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# B.M.S. College of Engineering, Bengaluru-560019

**Autonomous Institute Affiliated to VTU**

## September 2024 Supplementary Examinations

**Programme: B.E.** **Semester: I / II**
**Branch: Common to all Branches** **Duration: 3 hrs.**
**Course Code: 23CV1ESICV / 23CV2ESICV** **Max Marks: 100**
**Course: Introduction to Civil Engineering**

**Instructions**: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.



**Important Note:** Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

| | | UNIT - I | CO | PO | Marks |
|---|---|---|---|---|---|
| 1 | a) | Elaborate on the importance of surveying for any construction project. | *CO1* | *PO6* | **06** |
| | b) | With the help of a neat sketch comment on the following structural elements of a building;<br>- Foundation, Sill, Lintel, Roof | *CO1* | *PO6* | **08** |
| | c) | Explain briefly role of civil Engineering profession in the context of<br>i) Structural Engineering<br>ii) Transportation Engineering | *CO1* | *PO6* | **06** |
| | | **UNIT - II** | | | |
| 2 | a) | Debate on the necessity of an 'Intelligent Transport System' (ITS) in urban areas with a focus on advancing sustainable development. | *CO2* | *PO7* | **10** |
| | b) | Examine the challenges associated with the management of solid waste in urban areas. Assess the responsibilities of urban authorities in addressing waste management issues. | *CO2* | *PO7* | **10** |
| | | **UNIT - III** | | | |
| 3 | a) | Explain with examples the terms space, particle, rigid body and continuum. | *CO3* | *PO1, PO2* | **4** |
| | b) | In the Fig. Q.3(b) below, weights 'P = 2225 N' and 'Q = 4450 N' are suspended in a vertical plane by strings 1, 2, 3 as shown. Find the tension induced in each string. | *CO3* | *PO1, PO2* | **6** |

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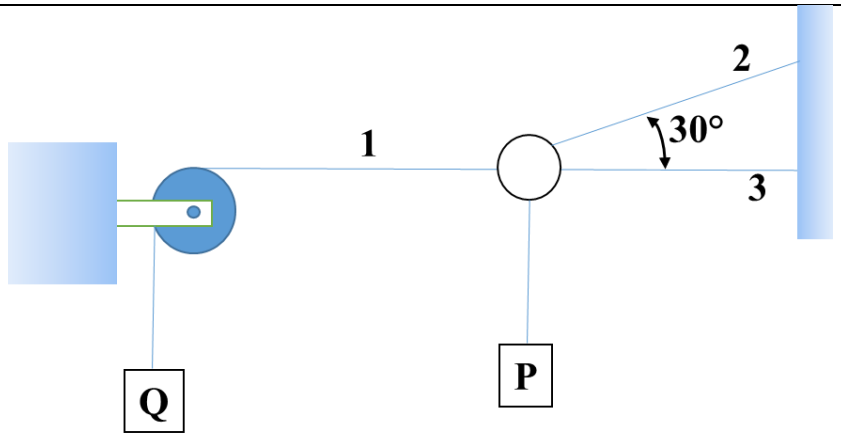
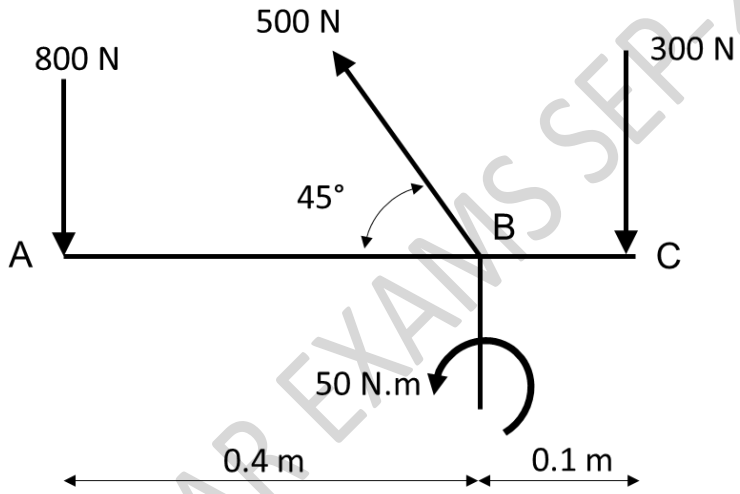
| | | |  <br>Fig. Q.3(b) | | | |
| | | c) | A bracket is subjected to coplanar force system as shown in Fig. Q.3 (c). Determine the magnitude, direction and the x-intercept of the resultant force with respect to 'A' as origin.<br>  <br>Fig. Q.3 (c) | *CO3* | *PO1, PO2* | **10** |
| | | | **OR** | | | |
| | 4 | a) | Explain the characteristics of a couple. | *CO3* | *PO1, PO2* | **4** |
| | | b) | The resultant of two concurrent forces P and Q is 780 N and directed vertically up. If force P = 450 N acting N $38^0$ W, find the force Q in magnitude and direction. | *CO3* | *PO1, PO2* | **6** |
| | | c) | Compute the co-ordinates of x – intercept of the resultant force for the coplanar non concurrent force system shown in Fig. Q.4(c). Each grid measures 1m x 1m. | *CO3* | *PO1, PO2* | **10** |

