07-03-2022_EM-I_FE_Sem-I (R19)_TSEC

1. The question paper will have MCQs (for 20 marks) and subjective/descriptive questions (for 60 marks).

2. MCQ correct options and subjective questions answers to be written on papers. Scan all pages of answer papers of Q1 to Q4 and create single file in pdf format to upload in the link given.

* Required

1. Enter your Name *

2. Enter your Exam Seat Number *

Questions

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2. MCQ correct options and subjective questions answers to be written on papers. Scan all pages of answer papers of Q1 to Q4 and create single file in pdf format to upload in the link given.

3. paste the question

Q1	**Choose the correct option from the following questions .All questions are compulsory and carry equal marks**
Q1.	The value of $(1-i)^8$ is
Option A:	8
Option B:	16
Option C:	1
Option D:	-i
Q2.	$\tanh\frac{y}{2} = tan\frac{x}{2}$, then value of y is
Option A:	$u = \log\tan\left(\frac{\pi}{4} - \frac{x}{2}\right)$
Option B:	$u = \tan\left(\frac{\pi}{4} + \frac{x}{2}\right)$
Option C:	$u = \tan\left(\frac{\pi}{4} - \frac{x}{2}\right)$
Option D:	$u = \log\tan\left(\frac{\pi}{4} + \frac{x}{2}\right)$
Q3.	The value of $\log\left[\frac{sin(x+iy)}{sin(x-iy)}\right]$ is
Option A:	-2$i\ tan^{-1}(cotx\ tanhy)$
Option B:	$2i\ tan^{-1}(cotx\ tanhy)$
Option C:	$2\ tan^{-1}(cotx\ tanhy)$
Option D:	$-2\ tan^{-1}(cotx\ tanhy)$

4. paste the question

Q4.	If $\alpha + i\,\beta = \frac{1}{a-i\,b}$ then the value of $(\alpha^2 + \beta^2)(a^2 + b^2)$ is
Option A:	-1
Option B:	1
Option C:	2
Option D:	0
Q5.	u $=(x^2 + y^2)^{2/3})$ then $x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2}$ is given by
Option A:	$\frac{4}{9}\,u$
Option B:	$\frac{4}{3}\,u$
Option C:	$\frac{2}{9}\,u$
Option D:	$\frac{2}{3}\,u$
Q.6	If $u = x^2 + y^2 + z^2, x = e^t, y = e^t sint, z = e^t cost\ , then$ $\frac{du}{dt}$ is given by
Option A:	$2e^{2t}$
Option B:	$4e^t$
Option C:	$4e^{2t}$
Option D:	e^{2t}
Q7.	If $y = x^n \, logx$, then the value of y_{n+1} is
Option A:	$\frac{n!}{x}$
Option B:	$n!\,logx$
Option C:	$n!\,x$
Option D:	$n!$

5. paste the question

Q8.	If A $= \frac{1}{\sqrt{3}}\begin{bmatrix} 1 & 1-i \\ 1+i & -1 \end{bmatrix}$, *the value of* A^{-1} is
Option A:	$\frac{1}{\sqrt{3}}\begin{bmatrix} 1 & 1-i \\ 1+i & -1 \end{bmatrix}$
Option B:	$\frac{1}{3}\begin{bmatrix} 1 & 1-i \\ 1+i & -1 \end{bmatrix}$
Option C:	$\frac{1}{\sqrt{3}}\begin{bmatrix} 1 & 1+i \\ 1-i & -1 \end{bmatrix}$
Option D:	$\frac{1}{\sqrt{3}}\begin{bmatrix} 1 & 1+i \\ 1+i & -1 \end{bmatrix}$
Q9	For which value of ρ & μ the following system will have no solution ? $2x+3y+5z=9; 7x+3y-2z=8; 2x+3y+\rho z=\mu$
Option A:	$\rho = 5, \mu = 9$
Option B:	$\rho = 5, \mu \neq 9$
Option C:	$\rho = 3, \mu \neq 9$
Option D:	$\rho \neq 5, \mu \neq 9$
Q10.	If $y = e^{m\sin^{-1}x}$ then applying Leibnitz theorem choose the correct option
Option A:	$(1-x)^2 - xy_1 - m^2y = 0$
Option B:	$(1-x^2)y_2 - xy_1 - m^2y = 0$
Option C:	$(1-x^2)y_2 - xy_1 = 0$
Option D:	$(1-x^2)y_2 + xy_1 - m^2y = 0$

