

NO OF PRINTED PAGES: 01

EN.No.:

SEMESTER II (B.TECH.)

ACADEMIC YEAR: 2021-22

JAYPEE UNIVERSITY OF ENGINEERING & TECHNOLOGY GUNA

Test-I (Even Semester 2021)

18B11PH211 PHYSICS-II

MAXIMUM DURATION: 1 HOUR

MAXIMUM MARKS: 15

IMPORTANT: Do not write any thing on the question paper except the Enrollment Number. All five questions are compulsory. The total marks for each question have been indicated next to it.

1. Show that : $\text{div}(\text{grad } r^m) = m(m+1)r^{m-2}$ [3]

2. Show that $\mathbf{F} = \hat{x}xy^2 + \hat{y}x^\alpha y$ is not conservative unless $\alpha = 2$. [3]

3. Check the fundamental theorem for gradient using $T = x^2 + 4xy + 2yz^3$, the points $\mathbf{a} = (0, 0, 0)$, $\mathbf{b} = (1, 1, 1)$ along the path $(0, 0, 0) \rightarrow (1, 0, 0) \rightarrow (1, 1, 0) \rightarrow (1, 1, 1)$. [3]

4. Calculate divergence of the following vector field: [3]

$$\mathbf{F} = (r \cos \theta)\hat{r} + (r \sin \theta)\hat{\theta} + (r \sin \theta \cos \phi)\hat{\phi}.$$

5. Calculate Curl of following vector field: [3]

$$\mathbf{F} = (2xz + 3y^2)\hat{y} + (4yz^2)\hat{z}$$