SRES's

SHREE RAMCHANDRA COLLEGE OFENGINEERING

Lonikand, Pune – 412216

Department of Civil Engineering

Unit test

DAMS and Hydraulic Structures

(2015 Pattern) (Semester - II)

Time : 1 Hour] *[Max. Marks : 30*

Instructions to the candidates:

Solve Q.1. or Q.2., Q.3. or Q.4.,Q.5 or Q.6.

Q1) a) Define & Explain the meaning of storage dam, diversion dams, overflowdams. **[5]**

b) Write different types of Instruments used to monitor dam at least four and explain any one. **[5]**

OR

Q2) a) Explain the factors which govern the selection of site for dam construction. **[5]**

b) What are the objectives of dam safety and instrumentation. **[5]**

Q3) a) Write short note on:

Horizontal inertia force which force should be taken into considerationwhile designing the dam structure. **[5]**

b) What is meant by the best central angle of an arch dam & what is its value? **[5]**

OR

Q4) a) Write advantages of Buttress Dams. **[5]**

b) A 20m high concrete gravity dam has vertical upstream face and downstream face is inclined at 45°. The top and base widths are 2m and 20m. respectively. The free board is 2m. Take weight density of water as $10kN/m^3$ & concrete $24kN/m^2$. Determine factor of safety againstoverturning. Consider full uplift. **[5]**

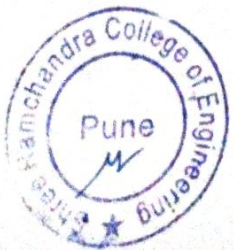
Q5) a) Discuss the various types of energy dissipator used below spillway in relation to the position of tail water depth and jump height curve at leasttwo with sketch. **[5]**

b) State classification of spillway and purpose of its provision (4 types)**[5]**

OR

Q6) a) State four types of spillway gates and explain any one with sketch. **[5]**

b) Write design steps for Down stream crest of ogee spillway. **[5]**



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SHREE RAMCHANDRA COLLEGE OFENGINEERING
Lonikand, Pune – 412216
Department of Civil Engineering

Unit Test marks –DHS-21-22

Roll No.	Name Of Student	Marks	Roll No.	Name Of Student	Marks
A401	HARSHALI RAJENDRA KAKADE	15	A441	KHATAKE YUVRAJ JABAJI	ABSENT
A402	MAULI SHIVAJI SALGAR	16	A442	KIRAN SANDESH KEDAR	15
A403	BANSAL ASHUTOSH RAJKUMAR	16	A443	KOLEKAR AISHWARYA SUNIL	20
A404	BHALEKAR AVINASH PRATAP	10	A444	KULAL RAMESHWAR PANDURANG	ABSENT
A405	BHALSING AGATYA BALASAHEB	21	A445	KUMBHAR ROHIT DATTATRAY	10
A406	BHASKARWAR MAYURI SANTOSHRAO	10	A446	KUNJIR AKSHAY LAXMAN	15
A407	BHAVSAR SAWAN RAVINDRA	15	A447	KUNJIR MAYUR BALASAHEB	09
A408	BHORKAR MANSI VASANT	20	A448	MAGAR VAIBHAV CHANDRAKANT	02
A409	BHOSALE PRATIK PRATAP	12	A449	MANE SAPNA MOHAN	08
A410	BHUJBAL OMKAR JAGANNATH	16	A450	MISAL RUSHIKESH NITIN	10
A411	CHIKTE VAIBHAV KAMLAKAR	12	A451	MORE PRAVIN SHIVAJI	08
A412	CHORE GAURAV PRAVINRAO	12	A452	NAWALE DHANANJAY MACHHINDRA	08
A413	DEVMANE SHRIKANT SHIVLING	15	A453	NEVSE SHUBHAM BABASO	9
A414	DHENGALE AMAR NARAYAN	10	A454	PAGIRE PRATIK NANA	08
A415	DHOTRE NIKHIL SATYAWAN	12	A455	PANGARKAR ASHWINI MOHAN	18
A416	DIVEKAR ROHIT CHANDRAKANT	15	A456	PAWAR AVINASH POPAT	10
A417	GADE SAGAR PRAVIN	12	A457	PAWAR VIRAJ RAJESH	10
A418	GAJARE AJAY RAJU	10	A458	PRASAD GOPICHAND PREMCHAND	08
A419	GARJE NACHIKET SANTOSH	13	A459	RAJESH VIJAY SAKE	15
A420	GAWADE MAYUR PANDURANG	22	A460	ROHIT RADHESHAM GUPTA	08
A421	GHATUL BHAGWAT EKNATH	12	A461	SALUNKE SHEKHAR VILAS	08
A422	GHOGARE MANSI SURESH	24	A462	SAVANT SUBODH KIRAN	16
A423	GONTE AJAY SANJAY	21	A463	SAWANT JEEVAN CHHAGAN	12
A424	GORDE AKASH BABASAHEB	15	A464	SHAIKH ADNAN SHAGIR	13
A425	GURME VISHAL JANARDHAN	AB	A465	SHINDE AVIRATNA ARJUN	10
A426	HAKE SAPNA PRAKASHRAO	ABSENT	A466	SHINDE NIKITA SURESH	15
A427	JADHAO ASHWINI DIPAK	12	A467	SHINDE UMESH VAMAN	10
A428	JADHAV NIKHIL SHNAKAR	07	A468	SURAJ DATTATRAY BHUJBAL	05
A429	JAGDALE ABHISHEK VILAS	12	A469	TAMHANE PRATIK PRAKASH	24
A430	JAGTAP GAURAV BALASAHEB	10	A470	TAPSALKAR ASMITA SANJAY	08
A431	JANWALE RUSHIKESH BALIRAM	21	A471	UNDRE ANIL MHASKU	20
A432	KADAM SHUBHANKAR ABHAY	15	A472	VALTE PRAGATI SADASHIV	15
A433	KALE RAHUL RANVEER	15	A473	WAGHMARE KAJAL MILIND	10
A434	KALE SAGAR BABASAHEB	ABSENT	A474	WAGHMARE MANGESH ANIL	10
A435	KALE VITHAL VIKAS	12	A475	JADHAV VAIJNATH SAHEBRAO	09
A436	KAMTHE AKASH RAMRAO	11	A476	NIKAM SUMIT	15
A437	KAMTHE ANJALI AMRUT	10	A477	ANDE NOMEH	12
A438	KATLE SUYOG SUDARSHAN	08			
A439	KAVTHEKAR SALMAN RASUL	10			
A440	KHARABE RAJKUMAR GANESHRAO	09			

Subject Teacher
Prof. Patil S S

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Prof. S. G. Nikam

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Verified all entries & found correct

Jr. Supervisor's Name, Signature & Date

Roll No. (In Figures) A422 Div. Center :

Roll No.(In Words) A Four two two.

