



# SARDAR PATEL COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)  
Munshi Nagar, Andheri (W) Mumbai - 400058



END SEMESTER EXAMINATION MAY 2026 / RE - EXAM JULY 2026(WP)

Program: CIVIL Second year B.Tech W.P

Duration: 3 hours

Course Code: BS-BTC 401

Maximum Points: 100

Course Name: PROBABILITY STATS & OR

Semester: IV

Notes: 1) Attempt any 5 out of 7 questions.

2) Use of scientific calculator is allowed.

25/05/2026

| Q.No. | Questions                                                                                                                                                                                                                                                                                                                        | Points | CO | BL    | Module No. |    |    |    |   |    |    |    |    |    |    |    |   |       |   |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----|-------|------------|----|----|----|---|----|----|----|----|----|----|----|---|-------|---|
| 1a)   | Solve the following LPP using Simplex method<br>Maximize $Z = 3x_1 + 2x_2$<br>Subject to $3x_1 + 2x_2 \leq 18$<br>$0 \leq x_1 \leq 4$<br>$0 \leq x_2 \leq 6$                                                                                                                                                                     | 10     | 3  | 2,4,5 | 5          |    |    |    |   |    |    |    |    |    |    |    |   |       |   |
| 1b)   | A & B throw alternately with a pair of ordinary dice. 'A' wins if he throw '6' before 'B' throw '7' and B wins if he throws '7' and B wins before 'A' throws '6'. If A begins. Find their respective chances of winning                                                                                                          | 10     | 1  | 2,4,5 | 1          |    |    |    |   |    |    |    |    |    |    |    |   |       |   |
| 2a)   | Assume that on the average one telephone number out of fifteen called between 2:00 pm and 3:00 pm on week days is busy. What is the probability that if 6 randomly selected telephone numbers are called<br>i. Not more than three<br>ii atleast three of them will be busy                                                      | 10     | 1  | 3,4,5 | 2          |    |    |    |   |    |    |    |    |    |    |    |   |       |   |
| 2b)   | Compute spearman's rank coorelation coefficient for the following data<br><table><tr><td>X</td><td>10</td><td>12</td><td>18</td><td>18</td><td>15</td><td>40</td></tr><tr><td>Y</td><td>12</td><td>18</td><td>25</td><td>25</td><td>50</td><td>25</td></tr></table>                                                              | X      | 10 | 12    | 18         | 18 | 15 | 40 | Y | 12 | 18 | 25 | 25 | 50 | 25 | 10 | 1 | 2,4,5 | 1 |
| X     | 10                                                                                                                                                                                                                                                                                                                               | 12     | 18 | 18    | 15         | 40 |    |    |   |    |    |    |    |    |    |    |   |       |   |
| Y     | 12                                                                                                                                                                                                                                                                                                                               | 18     | 25 | 25    | 50         | 25 |    |    |   |    |    |    |    |    |    |    |   |       |   |
| 3a)   | An aptitude test for selecting officers in a bank is conducted on 1000 candidates. The average score is 42 and standard deviation of score is 24. Assuming normal distribution for the scores, find<br>i.) The numbers of candidates whose scores exceed 60.<br>ii.) the numbers of candidates whose score lie between 30 and 60 | 10     | 3  | 2,4,5 | 3          |    |    |    |   |    |    |    |    |    |    |    |   |       |   |



# Bharatiya Vidya Bhavan's SARDAR PATEL COLLEGE OF ENGINEERING

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## END SEMESTER EXAMINATION MAY 2026 / ~~RE~~ - EXAM JULY 2026(WP)

|      |                                                                                                                                                                                                                                                                                                                                                                                                              |     |    |       |   |   |       |   |       |      |     |     |    |    |   |   |     |    |   |       |   |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|----|-------|---|---|-------|---|-------|------|-----|-----|----|----|---|---|-----|----|---|-------|---|
| 3b   | Ten individuals are chosen at random from a population and their heights are found to be (in inches): 63, 63, 66, 67, 68, 69, 70, 70, 71 & 72. In the light of the data discuss the suggestion that the mean height in the population is 66 inches.                                                                                                                                                          | 10  | 2  | 2,4,5 | 4 |   |       |   |       |      |     |     |    |    |   |   |     |    |   |       |   |
| 4a   | Solve the following LPP using Simplex method<br>Maximize $Z=6x_1-2x_2+3x_3$<br>Subject to $2x_1-x_2+2x_3\leq 2$<br>$x_1+4x_3\leq 4$<br>$(x_1, x_2, x_3\geq 0)$                                                                                                                                                                                                                                               | 10  | 3  | 1,4,5 | 5 |   |       |   |       |      |     |     |    |    |   |   |     |    |   |       |   |
| 4b   | In a partially destroyed laboratory record of an analysis of correlation data, the following results only are legible:<br>Variance of $X = 9$<br>Regression equations: $8x-10y+66=0$<br>$40x-18y=214$<br><br>What are<br>i. Mean, value of $x$ and $y$<br>ii. Standard deviation of $y$ .<br>iii. Coefficient of correlation between $x$ and $y$                                                             | 10  | 1  | 2,4,5 | 1 |   |       |   |       |      |     |     |    |    |   |   |     |    |   |       |   |
| 5a   | Fit a Poisson distribution for the following distribution<br><table><tr><td>X</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>Total</td></tr><tr><td>f(x)</td><td>142</td><td>156</td><td>69</td><td>27</td><td>5</td><td>1</td><td>400</td></tr></table>                                                                                                                                | X   | 0  | 1     | 2 | 3 | 4     | 5 | Total | f(x) | 142 | 156 | 69 | 27 | 5 | 1 | 400 | 10 | 3 | 1,4,5 | 2 |
| X    | 0                                                                                                                                                                                                                                                                                                                                                                                                            | 1   | 2  | 3     | 4 | 5 | Total |   |       |      |     |     |    |    |   |   |     |    |   |       |   |
| f(x) | 142                                                                                                                                                                                                                                                                                                                                                                                                          | 156 | 69 | 27    | 5 | 1 | 400   |   |       |      |     |     |    |    |   |   |     |    |   |       |   |
| 5b   | Two bad eggs are mixed accidentally with 10 good ones. Find the probability distribution of the number of bad eggs in 3, drawn at random, without replacement from this lot.                                                                                                                                                                                                                                 | 10  | 1  | 2,4,5 | 2 |   |       |   |       |      |     |     |    |    |   |   |     |    |   |       |   |
| 6a   | In an experiment on pea – breeding mendel obtained the following frequencies of seeds.<br><br>315 Round and Yellow<br>101 Wrinkled and Yellow<br>108 Round and Green<br>32 Wrinkled and Green<br>According to his theory of heredity the numbers should be in population 9:3:3:1. Is there any evidence to doubt the theory at 5% Los?                                                                       | 10  | 2  | 3,4,5 | 4 |   |       |   |       |      |     |     |    |    |   |   |     |    |   |       |   |
| 6b   | To verify whether a course in accounting improved performance, a similar test was given to 12 participants both before and after the course. The original marks recorded in alphabetical order of the participants were 44, 40, 61, 52, 32, 44, 70, 41, 67, 72, 53 and 72. After the course, the marks were in the same order 53, 38, 69, 57, 46, 39, 73, 48, 73, 74, 60 & 78.<br><br>Was the course useful? | 10  | 2  | 2,4,5 | 4 |   |       |   |       |      |     |     |    |    |   |   |     |    |   |       |   |