6. paste the question

Q2	**Solve any four out of six questions. Each question carries 5 marks**
A	Prove that $\frac{\sin 6\theta}{\sin 2\theta} = 16\cos^4\theta - 16\cos^2\theta + 3$
B	If $\cos(u+iv) = x+iy$, then show that $(1-x)^2 + y^2 = (coshv - cosu)^2$
C	If $u = \frac{e^{x+y+z}}{e^x + e^y + e^z}$, $show\ that\ \frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} + \frac{\partial u}{\partial z} = 2u$
D	Find the extreme value of the function $f(x,y) = x^3 + 3xy^2 - 3x^2 - 3y^2 + 4$
E	Reduce to normal form and find its rank given A = $\begin{bmatrix} 2 & 3 & 4 & 5 \\ 3 & 4 & 5 & 6 \\ 4 & 5 & 6 & 7 \\ 9 & 10 & 11 & 12 \end{bmatrix}$
F	If $sin\alpha\ cosh\beta = \frac{x}{2}$, $cos\alpha\ sinh\beta = \frac{y}{2}$ then show that (i) $cosec(\alpha - i\beta) + cosec(\alpha + i\beta) = \frac{4x}{x^2+y^2}$ (ii) $cosec(\alpha - i\beta) - cosec(\alpha + i\beta) = \frac{4iy}{x^2+y^2}$

7. paste the question

Q3	**Solve any four out of six questions. Each question carries 5 marks**
A	If $tan(\alpha + i\beta) = e^{i\theta}$, $prove\ that\ \alpha = \frac{n\pi}{2} + \frac{\pi}{4}\ and\ \beta = \frac{1}{2}\log\left[tan\left(\frac{\pi}{4} + \frac{\theta}{2}\right)\right]$
B	Find all the roots of $x^5 = 1 + i$
C	If $x = u + v + w, y = uv + vw + wu, z = uvw$, P.T $x\frac{\partial \emptyset}{\partial x} + 2y\frac{\partial \emptyset}{\partial y} + 3z\frac{\partial \emptyset}{\partial z} = u\frac{\partial \emptyset}{\partial u} + v\frac{\partial \emptyset}{\partial v} + w\frac{\partial \emptyset}{\partial w}$, where $\emptyset = \emptyset(x, y, z)$
D	Find the real value of λ for which the equations $x + 2y + 3z = \lambda x, 3x + y + 2z = \lambda y, 2x + 3y + z = \lambda z$ have a non zero solution and solve them completely in each case.
E	If y= $\sqrt{\frac{1+x}{1-x}}$, prove that $y = (1 - x^2)y_1$ and hence prove that $(1 - x^2)y_n - [2(n-1)x + 1]y_{n-1} - (n-1)(n-2)y_{n-2} = 0$
F	If $u = tan^{-1}\left(\frac{x^3 + y^3}{x-y}\right)$, prove that $x^2\frac{\partial^2 u}{\partial x^2} + 2xy\frac{\partial^2 u}{\partial x \partial y} + y^2\frac{\partial^2 u}{\partial y^2} = \sin 4u - \sin 2u$

8. paste the question

Q4	**Solve any four out of six questions. Each question carries 5 marks**
A	Prove that $\cos\left[i\log\left(\frac{a-ib}{a+ib}\right)\right] = \frac{a^2-b^2}{a^2+b^2}$
B	If $z = \cos\theta + i\sin\theta$, *prove that* (i) $\frac{1+z}{1-z} = i\cot\left(\frac{\theta}{2}\right)$, (ii) $\frac{2}{1+z} = 1 - i\tan\left(\frac{\theta}{2}\right)$
C	If $u = f(r)$ *and* $r = x^2 + y^2 + z^2$, prove that $$\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} + \frac{\partial^2 u}{\partial z^2} = f''(r) + \frac{2}{r}f''(r)$$
D	Find the n^{th} derivative of $y = x^3 e^{4x}\cos 3x$
E	Determine the value of K if the following matrix A has (i) rank 1 (ii) rank 2 (iii) rank 3, where $A = \begin{bmatrix} 3 & K & K \\ K & 3 & K \\ K & K & 3 \end{bmatrix}$
F	Express the following matrix A as a sum of a Hermitian and a Skew-Hermitian matrices, where $$A = \begin{bmatrix} 2 & 4+i & 4i \\ 3i & 6-i & 2 \\ 6 & 4-2i & 1-i \end{bmatrix}$$

9. Upload all your answers as a single pdf file *

Files submitted:

10. Have you uploaded the required correct files *

Mark only one oval.

- [ ] Yes