Day & Date : Monday 21/4/22 Examination : unit test

Subject : Dams & Hydraulics Section : -

Course / Paper No.: Medium of Answer : English

Main Ans. Book + No. of Supplements : = Total

Question No.	1	2	3	4	5	6	7	8	9	10	11	12	Total	Sign. of Examiner
Marks Obtained		09		10	05								24	

Use of coloured pencil or ink is strictly prohibited except in case of diagrams and sketches
(Write on both sides and start writing on this page.)

Q. 2
a)

Ans :- The following factors are mainly studied before locating a dam :-

1. The topography.
2. The geology and the foundation condition.
3. The available construction material.
4. The Spill Way size and its location
5. The environmental issues.
6. The earthquake prone zones.
7. The cost of the dam.
8. other consideration.

① The topography :-
It is the shape of the valley, where the dam is to be constructued, make the first choice of the type of dam e.g.
① Incase, it is a narrow 'V' shaped valley : The arch dam is the right choice.

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② The geology and the foundation conditions :-
All the forces acting on dam, are finally transmitted to the foundation so the selection of a dam mainly depends upon the type of foundation i.e the geological condition of the site

③ The available construction material :-
Before the selection of the dam is made, it is necessary to know, the availability of the construction material either on the site or in the nearly areas. This is an economic factor, required to be considered, to reduce to cost of construction of the dam.

④ The Spill way size and its location :-
It is construction required to flow out the surplus water from the reservoir. The size of the Spill way depends upon the maginitude and the frequency of floods and the location of the Spillway depends upon the site condition.

Q. 2. b
Ans : following are the various objective of dam safety and instruments :-

① To identify the problems and provide safe maintenance of the dam

② TO observe the rate and total amount of settlement for embankment construction.

③ To monitor dam performance, rate of construction slope stability assessment.

④ To provide for proper and safe design, Construction operation and maintenance of dams to protect the public Safety.

Q. 4. a
Ans : Advantages :-

① It can be built on unstable foundation

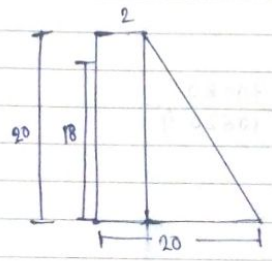
② It needs about $1/3^{rd}$ of the cement which is required to construct a gravity dam

③ There are no issues about the foundation drainage or uplift.

④ The uplift pressure on the buttress dam is less and so it has more stability if Compared with other type of dams.

⑤ The power house and the switch yards can be built between the buttresses. So the cost of construction can be reduced.

Q. 4. b
Ans :-



Self Weight

$W_1 = 2 \times 20 \times 24 \times 1$

$= 960.$

$W_2 = \frac{1}{2} \times 18 \times 20 \times 24 \times 1$

$= 4320$

Water pressure $= \frac{1}{2} \times \gamma_w H^2 \times 1.2$

$= \frac{1}{2} \times 10 \times 18^2$

$= 180$

Uplift pressure $= \frac{1}{2} \times \gamma H \times 20$

$= \frac{1}{2} \times 1 \times 10 \times 18 \times 20$

$= 720$

	Force		lever arm	MR	Mo
1)	W1	960 4320	18 m $2\frac{b}{3} = 2 \times \frac{18}{3} = 12$	18240 51840	
2)	Water pressure	180	$\frac{18}{3} = 6$		1080
3)	Uplift pressure	720	$\frac{2}{3} \times 2 = 666$		9540.4

05

MR = 70080

MO = 10620.4

$FS = \frac{MR}{M_o} = \frac{70080}{10620.4}$

$F_S = 6.54$

Q.5 a

Ans :

1. When water flows from crest and if the difference in upstream and downstream water level is more this causes very high velocity.
2. This high velocity has a very high kinetic energy which can cause dangerous source of the channel bed causing failure of spillway.
3. Therefore it is essential to reduce this kinetic energy of flow and this is done by energy dissipaters.
4. Thus energy dissipaters is a structure constructed near toe of spillway to reduce the high energy of flow.
5. The different type of energy dissipates are
   i) Hydraulic jump type
   ii) Bucket type.

05

Hydraulic jump is the jump of water take place when flow changes from super critical to sub critt

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Department of Electrical Engineering.