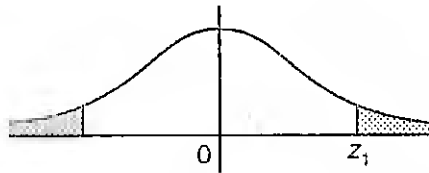
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|    |                                                                                                                                                                                                                                                              |    |   |       |   |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|---|-------|---|
| 7a | A crv X has PDF defined as $f(x) = \begin{cases} A+Bx, 0 \leq x \leq 1 \\ 0, elsewhere \end{cases}$<br>If the mean of the distribution is $1/3$ . Find A & B.                                                                                                | 10 | 2 | 2,4,5 | 3 |
| 7b | Use the Penalty (BIG - M) method to solve the following LPP<br>Maximize $Z = x_1 + 2x_2 + 3x_3 - x_4$<br>Subject to the constraint<br>$x_1 + 2x_2 + 3x_3 = 15$<br>$2x_1 + x_2 + 5x_3 = 20$<br>$x_1 + 2x_2 + x_3 + x_4 = 10$<br>& $x_1, x_2, x_3, x_4 \geq 0$ | 10 | 3 | 3,4,5 | 5 |

Percentage Points of  $t$ -distribution

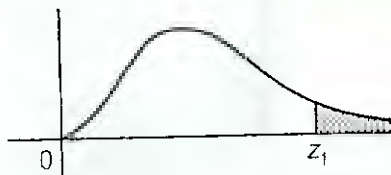
## Example

For  $\Phi = 10$  d. o. f.

$$P(|t| > 1.812) = 0.1$$

| $F \backslash P$ | 0.20  | 0.10  | 0.05   | 0.02   | 0.01   |
|------------------|-------|-------|--------|--------|--------|
| 1                | 3.078 | 6.314 | 12.706 | 31.812 | 63.657 |
| 2                | 1.886 | 2.920 | 4.303  | 6.965  | 9.925  |
| 3                | 1.638 | 2.353 | 3.182  | 4.541  | 5.841  |
| 4                | 1.533 | 2.132 | 2.776  | 3.747  | 4.604  |
| 5                | 1.476 | 2.015 | 2.571  | 3.365  | 4.032  |
| 6                | 1.440 | 1.943 | 2.447  | 3.143  | 3.707  |
| 7                | 1.415 | 1.895 | 2.365  | 2.998  | 3.499  |
| 8                | 1.397 | 1.860 | 2.306  | 2.896  | 3.355  |
| 9                | 1.383 | 1.833 | 2.262  | 2.821  | 3.250  |
| 10               | 1.372 | 1.812 | 2.228  | 2.764  | 3.169  |
| 11               | 1.363 | 1.796 | 2.201  | 2.718  | 3.106  |
| 12               | 1.356 | 1.782 | 2.179  | 2.681  | 3.055  |
| 13               | 1.350 | 1.771 | 2.160  | 2.650  | 3.012  |
| 14               | 1.345 | 1.761 | 2.145  | 2.624  | 2.977  |
| 15               | 1.341 | 1.753 | 2.131  | 2.602  | 2.947  |
| 16               | 1.337 | 1.746 | 2.120  | 2.583  | 2.921  |
| 17               | 1.333 | 1.740 | 2.110  | 2.567  | 2.898  |
| 18               | 1.330 | 1.734 | 2.101  | 2.552  | 2.878  |
| 19               | 1.328 | 1.729 | 2.093  | 2.539  | 2.861  |
| 20               | 1.325 | 1.725 | 2.086  | 2.528  | 2.845  |
| 21               | 1.323 | 1.721 | 2.080  | 2.518  | 2.831  |
| 22               | 1.321 | 1.717 | 2.074  | 2.508  | 2.819  |
| 23               | 1.319 | 1.714 | 2.069  | 2.500  | 2.807  |
| 24               | 1.318 | 1.711 | 2.064  | 2.492  | 2.797  |
| 25               | 1.316 | 1.708 | 2.060  | 2.485  | 2.287  |
| 26               | 1.315 | 1.706 | 2.056  | 2.479  | 2.779  |
| 27               | 1.314 | 1.703 | 2.052  | 2.473  | 2.771  |
| 28               | 1.313 | 1.701 | 2.048  | 2.467  | 2.763  |
| 29               | 1.311 | 1.699 | 2.045  | 2.462  | 2.756  |
| 30               | 1.310 | 1.697 | 2.042  | 2.457  | 2.750  |
| 40               | 1.303 | 1.684 | 2.021  | 2.423  | 2.704  |
| 60               | 1.296 | 1.671 | 2.000  | 2.390  | 2.660  |
| 120              | 1.289 | 1.658 | 1.980  | 2.358  | 2.617  |
| $\infty$         | 1.282 | 1.645 | 1.960  | 2.325  | 2.576  |

# Percentage Points of $\chi^2$ - Distribution



Example

For  $\Phi = 10$  d. o. f.