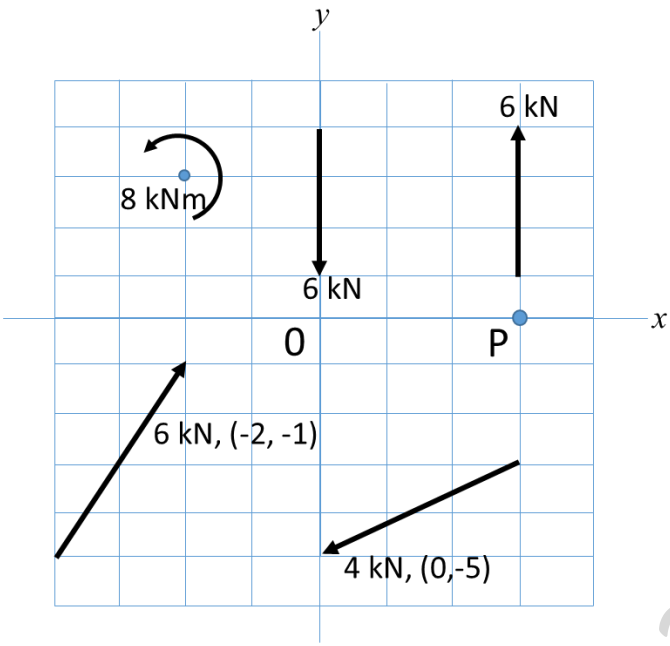



Fig. Q.4(c)

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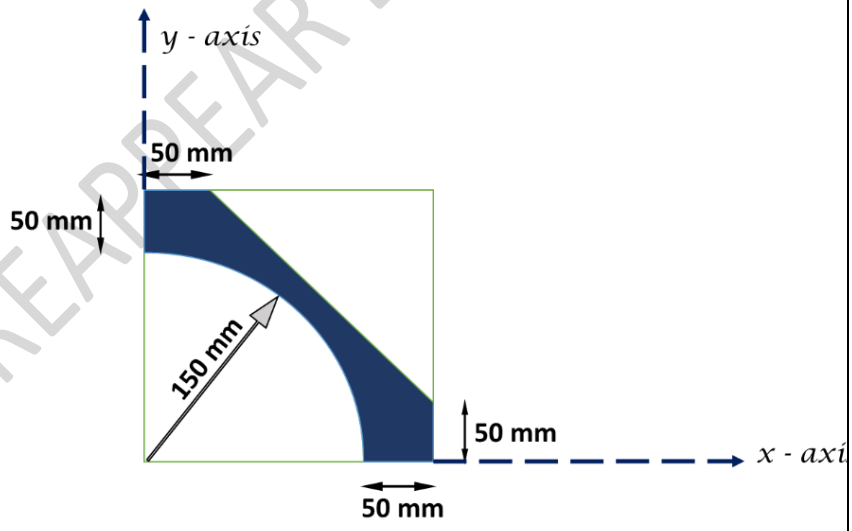
|---|---|---|---|---|---|---|
| | | | **UNIT - IV** | | | |
| 5 | a) | List the difference between centroid and center of gravity. | *CO4* | *PO1, PO2* | **2** |
| | b) | Derive the expression for centroid of a quarter circle. | *CO4* | *PO1, PO2* | **8** |
| | c) | Locate the centroid of the shaded lamina shown in Fig. Q.5(c).   Fig. Q.5(c) | *CO4* | *PO1, PO2* | **10** |
| | | | **UNIT - V** | | | |
| 6 | a) | State the following: -<br>i. Perpendicular axis theorem<br>ii. Radius of gyration. | *CO4* | *PO1, PO2* | **6** |
| | b) | Compute the least radius of gyration for the built up section shown in Fig. Q.6(b). | *CO4* | *PO1, PO2* | **14** |