Termwork Assessment sheet

Class: BE **Sem: II** **Subject : SGP (50 Marks)** **A.Y: 2021-2022**

Roll No.	Name of Student	Theory Attendance(10)	Submission(10)	Assessment Regularity (10)	Practical Performance (10)	Practical Attendance (10)	Total (50)
EE2101	SIDANKAR SUPRIYA SANJAY	6	5	6	7	6	30
EE2102	ADIK PRASAD YASHWANT	6	5	6	4	6	27
EE2103	ADMILE SANKET SUNIL	9	9	8	8	9	43
EE2104	AJINKYA HANUMANT WALKE	6	6	6	7	7	32
EE2105	ATOLE AKSHAY NAMDEV	7	6	6	7	7	33
EE2106	BADADE SUJEET BABASAHEB	9	9	8	8	8	42
EE2107	BARSKAR ASHOK NARAYAN	6	4	6	4	6	26
EE2108	BARVE ANIKET SHIVAJI	6	7	6	8	7	34
EE2109	BEDRE BHARATI SAMEER	6	7	7	8	7	35
EE2110	BHAWAR AJINKYA VIJAY	7	7	7	6	7	34
EE2111	BHENDEKAR SHITAL DINESHRAO	8	8	8	8	8	40
EE2112	BORKAR RAJASHREE RAJENDRA	8	8	8	7	8	39
EE2113	CHAITANYA DNYANDEV NARKHEDE	6	5	6	5	6	28
EE2114	CHAUDHARI PRATIK PRAMOD	7	8	7	8	8	38
EE2115	CHAVAN KRISHNA BHARAT	7	7	8	6	7	32
EE2116	CHINDHE VAIBHAV BAUSAHEB	8	6	8	6	7	35
EE2117	CHOPADE AKSHAY PRAKASH	8	7	8	7	8	38
EE2118	DAKE SUPRIYA SURESH	7	7	8	7	8	33
EE2119	DANWE MANGESH VISHWANATH	8	5	7	5	7	32
EE2120	DOIFODE SHRIRAM LAXMAN	7	5	6	5	7	30
EE2121	GAWTE RANI ASHOKRAO	7	6	6	5	7	31
EE2122	GHANGALE SAYALI SHIVAJI	7	6	6	6	7	32
EE2123	GHARJALE ASHWINI DNYANOBA	7	6	7	7	7	34
EE2124	HALUNDE ONKAR BHARMA	8	6	8	7	8	35
EE2125	HANCHATE ABHISHEK JANARDHAN	8	7	8	7	8	36
EE2126	HINGMIRE SANGMESHWAR KRISHNA	6	4	6	4	6	26
EE2127	JADHAV DHANAJI SAVAKAR	6	5	6	5	6	28
EE2128	JAGTAP SUJIT SANJAY	7	5	6	6	6	30
EE2129	JOGALE SHILPESH CHANDRAKANT	8	5	6	7	6	32
EE2130	KAMBLE ASHISHKUMAR SHIVRAJ	7	6	7	7	6	33
EE2131	KAMBLE VARSHA UTTAMRAO	9	8	8	7	8	40
EE2132	KATARE ONKAR NAGESH	7	7	7	6	7	34
EE2133	KATKAR SURAJ VITTHAL	7	8	8	8	8	39
EE2134	KHADSE TUSHAR ANIL	6	4	6	4	6	26
EE2135	KHARBE ANKIT ASHROBA	7	7	8	6	8	36
EE2136	KOTHMALE RAVIKANT SUBHASH	7	7	7	5	8	34
EE2137	LATE SURAJ SHIVNATH	8	5	6	6	7	32
EE2138	LOKHANDE ASHWIN PANDURANG	8	5	6	5	7	31
EE2139	MAHAJAN PAVAN MUKUND	8	8	8	7	8	37
EE2140	MAHALE RUPESH DEVIDAS	8	7	8	7	8	36

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EE2141	MARKANTE BALAJI RAVSAHEB	6	7	6	8	7	34
EE2142	MENDHE ABHISHEK MORESHWAR	6	6	6	8	7	33
EE2143	MERGAL ANIL SHRIRANG	6	4	6	4	6	26
EE2144	MHASAGAR ASHISH BHAURAO	6	4	6	3	6	25
EE2145	MIDGULE SATYAVAN MARUTI	7	7	6	6	6	32
EE2146	MOTIPALLE RAHUL DATTATRYA	7	7	8	8	8	38
EE2147	MULE RUSHIKESH BIBHISHAN	7	7	7	6	7	34
EE2148	NANAWARE DATTATRAYA PANDURANG	7	7	7	7	7	35
EE2149	NANDESHWAR NEHA DHARMENDRA	7	7	6	7	7	34
EE2150	NARKHEDE NILESH DILIP	6	6	7	6	6	31
EE2151	NIRMAL TEJAS PRAKASH	7	7	6	6	6	32
EE2152	NUNUNCHE SANTOSH NARAYAN	6	5	6	4	6	27
EE2153	OZARE SAHIL PANDURANG	8	8	8	7	8	39
EE2154	PANCHAL PRAFULL VISHWANATH	6	6	6	5	6	29
EE2155	PANCHAL SHRIKANT DAGDUSAHEB	6	5	6	5	6	28
EE2156	PATHARWAT SHRIDHAR PRATAP	6	3	6	3	6	24
EE2157	PATIL HITESH YOGESH	7	6	7	6	6	32
EE2158	PATIL RUSHIKESH UTTAM	8	8	8	7	7	38
EE2159	PAUL RAMESHEWAR DATTA	6	5	6	5	6	28
EE2160	POL ANANDA SURESH	6	5	6	5	6	28
EE2161	PRAMOD ABHIMANYU KAMBLE	6	6	6	5	6	29
EE2162	PRIYANKA VAIDYA	6	5	6	5	6	28
EE2163	RANE ROSHAN SUNIL	6	6	7	5	6	29
EE2164	RASKAR SAI SHARAD	8	7	6	7	7	35
EE2165	RATHOD AKASH DEVIDAS	8	6	6	6	7	33
EE2166	RODGE AKSHAY KESHAVRAO	7	8	7	7	7	36
EE2167	SALUNKHE TANMAY HEMANT	7	8	8	8	8	39
EE2168	SALUNKHE VINAYAK PANDURANG	6	5	6	6	6	29
EE2169	SAWATKAR AVINASH SUDAM	6	5	6	5	6	28
EE2170	SHIRSATH NIKHIL SAHEBRAO	8	5	6	6	6	29
EE2171	SHUBHAM GUPTA	7	8	7	8	8	36
EE2172	SOMWANSHI VIKRAM NAVNATH	6	6	7	6	6	31
EE2173	SONAWANE KEVAL DILIP	6	5	6	5	6	28
EE2174	SUKHDEVE PUJA VINAYAK	6	6	6	5	6	29
EE2175	SURADE AJINKYA KAILAS	6	5	6	5	6	28
EE2176	SURVASE AKSHAY AMBADAS	6	6	7	6	7	32
EE2177	SURYWANSHI KUNAL SHIVAJI	6	7	6	5	6	30
EE2178	TAYADE RAVI KISAN	6	5	6	5	6	28
EE2179	THAKARE AKASH SHIVNATH	6	6	6	5	6	29
EE2180	VARMA KULDEEP SHYAMSUNDAR	6	5	6	4	6	27
EE2181	WANI BADAL SANJAY	7	5	6	6	6	30
EE2182	YADAV VAIBHAV HIMMATRAO	6	5	6	5	6	28
EE2183	ZAREKAR ADITYA JITENDRA	6	6	7	5	7	31
EE2184	ZENDE RUTUJA MAHADEV	9	9	8	8	9	43
EE2185	ZODAPE VAIBHAV ARUN	6	4	6	4	6	26

Subject Incharge

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HOD

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Gat No. 351, Lonikand, Off Nagar Road, Pune - 412 216.