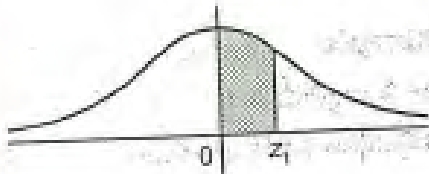
$$P(\chi^2 > 15.99) = 0.10$$

1

| 0.01   |
|--------|
| 63.657 |
| 9.925  |
| 5.841  |
| 4.604  |
| 4.032  |
| 3.707  |
| 3.499  |
| 3.355  |
| 3.250  |
| 3.169  |
| 3.106  |
| 3.055  |
| 3.012  |
| 2.977  |
| 2.947  |
| 2.921  |
| 2.898  |
| 2.878  |
| 2.861  |
| 2.845  |
| 2.831  |
| 2.819  |
| 2.807  |
| 2.797  |
| 2.287  |
| 2.779  |
| 2.771  |
| 2.763  |
| 2.756  |
| 2.750  |
| 2.704  |
| 2.660  |
| 2.617  |
| 2.576  |

| $P$ | 0 = .99 | 0.95   | 0.50   | 0.10   | 0.05   | 0.02   | 0.01   |
|-----|---------|--------|--------|--------|--------|--------|--------|
| F   |         |        |        |        |        |        |        |
| 1   | .000157 | .00393 | .455   | 2.706  | 3.841  | 5.214  | 6.635  |
| 2   | .0201   | .103   | 1.386  | 4.605  | 5.991  | 7.824  | 9.210  |
| 3   | .115    | .352   | 2.366  | 6.251  | 7.815  | 9.837  | 11.341 |
| 4   | .297    | .711   | 3.357  | 7.779  | 9.488  | 11.668 | 13.277 |
| 5   | .554    | 1.145  | 4.351  | 9.236  | 11.070 | 13.388 | 15.086 |
| 6   | .872    | 1.635  | 5.348  | 10.645 | 12.592 | 15.033 | 16.812 |
| 7   | 1.339   | 2.167  | 6.346  | 12.017 | 14.067 | 16.622 | 18.475 |
| 8   | 1.646   | 2.733  | 7.344  | 13.362 | 15.507 | 18.168 | 20.090 |
| 9   | 2.088   | 3.325  | 8.343  | 14.684 | 16.919 | 19.679 | 21.666 |
| 10  | 2.558   | 3.940  | 9.340  | 15.987 | 18.307 | 21.161 | 23.209 |
| 11  | 3.053   | 4.575  | 10.341 | 17.275 | 19.675 | 22.618 | 24.725 |
| 12  | 3.571   | 5.226  | 11.340 | 18.549 | 21.026 | 24.054 | 26.217 |
| 13  | 4.107   | 5.892  | 12.340 | 19.812 | 22.362 | 25.472 | 27.688 |
| 14  | 4.660   | 6.571  | 13.339 | 21.064 | 23.685 | 26.873 | 29.141 |
| 15  | 4.229   | 7.261  | 14.339 | 22.307 | 24.996 | 28.259 | 30.578 |
| 16  | 5.812   | 7.962  | 15.338 | 23.542 | 26.296 | 29.633 | 32.000 |
| 17  | 6.408   | 8.672  | 16.338 | 24.769 | 27.587 | 30.995 | 33.409 |
| 18  | 7.015   | 9.390  | 17.338 | 25.989 | 28.869 | 32.346 | 34.805 |
| 19  | 7.633   | 10.117 | 18.338 | 27.204 | 30.144 | 33.687 | 36.191 |
| 20  | 8.260   | 10.851 | 19.337 | 28.412 | 31.410 | 35.020 | 37.566 |
| 21  | 8.897   | 11.591 | 20.337 | 29.615 | 32.671 | 36.349 | 38.932 |
| 22  | 9.542   | 12.338 | 21.337 | 30.813 | 33.924 | 37.659 | 40.289 |
| 23  | 10.196  | 13.091 | 22.337 | 32.007 | 35.172 | 38.968 | 41.638 |
| 24  | 10.856  | 13.848 | 23.337 | 32.196 | 36.415 | 40.270 | 42.980 |
| 25  | 11.524  | 14.611 | 24.337 | 34.382 | 37.652 | 41.566 | 44.314 |
| 26  | 12.198  | 15.379 | 25.336 | 35.363 | 38.885 | 41.856 | 45.642 |
| 27  | 12.879  | 16.151 | 26.336 | 36.741 | 40.113 | 44.140 | 46.963 |
| 28  | 13.565  | 16.928 | 27.336 | 37.916 | 41.337 | 45.419 | 48.278 |
| 29  | 14.256  | 17.708 | 28.336 | 39.087 | 42.557 | 46.693 | 49.588 |
| 30  | 14.953  | 18.493 | 29.336 | 40.256 | 43.773 | 47.962 | 50.892 |

## Area Under Standard Normal Curve



The table gives the area under the standard normal curve from  $z = 0$  to  $z = z_1$  which is the probability that  $z$  will lie between  $z = 0$  and  $z = z_1$ .

| $z$ | .00   | .01   | .02   | .03   | .04   | .05   | .06   | .07   | .08   | .09   |
|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0.0 | .0000 | .0040 | .0080 | .0120 | .0160 | .0199 | .0239 | .0279 | .0319 | .0359 |
| 0.1 | .0398 | .0438 | .0478 | .0517 | .0557 | .0596 | .0636 | .0675 | .0714 | .0753 |
| 0.2 | .0793 | .0832 | .0871 | .0910 | .0948 | .0987 | .1026 | .1064 | .1103 | .1141 |
| 0.3 | .1179 | .1217 | .1255 | .1293 | .1331 | .1368 | .1406 | .1443 | .1480 | .1517 |
| 0.4 | .1554 | .1591 | .1628 | .1664 | .1700 | .1736 | .1772 | .1808 | .1844 | .1879 |
| 0.5 | .1915 | .1950 | .1985 | .2019 | .2054 | .2088 | .2123 | .2157 | .2190 | .2224 |
| 0.6 | .2257 | .2291 | .2324 | .2357 | .2389 | .2422 | .2454 | .2486 | .2517 | .2549 |
| 0.7 | .2580 | .2611 | .2642 | .2673 | .2703 | .2734 | .2764 | .2794 | .2823 | .2852 |
| 0.8 | .2881 | .2910 | .2939 | .2967 | .2995 | .3023 | .3051 | .3078 | .3106 | .3133 |
| 0.9 | .3159 | .3186 | .3212 | .3238 | .3264 | .3289 | .3315 | .3340 | .3365 | .3389 |
| 1.0 | .3413 | .3438 | .3461 | .3485 | .3508 | .3531 | .3554 | .3577 | .3599 | .3621 |
| 1.1 | .3643 | .3665 | .3686 | .3708 | .3729 | .3749 | .3770 | .3790 | .3810 | .3830 |
| 1.2 | .3849 | .3869 | .3888 | .3907 | .3925 | .3944 | .3962 | .3980 | .3997 | .4015 |
| 1.3 | .4032 | .4049 | .4066 | .4082 | .4099 | .4115 | .4131 | .4147 | .4162 | .4177 |
| 1.4 | .4192 | .4207 | .4222 | .4236 | .4251 | .4265 | .4279 | .4292 | .4306 | .4319 |
| 1.5 | .4332 | .4345 | .4357 | .4370 | .4382 | .4394 | .4406 | .4418 | .4429 | .4441 |
| 1.6 | .4452 | .4463 | .4474 | .4484 | .4495 | .4505 | .4515 | .4525 | .4535 | .4545 |
| 1.7 | .4554 | .4564 | .4573 | .4582 | .4591 | .4599 | .4608 | .4616 | .4625 | .4633 |
| 1.8 | .4641 | .4649 | .4656 | .4664 | .4671 | .4678 | .4686 | .4693 | .4699 | .4706 |
| 1.9 | .4713 | .4719 | .4726 | .4732 | .4738 | .4744 | .4750 | .4756 | .4761 | .4767 |
| 2.0 | .4772 | .4778 | .4783 | .4788 | .4793 | .4798 | .4803 | .4808 | .4812 | .4817 |
| 2.1 | .4821 | .4826 | .4830 | .4834 | .4838 | .4842 | .4846 | .4850 | .4854 | .4857 |
| 2.2 | .4861 | .4864 | .4868 | .4871 | .4875 | .4878 | .4881 | .4884 | .4887 | .4890 |
| 2.3 | .4893 | .4896 | .4898 | .4901 | .4904 | .4906 | .4909 | .4911 | .4913 | .4916 |
| 2.4 | .4918 | .4920 | .4922 | .4925 | .4927 | .4929 | .4931 | .4932 | .4934 | .4936 |
| 2.5 | .4938 | .4940 | .4941 | .4943 | .4945 | .4946 | .4948 | .4949 | .4951 | .4952 |
| 2.6 | .4953 | .4955 | .4956 | .4957 | .4959 | .4960 | .4961 | .4962 | .4963 | .4964 |
| 2.7 | .4965 | .4966 | .4967 | .4968 | .4969 | .4970 | .4971 | .4972 | .4973 | .4974 |
| 2.8 | .4974 | .4975 | .4976 | .4977 | .4977 | .4978 | .4979 | .4979 | .4980 | .4981 |
| 2.9 | .4981 | .4982 | .4982 | .4983 | .4984 | .4984 | .4985 | .4985 | .4986 | .4986 |
| 3.0 | .4987 | .4987 | .4987 | .4988 | .4988 | .4989 | .4989 | .4989 | .4990 | .4990 |