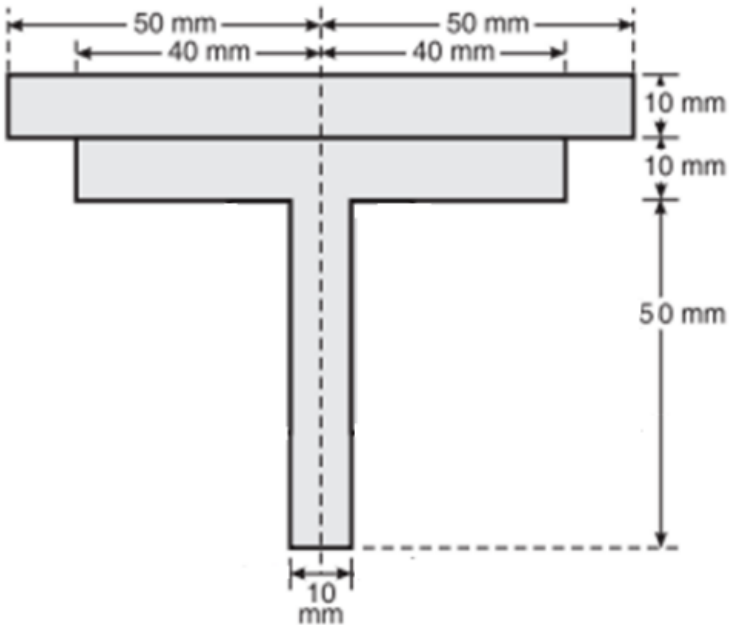



Fig. Q.6(b)

**OR**

| | | | | | |
|---|---|---|---|---|---|
| 7 | a) | State and prove Parallel axis theorem. | *CO4* | *PO1, PO2* | **05** |
| | b) | Compute the radius of gyration for the shaded area shown in Fig. Q.7(b) along its horizontal centroidal axis. | *CO4* | *PO1, PO2* | **15** |

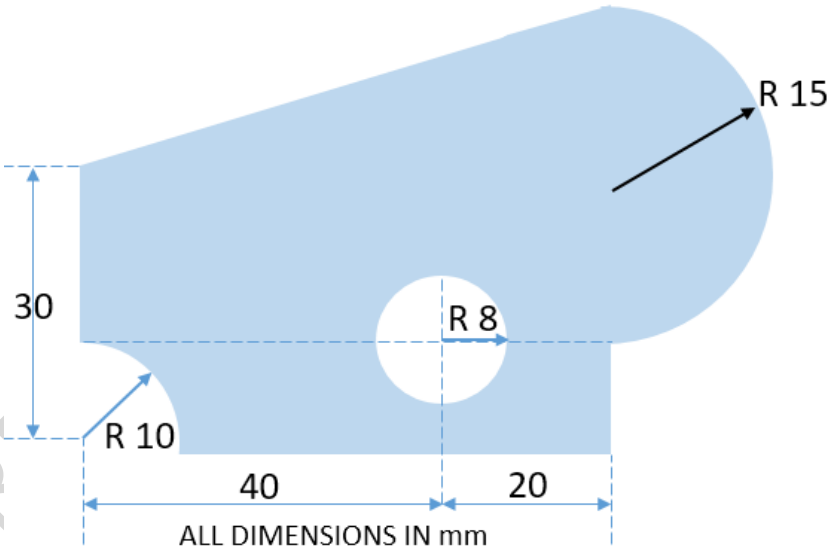



Fig. Q.7(b)

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