Supplement No.:

Supervisor's Signature & Date 2/3/22 Prof. Hude T.

Roll No. (In Figures) 15 **Div.** –

Class : S.E **Date :** 2/3/22

Subject : Statistics

18/20

Q1 Calculate i) Quartile deviation (Q.D) and ii) Mean Deviation (M.D) from mean for the following data:

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No. of students	6	5	8	15	7	6	8

Solution:

Marks	mid-value	No. of students	$d = \frac{x-35}{10}$	fd	$\lvert x-\bar{x}\rvert = \lvert x-33.4\rvert$	$f\lvert x-\bar{x}\rvert$	less than cf
0-10	5	6	-3	-18	28.4	170.4	6
10-20	15	5	-2	-10	18.4	92.0	11
20-30	25	8	-1	-8	8.4	67.2	19
30-40	35	15	0	0	1.6	24.0	34
40-50	45	7	1	7	11.6	81.2	41
50-60	55	6	2	12	21.6	129.6	47
60-70	65	8	3	9	31.6	94.8	50
Total		50		-8		659.2	

i) Here $N = 50$; $\frac{1}{4}N = 12.75$ $\frac{3}{4}N = 37.25$

The c.f. just greater than 12.75 is 19. Hence the corresponding class 20-30 contains Q_1.

$$Q_1 = 20 + \frac{10}{8}(12.75 - 11) = 22.19$$

The c.f just greater than 37.25 is 41. Hence the corresponding class 40-50 contains Q_3.

$$Q_3 = 40 + \frac{10}{7}(37.25 - 34) = 44.64$$

Hence, $QD = \frac{1}{2}(Q_3 - Q_1) = \frac{1}{2}(44.64 - 22.19) = 11.23$

ii) mean $(\bar{x}) = A + \frac{h \Sigma fd}{N} = 35 + \frac{10 \times (-8)}{50} = 33.4$ marks

$\therefore$ M.D. (from mean) $= \frac{1}{N} \Sigma f |x - \bar{x}| = \frac{659.2}{50} = 13.184$.

Q2 The variables x and y are connected by the equation $ax + bY + c = 0$. Show that the correlation between them is +1 if the sign of a and b are alike and +1 they are different.

Solution:

$ax + bY + c = 0$

$a E(X) + bE(Y) + c = 0$

$a[X - E(X)] + b[Y - E(Y)] = 0$

$\{X - E(X)\} = -\frac{b}{a}[Y - E(Y)]$

$Cov(X, Y) = E[\{X - E(X)\}\{Y - E(Y)\}] = -\frac{b}{a} E[\{Y - E(Y)\}^2] = -\frac{b}{a}\sigma_Y^2$

and $\sigma_X^2 = E\{X - E(X)\}^2 = \frac{b^2}{a^2} E[\{Y - E(Y)\}^2] = \frac{b^2}{a^2}\sigma_Y^2$

$$r = \frac{Cov(X, Y)}{\sigma_X \sigma_Y} = \frac{-\frac{b}{a}\sigma_Y^2}{\sqrt{\sigma_X^2}\sqrt{\frac{b^2}{a^2}\sigma_Y^2}} = \frac{-\frac{b}{a}\sigma_Y^2}{\left|\frac{b}{a}\right|\sigma_Y^2}$$

$$= \begin{cases} +1, & \text{if } b \text{ and } a \text{ are of opposite signs} \\ -1, & \text{if } b \text{ and } a \text{ are of same sign.} \end{cases}$$

Q3 An analysis of monthly wages paid to the workers of two firms A and B belonging to the same industry gives the following results:

	Firm A	Firm B
Number of workers	500	600
Average daily wages	Rs 186.00	Rs. 175.00
Variance of distribution of wages	81	100

i) Which firm A or B has a larger wage bill?
ii) In which firm A or B is there greater variability in individual wages?
iii) Calculate a) the average daily wage and b) the variance of the distribution of wages of all the workers in the firms A and B taken together.

Solution:
i) Firm A:
No. of wage-earners (say) $n_1 = 500$
Average daily wages (say) $\bar{x}_1 = Rs\ 186$
Average daily wage = Total wages paid / No. of workers.

Hence total wages paid to the workers $= n_1\bar{x}_1$
$= 500 \times 186$
$= Rs\ 93,000$

Firm B
No. of wage-earners (say) $n_2 = 600$
Average daily wages (say) $\bar{x}_2 = Rs\ 175$.
Total daily wages paid to the workers
$= n_2\bar{x}_2 = 600 \times 175 = Rs.\ 1,05,000.$

Thus we see that the firm B has larger wage bill.

ii) Variance of distribution of wages in firm A (Say) $\sigma_1^2 = 81$
Variance of distribution of wages in firm B (say) $\sigma_2^2 = 100$
C.V of distribution of wages for firm A
$= 100 \times \frac{\sigma_1}{\bar{x}_1} = \frac{100 \times 9}{186} = 4.84$

C.V of distribution of wages for firm B
$= 100 \times \frac{\sigma_2}{\bar{x}_2} = \frac{100 \times 10}{175} = 5.71$

Since C.V. for firm B is greater than C.V. for firm A, firm B has greater variability in individual wages.

ii) a) The average daily wages (say) $\bar{x}$ of all the workers in the two firm A and B taken together is given by:

$$\bar{x} = \frac{n_1\bar{x}_1 + n_2\bar{x}_2}{n_1 + n_2} = \frac{500 \times 186 + 600 \times 175}{500 + 600} = \frac{198000}{1100} = Rs\,180.$$

b) The combined variance σ^2 is given by the formula:

$$\sigma^2 = \frac{1}{n_1 + n_2}[n_1(\sigma_1^2 + d_1^2) + n_2(\sigma_2^2 + d_2^2)], \text{ where } d_1 = \bar{x}_1 - \bar{x}$$

$$d_2 = \bar{x}_2 - \bar{x}.$$

Here $d_1 = 186 - 180 = 6$ and $d_2 = 175 - 180 = -5$

Hence $\sigma^2 = \frac{500(81+36) + 600(100+25)}{500+600} = \frac{133500}{1100} = 121.36.$

Q4) In a partially destroyed laboratory, record of an analysis of correlation the following results only are legible:

Variance of $x = 9$. Regression equation $8x - 10y + 66 = 0$

$40x - 18y = 214$

What are i) the mean values $\bar{x}$ and $\bar{y}$ ii) the correlation coefficient between x & y & iii) standard deviation of y?