**END SEM/RE-EXAM EXAMINATION MAY / JUNE 2026**

Program: S.Y.BTech Civil(WP)

Course Code: PC-BTC402

Course Name: Structural Mechanics

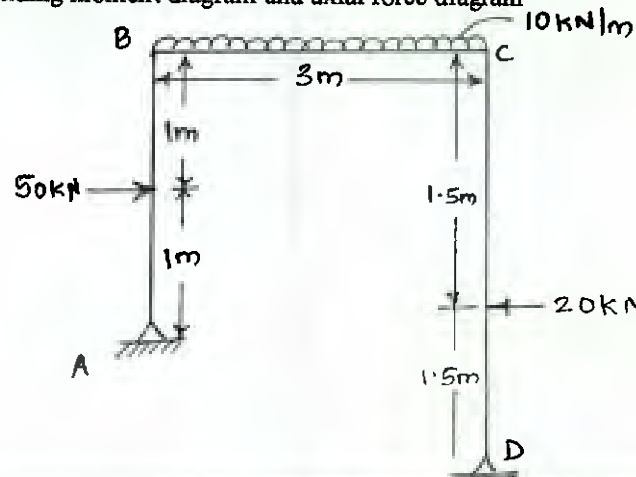
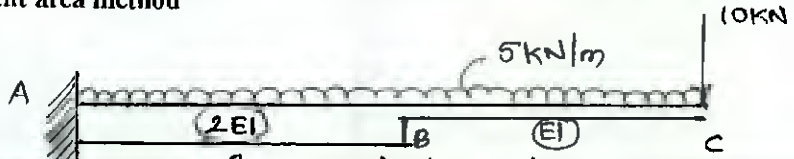
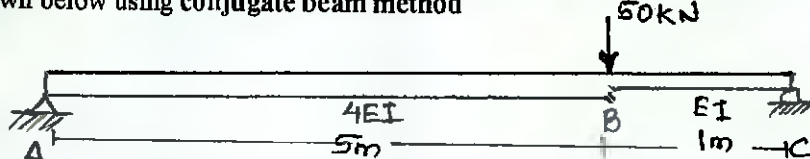
Notes: Attempt any 5 main questions out of 7

Duration: 3 hours

Maximum Points: 100

Semester: IV

28/05/2026

| Q.No. | Questions                                                                                                                                                                                                                                                                                                                                                                                            | Points | CO | BL | Module No. |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----|----|------------|
| 1.a)  | Evaluate the maximum and minimum stress developed at the base for a hollow circular chimney, of internal diameter 2.2 m, thickness 600mm and height 25 m. The wind pressure is $2.8 \text{ kN/m}^2$ on the projected area. The density of masonry may be taken as $20 \text{ kN/m}^3$                                                                                                                | 10     | 1  | 4  | 1          |
| 1.b)  | A simply supported beam of span 8m, is subjected to a point load of 100 kN at midspan at an angle of $20^\circ$ with Y axis (clockwise). The cross section of the beam is a rectangle of 250x600mm.<br>Find the maximum bending moment and state its location.<br>Find the location of the neutral axis and show it in the cross section. Find the bending stresses at all four corners of the beam. | 10     | 1  | 3  | 2          |
| 2.    | For the frame shown below, obtain the support reactions and draw the shear force diagram, bending moment diagram and axial force diagram<br>                                                                                                                                                                     | 20     | 2  | 3  | 3          |
| 3.a)  | Find the slope and vertical deflection at C for the beam shown below using moment area method<br>                                                                                                                                                                                                                | 10     | 3  | 3  | 5          |
| 3.b)  | Find the slope and vertical deflection at B, slope at both supports for the beam shown below using conjugate beam method<br>                                                                                                                                                                                     | 10     | 3  | 3  | 5          |

