}$
6) Express following as x+iy form:$\frac{2+i}{2-i}$
7)Find modulus and amplitude: -1+i$\sqrt{3}$
8) Find modulus and amplitude: $\frac{1}{2}$ -$\frac{\sqrt{3}}{2}$i
9) Prove that :sin(ix)=i sin(hx).
10) Evaluate: $\lim_{x\to 2}\frac{x^3-8}{x^2-3x+2}$.
11) Evaluate:$\lim_{x\to 0}\left[\frac{1}{x}-\frac{1}{x2+x}\right]$
12) Evaluate:$\lim_{x\to 2}\frac{x^9-512}{x-2}$

4Marks

1)If f(x)=$\frac{3x+4}{5x-7}$ and g(x)= $\frac{7x+4}{5x-3}$ Show that f{$g(x)$}=x
2) If f(x) =$\frac{x+1}{x-1}$, x ≠1 show that x=f(y).
3) If f(x) =$\frac{x-4}{4x-1}$, show that f {$f(x)$}=x.
4) If f(x) =$\frac{x+3}{4x-5}$and t=$\frac{3+5x}{4x-1}$ show that f(t)=x.
5) Express in polar form: -2-2$\sqrt{3}i$
6) Express in polar form: $\frac{1}{2}$+$\frac{\sqrt{3}}{2}i$
7) Find $\left|\frac{z1}{z2}\right|$ and Arg($\frac{z1}{z2}$) where z1=2+2$\sqrt{3}i$ and z2=-1+$\sqrt{3}i$.
8) Express in x+iy form$\frac{1}{(3+i)^2}$+$\frac{1}{(3-i)^2}$
9) Simplify using De,Moivre,s Theorem $\frac{(\cos 2\theta+i\sin 2\theta)\ \ (\cos\theta-i\sin\theta)^3}{(\cos 3\theta+i\sin 3\theta)\ \ (\cos 5\theta-i\sin 5\theta)^4}$

10)Separate into Real and Imaginary parts $\frac{(1+i^3)^2}{(3-i)^3}$

11) Separate into Real and Imaginary parts$\frac{i^{47}-3i^{24}}{5i^{88}-2i^{53}}$.

12) Separate into Real and Imaginary parts: $cosh$(x+iy)

13) Evaluate: $\lim_{x\to\infty} \frac{2x^2+3x+5}{3x^2-x+7}$

14) Evaluate: $\lim_{x\to 0} \frac{\sqrt{2+x}-\sqrt{2-x}}{x}$

15)Ifx+iy=sin(A+iB),prove that

$\frac{x^2}{cosh^2B} + \frac{y^2}{sinh^2B}$=1,$\frac{x^2}{sin^2A} - \frac{y^2}{COS^2}$ =1

16) Using Euler's Theorem prove that

$sin^2\theta + cos^2\theta$=1

17) Using Euler's Theorem prove that

cos2θ=$cos^2\theta - sin^2\theta$

Question Bank

Engg.Maths (17216)

4 Marks Question

1) Differentiate w.r.t. x :$y = \frac{e^x+e^{-x}}{e^x-e^{-x}}$

2) If $y = tan^{-1}\left(\frac{13\,x}{1-42x^2}\right)$ find $\frac{dy}{dx}$

3) If $y = sin^{-1}\left(\frac{2\,x}{1+x^2}\right)$ find $\frac{dy}{dx}$

4) Find $\frac{dy}{dx}$ if $\sin y = \log(x+y)$

5) If $e^x = y^x$ Prove that $\frac{dy}{dx} = \frac{(\log y)^2}{\log y - 1}$

6) If $y = e^{m\,sin^{-1}x}$ Prove that $(1-x^2)\frac{d^2y}{dx^2} - x\frac{dy}{dx} - m^2y = 0$

7) Differentiate $(\sin x)^{\tan x}$ w.r.t. x

8) Differentiate $tan^{-1}\left(\frac{2x}{1-x^2}\right)$ w.r.t. $sin^{-1}\left(\frac{2x}{1+x^2}\right)$

9) Solve using Gauss-Elimination Method:

$$2x - 3y + 4z = 7\ ;\quad 5x - 2y + 2z = 7;\quad 6x - 3y + 10z = 23$$

10) Solve using Jacobie's Method:

$$10x + y + 2z = 13\ ;\quad 3x + 10y + z = 14;\quad 2x + 3y + 10z = 15$$

11) Solve using Jacobie's Method:

$$5x - y + z = 10\ ;\quad 2x + 4y = 12;\quad x + y + 5z = -1$$

12) Solve using Gauss-Seidal Method:

$$10x + y + z = 12\ ;\quad x + 10y + z = 12;\quad x + y + 10z = 12$$

13) Solve using Gauss-Seidal Method:

$$20x + y - 2z = 17\ ;\quad 3x + 20y - z = -18;\quad 2x - 3y + 20z = 25$$

14) Find approximate root of the equation $x^3 - 2x - 5 = 0$ using Bisection method in the interval (2,3) carry out three iterations.

15) Find approximate root of the equation $x^3 + 2x^2 - 8 = 0$ using Regula Falsi method carry out three iterations.

16) Evaluate $\sqrt[3]{7}$ using Newton Raphson Method carry out two iterations.

3 Marks Question

17) If $y = sin^{-1}x$ Prove that $(1-x^2)\frac{d^2y}{dx^2} - x\frac{dy}{dx} = 0$

18) Find $\frac{dy}{dx}$ if $y = e^x \tan x$

19) Find $\frac{dy}{dx}$ if $y = \sec x \tan x$

20) Find $\frac{dy}{dx}$ if $y = \frac{\sin x}{1-\cos x}$

21) Find $\frac{dy}{dx}$ if $y = \log(x^2 + 2x + 5)$

22) Find $\frac{dy}{dx}$ if $y = x^3 + xy^2 = y^3 + yx^2$

23) Find $\frac{dy}{dx}$ if $x = a\ cos^3\theta$, $y = b\ sin^3\theta$

24) Differentiate w.r.t. x :$7^{\sqrt{x^2+1}}$

25) Find the approximate root of the equation $x^3 - 9x + 1 = 0$ lies between 2 and 3 using bisection method (Two Iteration)

26) Using Bisection method find the approximate value of $\sqrt{10}$ perform two Iteration

27) By using method of False Position find root of equation $x^2 + x - 1 = 0$ in the interval (0,1) (perform two Iteration)

28) Solve following equations for x and y using Gauss-Elimination Method

$$x + y + z = 4\ ;\quad 2x + y + z = 5;\ \ 3x + 2y + z = 7$$

29) Solve following equations for y and z using Gauss-Elimination Method

$$x + y + z = 6\ ;\quad 3x - y + 3z = 10;\ \ 5x + 5y - 4z = 3$$

30) Show that root of the equation $x.\log x = 1.2$ lies between (1,2)

31) Show that root of the equation $3x - \cos x - 1 = 0$ lies between (0,1)