Solution i) Since both lines of regression pass through the pain $(\bar{x}, \bar{y})$ we have: $8\bar{x} - 10\bar{y} + 66 = 0$ & $40\bar{x} - 18\bar{y} = 214$. Solving we get $\bar{x} = 13$, $\bar{y} = 17$.

ii) Let $8x - 10y + 66 = 0$ & $40x - 18y = 214$ be the line of regression of y on x and x on y respectively. These equations can be put in the form:

$$y = \frac{8}{10}x + \frac{66}{10} \quad \& \quad x = \frac{18}{40} + \frac{214}{40}$$

b_{yx} = Regression coefficient of y on $x = \frac{8}{10} = \frac{4}{5}$

and b_{xy} = Regression coefficient x on $y = \frac{18}{40} = \frac{9}{20}$

Hence since both the regression coefficients are positive, we take $r = +0.6$.

iii) We have $b_{yx} = r \cdot \frac{\sigma_y}{\sigma_x} \Rightarrow \frac{4}{5} = \frac{3}{5} \times \frac{\sigma_y}{3}$

Hence $\sigma_y = 4$

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Reference/SRCOE/EE/PR/02 **Department of Electrical Engineering**

Date:- 31/03/2022

PROJECT REVIEW REPORT (Phase II)

Roll No.	NAME OF THE STUDENT& SIGN	PROJECT TITLE	GUIDE NAME	PANEL MEMBERS
24	Ashwini Dnyanoba Gharjale	Hybrid bicycle	Prof. Priya Patil	Prof. V.M. Rao
40	Rupesh Devidas Mahale			Prof. S.V. Ahirrao
10	Bharati Sameer Bedre			Prof. P.R. patil
66	Tanmay Salunkhe			Prof J. purohit

COMMENTS:

1) Prof. V.M.V. Rao :- Project is good and Need to improve features of topic.

2) Prof. S.V. Ahirrao - Nicely explained the concept. Need some changes in ppt. As well all the participants should give/show participation.

3) Prof. P.R. Patil - mention ppt with mounting place of various parts, well explained project work, to arrange for old bicycle.

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Department of Electrical Engineering

Date:- 31-03-2022

PROJECT REVIEW REPORT (Phase II)

Roll No.	NAME OF THE STUDENT& SIGN	PROJECT TITLE	GUIDE NAME	PANEL MEMBERS
14	pratik pramod chaudhari	Solar inverter design for home	Arbales.P.	prof. D.A.Tikar
10	Ajinkya vijay Bhawar			prof. S.V. Ahirrao
49	Neha nandeshwar			

COMMENTS:

1) prof. D.A Tikar :- change the topic otherwise implement new things in that topic.

2) prof. S.V. Ahirrao :- Change the title or project or use the latest application for Solar or else not accepted.

Prof. V.M. V. Rao

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Reference/SRCOE/EE/PR/02 **Department of Electrical Engineering**

Date:- 31/03/2022

PROJECT REVIEW REPORT (Phase II)

Roll No.	NAME OF THE STUDENT& SIGN	PROJECT TITLE	GUIDE NAME	PANEL MEMBERS
	Shital Dineshrao Bhendekar Shital	Artificial oxygen Tree	Prof. J. Purohit	S. V. Ahirrao.
	Akshay Prakash Chopade			D. A. Tikar
	Vaibhav Bhausaheb Chindha			

COMMENTS:

1) S. V. Ahirrao – Only keep Artificial tree concept with some new appn of O_2 & H_2

2) D. A. Tikar – Add some more parts related to Artificial oxygen or more focused on solar based topic

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Reference/SRCOE/EE/PR/01

Date:- 08/10/2021

PROJECT REVIEW REPORT (Phase II) /I

Roll No.	NAME OF THE STUDENT& SIGN	PROJECT TITLE	GUIDE NAME	PANEL MEMBERS
26	Abhishek Hanchate	Solar based refrigetor for rural area.	Prof. purohit J	S.V. Ahirrao
40	Rahul Motipalle			D.A. Tikar

COMMENTS:

1) S.V. Ahirrao – No study of the project topic. No work done.

2) D.A. Tikar – Do anything new Indtest topic.

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Reference/SRCOE/EE/PR/01

Date:- 08/10/2021

PROJECT REVIEW REPORT (Phase II) /I

Roll No.	NAME OF THE STUDENT& SIGN	PROJECT TITLE	GUIDE NAME	PANEL MEMBERS
	Vaasha Kamble	Design & Construction of an isolated DC-DC flyback converter for Solar MPPT purposes	Prof. Poiya Patil	Prof. S.V. Ahirrao
70	Shubham Gupta			Prof. D.A. Tikal
	Ankit Ashtaba Kharbe			

COMMENTS:

1) Prof. S.V. Ahirrao – Need to implement a new/latest applicatn for DC supply generated. No study done

2) Prof. D.A. Tikas – change the topic otherwise add some new applicatn or some dc power regulated instruments

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RULES AND REGULATIONS

FOR

UG CREDIT SYSTEM PROGRAMME
UNDER FACULTY OF ENGINEERING

EFFECTIVE FROM JUNE 2015

Extract from Affiliating University's Web site Course structure, Evaluation Scheme for C.B.C. System.