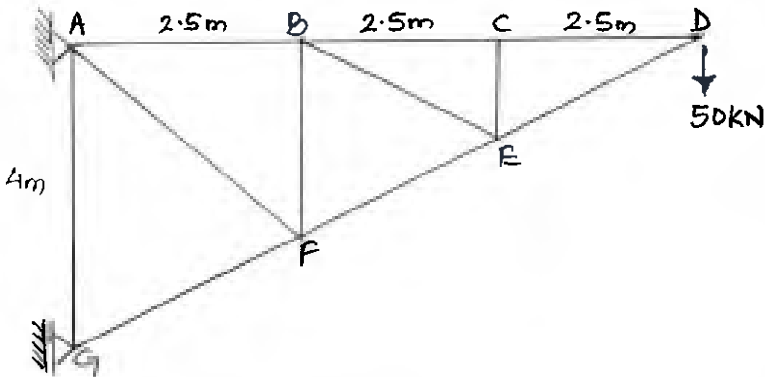
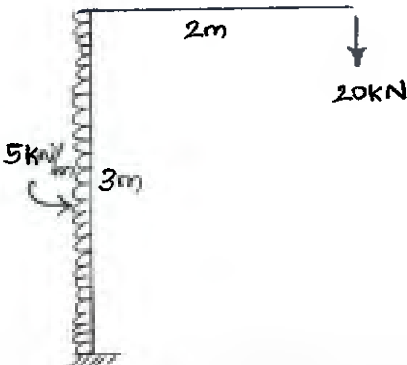
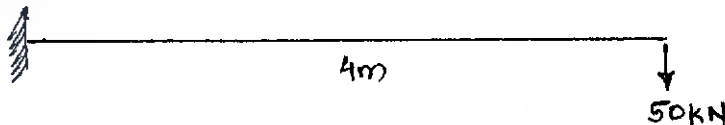


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Munshi Nagar, Andheri (W) Mumbai – 400058



**END SEM/RE-EXAM EXAMINATION MAY / JUNE 2026**

|      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |    |   |   |   |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|---|---|---|
|      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |    |   |   |   |
| 4.a) | <p>For the pin-jointed frame shown, find the vertical deflection at D</p>                                                                                                                                                                                                                                                                                                                                                   | 10 | 3 | 3 | 6 |
| 4.b) | <p>Analyse the deflection of vertical joint C for the frame shown below</p>                                                                                                                                                                                                                                                                                                                                                 | 10 | 3 | 3 | 6 |
| 5.a) | <p>A beam of length 6 m is simply supported at its ends and carries a point load of 35 KN at a distance of 1.5m from the left support and a UDL of 10kN/m on full span<br/>Find: (i) deflection under each load. (ii) Maximum deflection and (iii) The point at which maximum deflection occurs,<br/><math>E = 2 \times 10^5 \text{ N/mm}^2</math> and <math>I = 90 \times 10^6 \text{ mm}^4</math>. Use Macaulay's method</p>                                                                                | 10 | 3 | 3 |   |
| 5.b) | <p>Calculate the crippling loads given by Euler's and Rankine's formulae for a steel column 3.5 m long with both ends hinged (pinned). The cross section of the column is a symmetrical I section with the following dimensions. Top and bottom Flange width = 225 mm, Top and bottom Flange thickness = 20mm, Depth of web = 310 mm, Thickness of web = 22 mm. Take <math>E = 2 \times 10^5 \text{ N/mm}^2</math>, <math>\sigma_c = 350 \text{ MPa}</math> and Rankine's constant = <math>1/7000</math>.</p> | 10 | 4 | 3 | 7 |
| 6.a) | <p>State and explain Castiglano's first theorem and explain its application.</p>                                                                                                                                                                                                                                                                                                                                                                                                                              | 06 | 1 | 3 | 2 |
| 6.b) | <p>Evaluate the strain energy stored in the beam due to bending in the following beam and evaluate its deflection at free end</p>                                                                                                                                                                                                                                                                                         | 08 | 2 | 4 | 4 |

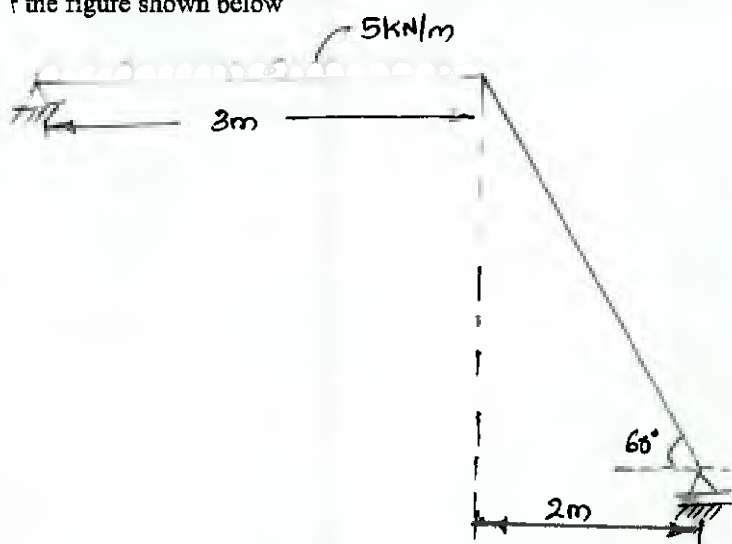


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**END SEM/RE-EXAM EXAMINATION MAY / JUNE 2026**

|      |                                                                                                                                                                                                                                                                                                                                          |    |   |   |   |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|---|---|---|
|      |                                                                                                                                                                                                                                                                                                                                          |    |   |   |   |
| 6.c) | State and explain Maxwell's Reciprocal theorem                                                                                                                                                                                                                                                                                           | 06 | 2 | 2 | 4 |
| 7.a) | A simply supported beam of a certain cross section and material undergoes 2mm deflection for a 5m span when loaded by a central point load of 50kN. If the same cross section is used as a cantilever beam of 1.8m span loaded by a UDL of 5kN/m on full span and a point load of 15kN at free end, evaluate the deflection at free end. | 05 | 3 | 3 | 5 |
| 7.b) | Determine the support reactions and draw the SFD, BMD and AFD for the figure shown below<br>                                                                                                                                                          | 15 | 2 | 3 | 3 |



