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**I- SEM COMMON /2019(W)/ (NEW)**  
**Th. 2(a) ENGINEERING PHYSICS**

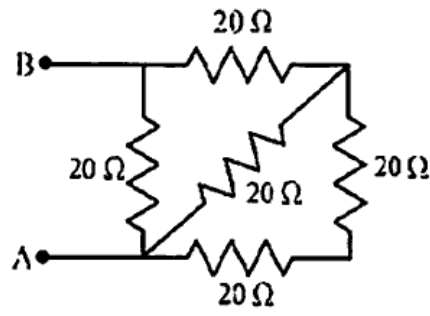
Full Marks: 80

Time : 3 Hours

Answer any FIVE Questions including Q No. 1 & 2  
 Figures in the right hand margin indicates marks

|     |   |        |
|-----|---|--------|
| 1.  | Answer ALL the questions:   | 2 × 10 |
| (a) | Write down the units of the following physical quantities :<br>i) Power<br>ii) Wavelength<br>iii) Stress<br>iv) Torque                        |        |
| (b) | State parallelogram law of vector addition.   |        |
| (c) | Given $\vec{A} = 4\hat{i} + 3\hat{j} + 2\hat{k}$ , $\vec{B} = 5\hat{i} + 2\hat{j} + \hat{k}$ . Find $\vec{A} \times \vec{B}$                  |        |
| (d) | Under what condition the range of a projectile is maximum?  |        |
| (e) | Write down two applications of Ultrasonics.   |        |
| (f) | Define Joule's Mechanical equivalent of heat.   |        |
| (g) | State the laws of reflection.   |        |
| (h) | Write down two applications of optical fibre.   |        |
| (i) | Define Unit pole.   |        |
| (j) | State Lenz's law.   |        |
| 2.  | Answer any SIX questions:   |        |
| (a) | Check the correctness of formula dimensionally.   | 5 × 6  |
|     | $T = 2\pi \sqrt{\frac{l}{g}}$   |        |
| (b) | State Kepler's laws of planetary motion.  |        |
| (c) | Distinguish between longitudinal and transverse wave.   |        |
| (d) | Discuss the properties of ultrasonic.   |        |
| (e) | Define critical angle and total internal reflection.  |        |
| (f) | State and explain Coulomb's law of electrostatics.  |        |
| (g) | Distinguish between Fleming's left hand rule and Fleming's right hand rule.   |        |
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| 3.  | Derive expression for Equation of trajectory, Time of flight, maximum height for a projectile fired at an angle $\theta$ with the horizontal. | 10     |
| 4.  | State the laws of limiting friction and discuss the methods to reduce friction.   | 10     |

|      |  |    |
|------|--|----|
| 5.i) | State and explain Newton's laws of gravitation.  | 6  |
| ii)  | Derive a relation between g & G.   | 4  |
| 6.   | How much steam at $100^{\circ}\text{C}$ will melt 3.2 kg of ice at $-10^{\circ}\text{C}$ ? Given that the Specific heat capacity of ice = $0.5\text{Kcalkg}^{-1}$ , Specific latent heat of steam = $540\text{Kcalkg}^{-1}$ , Specific latent heat of ice = $80\text{Kcalkg}^{-1}$ | 10 |
| 7.i) | State Kirchoff's laws.   | 4  |
| ii)  | Find the equivalent resistances between A & B.   | 6  |



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