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PREFACE:

In a bid to fine tune our technical education system to the global standards & practices, the Credit-Grade based performance and assessment system will be implemented with effect from June 2015 onwards for all the Under Graduate Programmes (UG) under the Faculty of Engineering, University of Pune, starting with First Year.

With the advent of technology and ever-changing expectations from the Industry and Society, it has become imperative to relook at the structure and subject contents of various UG courses to make it contemporary and relevant.

As per the decision by the authorities of University of Pune the faculty of Engineering has prepared the credit system and structure. The revised course is of 190 credits and 1 credit is equivalent to 15 hours. Assessments in credit system consist of A) In-semester continuous assessment and B) End-semester assessment for the Theory head and Term Work/ Practical / Oral / Presentation at the end of the semester for Practical, Oral, Seminar and Project Head.

The faculty of Engineering has shouldered the idea of incorporating latest advances in Science and technology and equip the subject/syllabus contents with latest and relevant topics and know-hows. Accordingly the new structure and syllabi are being introduced, to be implemented from **the academic year 2015-16** from First Year and it will continue for subsequent years. The rules governing the programmes shall be as given below with suffix R, followed by the rule number.

- All UG programmes, under Faculty of Engineering shall be offered with credit system.
- All the B.E. programmes running under the Faculty of Engineering will be of four years duration.
- The total no. of credits required for the completion of the programme is 190 credits.
- One credit is equivalent to 15 hours.
- A student is required to earn 190 credits in a minimum period of eight semesters.

1. UG Programme Structure:

Each B.E. / B. Tech. programme is of 4 years duration. The minimum total no. of credits requirement for each programme is 190. In the structure, the credits are distributed over 8 semesters. The open elective included, gives the student a wide choice of subjects from other programmes. The Credit structure for B E programme is given below in table 1.

TABLE -1 Credit structure for B E programme

Course Work	Credits								
	Sem-1	Sem-2	Sem-3	Sem-4	Sem-5	Sem-6	Sem-7	Sem-8	Total
Mandatory Subjects[$]	19	19	20	20	18	18	10	6	130
Elective Subjects							6	6	12
Lab Courses	6	6	5	5	5	4	4	4	39
Seminar						1			1
Project Work							2	6	8
Total	25	25	25	25	23	23	22	22	190

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$: Mandatory subjects of first, second and third semester must include at least 40 credits for Engineering Physics, Engineering Chemistry, Engineering Mathematics, social science and soft skills
In addition to above credits, there should be audit courses in semester five, six and seven to develop the various skills.
The detail structure is given in Tables

TABLE -2 Structure for Semester-1

	Code	Subjects	Short Name	Weekly Work Load (in Hrs)			Semester Examination Scheme of Marks						Credits
							Theory		TW	PR	OR	Max. Marks	
				Lectures	Tutorials	PR/DRG	In-Semester Exam	End-Semester Exam					
	107001	Engineering Mathematics I		4	1	–	50	50	25	–	–	125	5
#	107002/ 107009	Engineering Physics OR Engineering Chemistry		4	–	2	50	50	25	–	–	125	4+1
	110003	Engineering Graphics I		3	–	2	50	50	–	-	–	100	3+1
#	103004/ 104012	Basic Electrical Engineering OR Basic Electronics Engineering		3	–	2	50	50	25	–	–	125	3+1
	101005	Basic Civil and Environmental Engineering		3	–	2	50	50	25	–	–	125	3+1
	102006	Fundamentals of Programming Languages I		1	–	2	-	-	–	50*	–	50	1+1
	111007	Workshop Practice		–	–	2	–	–	50	–	–	50	1
	Total of Semester I			18	1	12	250	250	150	50	–	700	25

TABLE - 3 Structure for Semester-2

	Code	Subjects	Short Name	Weekly Work Load (in Hrs)			Semester Examination Scheme of Marks						Credits
							Theory		TW	PR	OR	Max. Marks	
				Lectures	Tutorials	PR/ DRG	In-Semester Exam	End-Semester Exam					
	107008	Engineering Mathematics II		4	–	–	50	50	–	–	–	100	4
#	107009/ 107002	Engineering Chemistry OR Engineering Physics		4	–	2	50	50	25	–	–	125	4+1
	110010	Basic Mechanical Engineering		3	–	2	50	50	25	-	–	125	3+1
	101011	Engineering Mechanics		4	–	2	50	50	25	–	–	125	4+1
#	104012/ 103004	Basic Electronics Engineering OR Basic Electrical Engineering		3	–	2	50	50	25	–	–	125	3+1
	102013	Fundamentals of Programming Languages II		1	–	2	-	-	-	50*	–	50	1+1
	102014	Engineering Graphics II		–	–	2	–	–	50	–	–	50	1
	Total of Semester II			19	–	12	250	250	150	50	–	700	25

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Instructions:

1. PR/Tutorial must be conducted in minimum three batches (batch size 22 maximum) per division
2. Minimum number of required Experiments/Assignments in PR/DRG/Tutorial be carried out as mentioned in the syllabi of related subjects.
3. * for FPL-I and FPL-II: S.P. Pune University Online Practical Examination shall be conducted at the semester end.
4. # Every student should appear for Engineering Physics, Engineering Chemistry, Basic Electronics Engineering and Basic Electrical Engineering during the year.
5. # College is allowed to distribute Teaching Workload of subjects Physics, Chemistry, BEE, BXE in semester I and II by dividing number of FE divisions appropriately in two groups.