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01/06/2026

## END SEMESTER EXAMINATION MAY 2026 / RE-EXAM JULY 2026(WP)

Program: Civil Second year B.Tech W.P

Duration: 3 hrs

Course Code: PC-BTC403

Maximum Points: 100

Course Name: Surveying & Geomatics

Semester: IV

01/06/2026

| Q. No. | Questions                                                                                                                                                                                                                             | Point<br>s | CO  | BL | Module<br>No. |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----|----|---------------|
| 1      | A. Derive a relation between the radius and degree of a curve.                                                                                                                                                                        | 5          | 1,2 | 3  | 1             |
|        | B. State the applications and advantages of triangulation.                                                                                                                                                                            | 5          | 1,2 | 1  | 2             |
|        | C. Difference between topographic surveying & geodetic surveying.                                                                                                                                                                     | 5          | 1,3 | 2  | 3             |
|        | D. What is GIS. State the applications of GIS in surveying and geomatics.                                                                                                                                                             | 5          | 1,4 | 2  | 5             |
| 2      | A. Illustrate the working principle of Remote Sensing with neat sketch and discuss the seven elements involved in the remote sensing process.                                                                                         | 10         | 2,4 | 2  | 4             |
|        | B. Classify GIS data types and compare Spatial Data and Non-Spatial Data with suitable examples.                                                                                                                                      | 10         | 2,4 | 4  | 5             |
| 3      | A. Explain the three segments of Global Positioning System (GPS) with neat sketch. Discuss the functions of each segment in detail.                                                                                                   | 10         | 1,4 | 2  | 6             |
|        | B. Describe the procedure for Building Setting Out with neat sketch.                                                                                                                                                                  | 10         | 1,2 | 2  | 7             |
| 4      | A. Discuss coordinate reference system and Differentiate between local datum and global datum.                                                                                                                                        | 10         | 2,3 | 4  | 3             |
|        | B. Two tangents PQ and QR intersect at a point B at 160.5 m chainage. Let us calculate all the necessary data for setting out a circular curve of 120 m radius and deflection angle 30° by the method of offsets from the long chord. | 10         | 1,2 | 3  | 1             |
| 5      | A. Explain the principles of GPS surveying. Discuss Differential GPS (DGPS) and Real Time Kinematic (RTK) surveying techniques.                                                                                                       | 10         | 2,4 | 2  | 6             |
|        | B. Write short notes on:<br>1. Active and passive remote sensing<br>2. Image interpretation techniques                                                                                                                                | 10         | 1,2 | 2  | 4             |



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## END SEMESTER EXAMINATION MAY 2026 / RE - EXAM JULY 2026(WP)

| 6       | A. Explain the procedure for Tunnel Surveying and transfer of tunnel alignment through shaft with neat sketch.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 10                       | 2,3                      | 2 | 7     |   |       |         |                |   |     |   |     |    |     |   |   |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|---|-------|---|-------|---------|----------------|---|-----|---|-----|----|-----|---|---|
|         | B. Draw a neat sketch of a circular curve and show the following notation thereon: (a) Back tangent, (b) forward tangent, (c) point of commencement, (d) point of tangency, (e) point of intersection, (f) angle of deflection, (g) angle of intersection, (h) long chord, (i) apex distance, and (j) versed sine of curve.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 10                       | 1,2                      | 1 | 1     |   |       |         |                |   |     |   |     |    |     |   |   |
| 7       | <p>A. An inaccessible point P is observed from two instrument stations, A and B, which lie in the same Vertical plane as point P. Assume the point P lies between station A &amp; B and that all point lie in Same vertical plane. The horizontal distance between Stations A and B is 28m. A benchmark (BM) of reduced level (RL) of 100.00 m is visible from both stations.</p> <p>The following staff readings on benchmark were recorded</p> <table border="1"> <tr> <th>Station</th> <th>Staff Readings on BM (m)</th> </tr> <tr> <td>A</td> <td>2.045</td> </tr> <tr> <td>B</td> <td>1.105</td> </tr> </table> <p>The following angles of elevation to point P were observed</p> <table border="1"> <tr> <th>Station</th> <th>Vertical angle</th> </tr> <tr> <td>A</td> <td>32°</td> </tr> <tr> <td>B</td> <td>40°</td> </tr> </table> <p>Determine-</p> <ol style="list-style-type: none"> <li>Horizontal distance of point P from station A and B</li> <li>The reduced level (RL) at pointy P</li> <li>Draw proper sketch showing details</li> </ol> | Station                  | Staff Readings on BM (m) | A | 2.045 | B | 1.105 | Station | Vertical angle | A | 32° | B | 40° | 10 | 1,2 | 3 | 2 |
|         | Station                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Staff Readings on BM (m) |                          |   |       |   |       |         |                |   |     |   |     |    |     |   |   |
| A       | 2.045                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                          |                          |   |       |   |       |         |                |   |     |   |     |    |     |   |   |
| B       | 1.105                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                          |                          |   |       |   |       |         |                |   |     |   |     |    |     |   |   |
| Station | Vertical angle                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                          |                          |   |       |   |       |         |                |   |     |   |     |    |     |   |   |
| A       | 32°                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                          |                          |   |       |   |       |         |                |   |     |   |     |    |     |   |   |
| B       | 40°                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                          |                          |   |       |   |       |         |                |   |     |   |     |    |     |   |   |
|         | B. Discuss the applications of Global Positioning System (GPS) in Surveying and Geomatics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 10                       | 1,2                      | 4 | 5     |   |       |         |                |   |     |   |     |    |     |   |   |

Notes:

Notes:



# SARDAR PATEL COLLEGE OF ENGINEERING

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Munshi Nagar, Andheri (W) Mumbai – 400058



## END SEMESTER EXAMINATION MAY/JUNE 2026

Program: CIVIL ENGINEERING (Working Professional)

Course Code: PC-BTC-404

*Second year*

Course Name: Hydraulic Engineering

Duration: 3 hrs

Maximum Points: 100

Semester: IV

Notes: Attempt any five questions

*03/06/2026*

| Q.No. | Questions                                                                                                                                                                                                                                                                                                                                                                                                                       | Points | CO  | BL   | Module No. |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----|------|------------|
| 1     | A. Discuss in detail dimensionless numbers and their significance: <ul style="list-style-type: none"><li>• Froude number</li><li>• Reynolds number</li><li>• Euler number</li><li>• Weber number,</li><li>• Mach number</li></ul> B. Differentiate between distorted and undistorted models in hydraulic engineering. Give practical examples where distorted models are used.<br>C. What is similitude in model studies?       | 10+8+2 | 2,3 | 2,3  | 1          |
| 2     | A. Differentiate notch and weir. Discuss the classification of notches & weir.<br>B. What are hydraulically efficient channel sections? Explain with reference to rectangular and trapezoidal channels.<br>C. A rectangular channel is to carry 15 m <sup>3</sup> /s of water at an average velocity of 2.5 m/s. Find the most economical cross-section. Take Chezy's constant C=55.                                            | 10+6+4 | 1,2 | I,II | 1,2        |
| 3     | A. Explain the classification of open channels. Give examples of prismatic and non-prismatic channels.<br>B. A rectangular channel is to carry 1.2 m <sup>3</sup> /s of water with a bed slope of 1 in 2500. Determine its most economical section. Take Chezy's constant C=55.<br>C. A rectangular channel 5 m wide has a specific energy of 3.5 Nm/N. Calculate the critical depth, critical velocity, and maximum discharge. | 3+7+5  | 1,2 | I,II | 3          |



