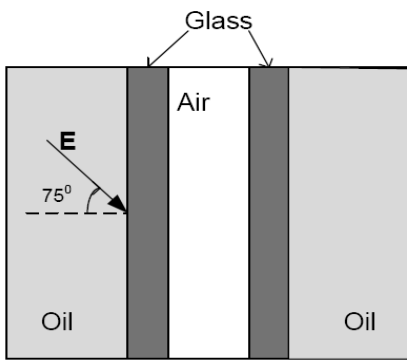# MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY, BHOPAL

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

End Term Examination, July 2020

Course: B.Tech.	**Semester: IVth**	**Branch: ECE**
Subject Name: Electromagnetic Fields		**Subject Code: EC-225**
Time: 2 Hours		**Maximum Marks: 30**

Note: Answer all questions. Assume necessary data if necessary.

Q.1	For a given vector $\mathbf{A}= xy\ a_x - 2x\ a_y$, verify Stoke's theorem over a quarter circle with a radius 6 in first quadrant.	5
Q.2	Determine the direction of the wave which is travelling in a dielectric and hits a conducting surface head on. Do not use the formula for reflection coefficient, use boundary conditions and Poynting vector to logically deduce the direction after the hit.	5
Q.3 (a)	Analyze effects on various parameters (Attenuation and Phase constants, velocity, skin depth, Intrinsic impedance and phase difference between $\mathbf{E}$ and $\mathbf{H}$ of a wave due to different types of mediums (Lossless, Air, lossy and good conductor).	5
Q.4 (a)	A plane wave $E= 30\cos(\omega t-z)\ a_x$ V/m in air normally hits a lossless medium ($\mu=\mu_0$, $\epsilon=4\epsilon_0$) at z=0. Find $\mathbf{E_r, H_r, E_t, H_t,}$ reflection coefficient and transmission coefficient.	5
Q.5 (a)	Given $\boldsymbol{H} = H_m e^{j(wt+\beta z)}\boldsymbol{a}_x$ A/m in free space. Find electric field $\boldsymbol{E}$.	5
Q.6 (a)	Two parallel sheets of glass (ϵ_r=8) mounted vertically are separated by a uniform air gap between 5their inner surface. The sheets properly sealed are immersed in oil (ϵ_r =3) as shown in figure below. A uniform electric field of strength 2000 V/m makes an angle of 75° with normal to the glass surface. Calculate magnitude and direction of electric field in glass and enclosed air gap.	5