TABLE -4 Structures for Semester-3

Subject Head	Duration/week	In-semester Exam	End-semester Exam	Practical/Oral Exam	Term Work Marks	Credits
Theory	20	250	250		100	20
Practical/Oral	10			150		5
Total	30	250	250	150	100	25

TABLE -5 Structure for Semester-4

Subject Head	Duration/week	In-semester Exam	End-semester Exam	Practical/Oral Exam	Term Work Marks	Credits
Theory	20	250	250		100	20
Practical/Oral	10			150		5
Total	30	250	250	150	100	25

TABLE -6 Structure for Semester-5

Subject Head	Duration/week (hrs)	In-semester Exam	End-semester Exam	Practical/Oral Exam	Term Work Marks	Credits
Theory	18	150	350		100	18
Practical/Oral	10			150		5
Total	28	150	350	150	100	23

TABLE -7 Structure for Semester-6

Subject Head	Duration/week	In-semester Exam	End-semester Exam	Practical/Oral Exam	Term Work Marks	Credits
Theory	18	150	350		100	18
Practical/Oral	8			100		4
Seminar	1			50		1
Total	27	150	350	150	100	23

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TABLE -8 Structure for Semester-7

Subject Head	Duration/week (hrs)	In-semester Exam	End-semester Exam	Practical/Oral Exam	Term Work Marks	Credits
Theory	16	150	350	-	100	16
Practical/Oral	8			100		4
Project	2			50		2
Total	26	150	350	150	100	22

TABLE -9 Structure for Semester-8

Subject Head	Duration/week	In-semester Exam	End-semester Exam	Practical/Oral Exam	Term Work Marks	Credits
Theory	12	120	280	-	100	12
Practical/Oral	8			100		4
Project	6			100	50	6
Total	26	120	280	200	150	22

Note: Semester 1 and semester 2 will be part of First Year of Engineering (FE)
Semester 3 and semester 4 will be part of Second Year of Engineering (SE)
Semester 5 and semester 6 will be part of Third Year of Engineering (TE)
Semester 7 and semester 8 will be part of Final Year of Engineering (BE)

Practicals/Lab. Work:
The laboratory work will be based on completion of assignments confined to the courses of that semester.

SEMINAR:
Shall be on state of the art topic of student's own choice approved by an authority. The student shall submit the duly certified seminar report in standard format, for satisfactory completion of the work by the concerned Guide and head of the department/institute.

PROJECT WORK:
The project work shall be based on the knowledge acquired by the student during the graduation and preferably it should meet and contribute towards the needs of the society. The project aims to provide an opportunity of designing and building complete system or subsystems based on area where the student likes to acquire specialized skills.

Project work in the seventh semester is an integral part of the project work. In this, the student shall complete the partial work of the project which will consist of problem statement, literature review, project overview, scheme of implementation . As a part of the progress report of Project work, the candidate shall deliver a presentation on the advancement in Technology pertaining to the selected Project topic.

Project Work in the eighth semester, the student shall complete the remaining part of the project which will consist of the fabrication of set up required for the project, work station, conducting experiments and taking results, analysis & validation of results and conclusions.

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The student shall prepare the duly certified final report of project work in standard format for satisfactory completion of the work by the concerned guide and head of the Department/Institute.

2. Examination Scheme:

R 2.1

The theory examination shall be conducted in three phases for all the subjects of semesters 1-4 and two phases for the semesters 5-8. For first four semesters (Semester 1, 2, 3 and 4), the Phase-1 and Phase-2 exam are part of in-semester exam and Phase 3 is a part of end-semester exam.

R 2.1.1: Phases of FE and SE

Phase I Online examination of 25 marks, 30 minutes duration, containing objective- multiple choice questions (MCQ) and fill in blanks; based on unit I and unit II of the subject, shall be conducted as per the schedule of the university.

Phase II Online examination of 25 marks, 30 minutes duration, containing objective- multiple choice questions (MCQ)) and fill in blanks; based on unit III and unit IV of the subject, shall be conducted as per the schedule of the university.

Phase III Written examination of 50 marks, 2 hours duration; based on all the six units, shall be conducted at the end of semester, as per the schedule of the university.

R 2.1.2: Phases of TE and BE

Phase I:

Theory examination of 30 marks, 60/90 minutes duration based on unit I ,unit II and unit III of the subject, shall be conducted as per the schedule of the university.

Phase II:

Theory examination of 70 marks, 150/180 minutes duration, based on all the units of the subject, shall be conducted at the end of semester as per the schedule of the university.

R-2.2

For the subject of Engineering Graphics- I at FE, the mode of examination shall be manual for phase I and phase II. Phase I and phase II examinations shall be of one hour duration each. All these examinations shall be conducted as per the schedule of the University.

R-2.4

The practical examination of 50 marks, one hour duration for Fundamentals of Programming Languages- I and Fundamentals of Programming Languages-II, shall be conducted online at the end of respective semesters as per the schedule of the University.

R-2.5

The third semester (first semester of SE) Phase 1 and Phase 2 will be conducted together by considering the direct second year admissions.

3. Structure of Question Paper :

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R 3.1: For FE and SE:

- All questions for online examinations shall be objective type with multiple choice/ fill in the blanks type questions. The weightage for each question will be of one or two marks as per the difficulty level. More or less equal weightage is to be given to every unit pertaining to the examination.
- The nature of all questions in phase III written examination shall be Fundamental, Mathematical and analytical. The weightage for the syllabus units is as in table 10 and every question will have an internal option.

Table 10 Unitwise weightage

Unit	% Weightage
unit I & unit II	25%
unit III & unit IV	25%
unit V	25%
unit VI	25%

R 3.2: For TE and BE

- Three Units (Unit Nos. 1, 2 & 3) will be covered for 30 marks for Phase-1(In semester) Exam. Equal weightage will be given to all units (10 marks each).
- All the Six Units will be covered for 70 marks for Phase -2 (End-semester) Exam. 20 marks will be the weightage for first 3 units and 50 marks will be the weightage for Units 4,5 and 6. Question Paper will have only one section and five questions.

4. Assessment

A. Theory

R 4.1:

- **In-Semester Examination for FE and SE:**

  Since in-semester exam for FE and SE is online, the assessment will be computer based.
- **In-Semester Examination for TE and BE:**

  Assessment will be done at the CAP Centre of the College by the Expert who is appointed as an examiner for the subject as per 32/5 panel for the In-Semester exam.

R 4.2:

End-Semester Examination for FE,SE,TE and BE:

Assessment will be done at the CAP Centre by the Expert who is appointed as an examiner for the subject as per 32/5 panel for the End-Semester exam.