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**END SEMESTER EXAMINATION MAY/JUNE 2026**

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |        |     |      |     |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----|------|-----|
| 4 | <p>A. Discuss in detail types of flow in open channels along with examples and mathematical formulae.</p> <p>B. A trapezoidal channel with side slopes of 2 horizontal to 3 vertical has a bed slope of 1 in 1200. If the depth of flow is 1.5 m and base width is 2 m, calculate the discharge using Manning's <math>n = 0.014</math>.</p> <p>C. A horizontal pipe 150 mm in diameter is joined by sudden enlargement to a 225 mm diameter pipe. Water is flowing through it at the rate of <math>0.05 \text{ m}^3/\text{s}</math>.</p> <p>Find: (i) Loss of head due to abrupt expansion</p> <p>(ii) Pressure difference in the two pipes</p> <p>(iii) Change in pressure if the change of section is gradual without any loss</p> | 10+5+5 | 1,2 | I,II | 6   |
| 5 | <p>A. Differentiate between major and minor losses in pipe flow. Illustrate with examples of fittings and bends where minor losses occur.</p> <p>B. Define specific energy and specific force in open channel flow. Discuss their applications in hydraulic engineering.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 10+10  | 1,2 | I,II | 6   |
| 6 | <p>A. Derive an expression for force exerted by jet in stationary fixed plate.</p> <p>B. A jet of data 75 mm diameter has a velocity of 30 m/s. It strikes a flat plate inclined at <math>45^\circ</math> to the axis of jet. Find the force on the plate when the plate is stationary.</p> <p>C. Impulse turbine Vs Reaction Turbine (Any 10 differences)</p>                                                                                                                                                                                                                                                                                                                                                                       | 5+5+10 | 2-4 | I,II | 3,4 |
| 7 | <p>A. Define: Hydraulic Turbines. Discuss the various classification of Hydraulic turbines.</p> <p>B. Write a short note on Reciprocating pumps.</p> <p>C. Draw and discuss working principle of Pelton wheel.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 10+5+5 | 2-4 | I,II | 5   |



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## END SEMESTER EXAMINATION MAY/JULY 2026



Program: B.Tech. Working Professional *Second year*

Duration: 3 hr

Course Code: PC-BTC405

Maximum Points: 100

Course Name: Transportation Engineering

Semester: IV

Notes:

*05/06/2026*

- Solve any five questions
- Figure on right indicate maximum marks for the given question, course outcome attained and module no. of questions.

| Q. No. | Questions                                                                                                                | Poi<br>nts | C<br>O | BL | Mo<br>dule<br>No. |
|--------|--------------------------------------------------------------------------------------------------------------------------|------------|--------|----|-------------------|
| Q1     |                                                                                                                          |            |        |    |                   |
| (a)    | Suggest measures which can be taken to reduce wearing of railway tracks                                                  | 10         | 4      | L4 | 4                 |
| (b)    | Draw a neat layout of a small airport with a single runway, label each component.                                        | 10         | 2      | L3 | 2                 |
| Q.2    |                                                                                                                          |            |        |    |                   |
| (a)    | Elaborate the necessary data for Runway orientation                                                                      | 10         | 2      | L3 | 2                 |
| (b)    | Describe important criteria considered before finalizing location of an airport                                          | 10         | 2      | L3 | 2                 |
| Q.3    |                                                                                                                          |            |        |    |                   |
| (a)    | Explain minimum turning radius and minimum circling radius and discuss their impact on design of an airport.             | 10         | 3      | L3 | 3                 |
| (b)    | How would you plan and co-ordinate multimodal transport facilities for Indian conditions                                 | 10         | 3      | L4 | 3                 |
| Q.4    |                                                                                                                          |            |        |    |                   |
| (a)    | With a neat sketch explain coning of wheels in railway engineering                                                       | 7          | 4      | L2 | 4                 |
| (b)    | Compare the types of railway gauges and suggest most appropriate type for connecting two cities by a rail line in India. | 6          | 4      | L4 | 4                 |
| (c)    | Explain the types of wear of rails and suggest measures to reduce the same.                                              | 7          | 4      | L3 | 4                 |
| Q.5    |                                                                                                                          |            |        |    |                   |
| (a)    | Describe the various types of gradients in railway alignment with a neat sketch                                          | 10         | 5      | L3 | 5                 |



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### END SEMESTER EXAMINATION MAY/JULY 2026

|     |                                                                                     |    |   |    |   |
|-----|-------------------------------------------------------------------------------------|----|---|----|---|
| (b) | Draw a neat sketch of permanent way of railway line and explain its components      | 10 | 5 | L3 | 5 |
|     |                                                                                     |    |   |    |   |
| Q.6 |                                                                                     |    |   |    |   |
| (a) | Explain any five aircraft characteristics and their impact on design of an airport. | 10 | 2 | L3 | 2 |
| (b) | Describe the various track fittings and fastenings used in railways                 | 10 | 4 | L3 | 4 |
|     |                                                                                     |    |   |    |   |
| Q.7 |                                                                                     |    |   |    |   |
| (a) | Suggest measures which can be taken to reduce wearing of railway tracks             | 10 | 4 | L4 | 4 |
| (b) | Describe in detail the objectives of Transportation                                 | 10 | 1 | L4 | 1 |

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**END SEMESTER EXAMINATION MAY/JUNE 2026**Program: **CIVIL ENGINEERING (Working Professional)**

Duration: 3 hrs

Course Code: PE-BTC-406

*Second Year*

Maximum Points: 100

Course Name: Water Supply Engineering

Semester: IV

Notes: Q.1 is compulsory and attempt any four out of remaining six questions

*08/06/2026*

| Q.No. | Questions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Points | CO  | BL   | Modul No. |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----|------|-----------|
| 1     | <b>Solve any four:</b><br>A. Planned water supply Scheme Vs Unplanned water supply scheme (Any five)<br>B. Factors affecting settling efficiency.<br>C. Cascade Aerator.<br>D. Break-point chlorination.<br>E. Requirements of good distribution system.<br>F. Elevated Reservoir.                                                                                                                                                                                                                                                                                                                                                       | 10+5+5 | 1-4 | I,II | 1-5       |
| 2     | A. What do you mean by Water Demand? Discuss the various Factors affecting the water demand in metro cities.<br>B. A town has the following data:<br>• Population = 1,20,000<br>• Per capita water demand = 180 LPCD<br>• Water is pumped uniformly for 16 hours/day<br>• Maximum Daily Demand (MDD) = $1.8 \times$ Average Daily Demand (ADD)<br>• Peak Hourly Demand (PHD) = $1.5 \times$ Maximum Daily Demand (MDD)<br>Calculate:<br>1. Average Daily Demand (ADD)<br>2. Maximum Daily Demand (MDD)<br>3. Peak Hourly Demand (PHD)<br>4. Required capacity of Service Reservoir (ESR)<br>C. Make a list chemical properties of water. | 10+5+5 | 1,2 | I,II | 1,2       |
| 3     | A. Define a Water Treatment Plant (WTP). Explain briefly the main units involved in a water treatment plant with their functions<br>B. Design a sedimentation tank for the following parameters:<br>• Water supplied = 1,400,000 L/day<br>• Detention period = 5 hours                                                                                                                                                                                                                                                                                                                                                                   | 10+5+5 | 1,2 | I,II | 2         |



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## END SEMESTER EXAMINATION MAY/JUNE 2026

|   |                                                                                                                                                                                                                                                                                                                                                                |        |     |      |   |
|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----|------|---|
|   | <ul style="list-style-type: none"><li>• Velocity of flow = 12 cm/min</li><li>• Depth of water = 4 m</li><li>• Allowance for sludge = 80 cm</li></ul> <p>C. Define: Intake well. Discuss any four types of intake wells.</p>                                                                                                                                    |        |     |      |   |
| 4 | <p>A. Define: Aeration. Discuss the main objectives and factors affecting aeration process.</p> <p>B. Write a short note on: Requirements of good disinfectant.</p> <p>C. Discuss any five limitations of aeration process.</p>                                                                                                                                | 10+5+5 | 1,2 | I,II | 3 |
| 5 | <p>A. Define: Filtration. Discuss the construction, operation, and neat sketch of slow sand filter (SSF).</p> <p>B. Design a slow sand filter for 50000 Population &amp; 180 lpcd max. water supply rate</p> <ul style="list-style-type: none"><li>• rate of filtration = 200 lit/hr/m<sup>2</sup></li></ul> <p>C. Write a short note on: Pressure Filter.</p> | 10+5+5 | 1-4 | I,II | 3 |
| 6 | <p>A. Define: Chlorination. Discuss the various forms of chlorination process.</p> <p>B. Calculate the quantity of bleaching powder required for disinfection 1 MLD of water. The dose of chlorine is 0.5 mg/L.</p> <p>C. Discuss the various methods of disinfections. (Any Five)</p>                                                                         | 10+5+5 | 2-4 | I,II | 4 |
| 7 | <p>A. What are the principal methods of layout of distribution system?</p> <p>B. Discuss the factors affecting the leakages of distribution system.</p> <p>C. Discuss the purpose of distribution reservoir.</p>                                                                                                                                               | 10+5+5 | 2-4 | I,II | 5 |



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**End Semester 2026 Examinations**  
**SET B**



Program: CME

Course Code: MI

Course Name: Minor in Management

Second Year B. Tech Civil  
Working Professional  
W.P

Duration: 03 hours

Maximum Points: 100

Semester: IV.

**Note:**

- Question 01 is compulsory
- Attempt any four questions out of remaining 06 questions
- Attempt main question and sub question together
- Draw neat charts wherever required

18/06/2026

| Q.No.  | Questions                                                                                                                                                                                                                                                                                                                              | Points | CO    | BL |
|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------|----|
| Q.1.A  | Describe ANY TWO of following in 250-300 words<br><br>1. Describe the levels of management and their functions.<br>2. Hawthorne's Experiments<br>2. Explain any three leadership styles with examples describing the attributes of a leader. Give examples for every leadership style.<br>4. Explain Kautilya's approach to management | 20     | 01,2, | 01 |
| Q.2.A. | Explain different types of <b>Organizational structures</b> (functional, divisional, matrix, Departmentation). Compare their advantages and limitations with suitable examples.                                                                                                                                                        | 10     | 02    | L2 |
| Q.2.B  | <b>Case:</b><br>A retail chain is expanding into three new cities. The operations head must decide how to structure teams, whether to centralize decision-making at headquarters or give autonomy to local managers. Employees are confused about reporting lines, and duplication of tasks is occurring.                              | 10     | 04    | L5 |
|        | <b>Questions</b><br><br>1. Explain how proper organizing could resolve the confusion in reporting and duplication of tasks.<br><br>2. Recommend an organizational structure suitable for this expansion and justify your choice.                                                                                                       |        |       |    |
| Q.3.A. | What does departmentation mean in the context of organizing? What is                                                                                                                                                                                                                                                                   | 10     | 01    | L1 |

|        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |    |    |
|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|
|        | departmentation? Describe various bases of departmentation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |    |    |    |
| Q.3.B  | What is planning. Explain the importance of planning in an organisation. Describe the different types of plans that an organisation prepares for smooth functioning and to achieve the organisational goals.                                                                                                                                                                                                                                                                                                                                                                                                                                          | 10 | 02 | L2 |
| Q.4. A | Explain Control in management. Evaluate the process and functions of controlling in an organization.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 10 | 03 | L6 |
| Q.4 B  | Case let:<br>Tata Motors has undergone significant transformation in recent years. The company faced declining sales and employee dissatisfaction. The leadership introduced new strategies, restructured teams, and implemented training programs to improve performance and morale. However, some employees resisted change due to fear of job loss and unclear communication.<br>Questions:<br>a Identify the leadership style adopted by the company.<br>b What organizational barriers are evident in the case?<br>c Suggest strategies to overcome employee resistance.<br>d Evaluate the importance of training in organizational development. |    |    |    |
| Q.5. A | Discuss the process of Motivation in Management. Explain in detail any three theories of motivation that can be applied in an organisation. Highlight the advantages and disadvantages of the theories.                                                                                                                                                                                                                                                                                                                                                                                                                                               | 10 | 04 | L5 |
| Q.5 B. | Explain the advantages and disadvantages of centralization and decentralization. What are the factors that determine degree of decentralization?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 10 | 01 | L2 |
| Q.6.A. | Explain the leadership theories. Trait theory, Behavioural Theory and Situational Theory.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 10 | 03 | L4 |
| Q.6.B  | What do you mean by coordination? Why is coordination called as essence of management? Discuss the various techniques and principles of coordination.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 10 | 05 | L2 |
| Q.7A.  | Write Short Notes on any Two:<br>1. 5 M'S of Management<br>2. Difference between Transformational and transactional leadership<br>3. Difference between a manager and Leader<br>4. Types of power                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 10 | 02 | L2 |
| Q.7. B | What is the importance of Directing in an organisation. How and why do directing and planning go hand in hand? Explain in detail the elements of Directing with examples.                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 10 | 03 | L1 |