B. Term work:

R 4.3:

Term Work assessment shall be conducted for the Lab Practice, Project, tutorials and Seminar. Term work is continuous assessment based on work done, submission of work in the form of report/journal, timely completion, attendance, and understanding. It should be assessed by subject teacher of the institute for first to sixth semester and by the external examiner at seventh and eighth semester. At the end of the semester, the final grade for a Term Work shall be

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assigned based on the performance of the student and is to be submitted to the Savitribai Phule Pune University. A student who fails in the Term Work on account of unsatisfactory performance shall be given F grade and on the account of inadequate attendance shall be given FX grade.

C. Practical/Oral/Presentation :

R 4.4:

Practical/Oral/presentation is to be conducted and assessed jointly by internal and external examiners. The performance in the Practical/Oral/Presentation examination shall be assessed by at least one pair of examiners appointed as examiners by the Savitribai Phule Pune University. The examiners will prepare the mark / grade sheet in the format as specified by the Savitribai Phule Pune University, authenticate and seal it.

5. RULES OF PASSING

R-5.1

To pass the term work / Practical / Oral the student has to earn Minimum of 40% marks in each head.

R-5.2

To pass the Theory Subject head the student has to earn minimum of 40 per cent marks in End-Semester exam and 40 percent average marks (In-Semester marks + End-Semester marks).

R-5.3

The failing student can repeat the End-Semester exam to pass the head in any semester and the In-Semester exam marks will be retained as it is. Or the failing student can repeat for End-Semester exam as well as in-semester exam. for the head of Even semester in the Even semester only and for the head of Odd semester in Odd semester only for the theory head.

R-5.4

To earn credits of a course (Theory/term work/practical/oral/presentation) student must pass the course with minimum passing marks/grade.

R 5.5

Student can only apply for the revaluation/Photocopying of End-Semester exam only.

6. RULES OF A.T.K.T.:

R-6.1

A student can register for the third semester(SE), if he/she earns minimum 50% credits of the total of first and second semesters(FE).

R-6.2

A student can register for the fifth semester(TE), if he/she earns minimum 50% credits of the total of third and forth semesters(SE) and all the credits of first and second semester(FE).

R-6.3

A student can register for the seventh semester(BE), if he/she earns minimum 50% credits of the total of fifth and sixth semesters(TE) and all the credits of third and forth semester(SE).

R-6.4

A student will be awarded the bachelor's degree if he/she earns 190 credits and clears all the audit courses specified in the syllabus.

7. Assessment and Grade Point Average:

R-7.1

Marks/Grade/Grade Point

A grade is assigned to each head based on marks obtained by a student in examination of the course. The marks obtained in in-semester and end-semester examination are considered

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together to calculate the grade of the course. These grades, their equivalent grade points are given in Table 11.

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TABLE 11 Grade and Grade Point

Grade	Grade Points	Percentage of Marks Obtained	Remarks
O	10	90-100	Outstanding
A	9	80-89	Very Good
B	8	70-79	Good
C	7	60-69	Fair
D	6	50-59	Average
E	5	40-49	Below Average
F	0	Below 40	Fail
AP	0	--	Passed Audit Course
FX	0	--	Detained, Repeat the Course
II	0	--	Incomplete -- Absent for Exam but continue for the course
PP	--	--	Passed (Only for non credit courses)
NP	--	--	Not Passed (Only for non credit courses)

- **Passing Grade** -The grades **O, A, B, C, D, E** are passing grades. A candidate acquiring any one of these grades in a course shall be declared as pass. And student shall earn the credits for a course only if the student gets passing grade in that course.
- **F Grade** -The grade F shall be treated as a failure grade. The student with F grade will have to pass the concerned course by re-appearing for the examination. The student with F grade for any stage of the Project Work, will have to carry out additional work/ improvement as suggested by the examiners and re-appear for the examination.

- **AP Grade** -The student registered for auditing a course shall be awarded the grade AP and shall be included such AP grade in the Semester grade report for that course, provided student has the minimum attendance as prescribed by the Savitribai Phule Pune University and satisfactory in-semester performance and secured a passing grade in that course. No grade points are associated with this grade and performance in these courses is not accounted in the calculation of the performance indices SGPA
and CGPA.

- **FX Grade**-The grade FX in a course is awarded by the college, if a student does not maintain the minimum attendance in the Lecture / Tutorial class as prescribed by the Savitribai Phule Pune University and/or his performance during the semester is not satisfactory and/or he/she fails in the Term Work head of that course.
  The student with FX grade in a given course is not permitted to take the end of semester examination in that course. Such a student will have to re-register for the course.
- **Grade II**-Grade II shall be awarded to a candidate in a course in which he has the minimum attendance as prescribed by the University and satisfactory in-semester performance but could not appear for the end-semester examination. Such a student will have to appear in the subsequent end-semester examination.

- **PP / NP Grade** -The non-credit courses, such as Practical Training, Communication Skill, Field Visit Courses etc. shall be awarded PP/NP grades. No grade points are associated with these grades and performance in these courses is not accounted in the calculation of the performance indices SGPA and CGPA. However, the award of the degree is subject to obtain a PP grade in all such compulsory courses.

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- The student with F / FX / grade II in a course shall not be awarded any credits for that course.

8. PERFORMANCE INDICES:

R-8.1

The semester end grade sheet will contain grades for the courses along with titles and SGPA. Final grade sheet and transcript shall contain CGPA.

R-8.2

SGPA -The performance of a student in a semester is indicated by a number called the Semester Grade Point Average (SGPA). The SGPA is the weighted average of the grade points obtained in all the courses, seminars and projects registered by the student during the semester.

(i) Semester Grade Point Average (SGPA) =

$$SGPA = \frac{\sum_{i=1}^{p} Ci\,Gi}{\sum_{i=1}^{p} Ci}$$

$$\text{SGPA} = \frac{\sum \text{Grade Points Earned} \times \text{Credits for each course}}{\text{Total Credits}}$$

For Example: suppose in a given semester a student has registered for five courses having credits C1, C2, C3, C4, C5 and his / her grade points in those courses are G1, G2, G3, G4, G5 respectively.

Then students

$$\text{SGPA} = \frac{C1G1 + C2G2 + C3G3 + C4G4 + C5G5}{C1 + C2 + C3 + C4 + C5}$$

SGPA is calculated up to two decimal places by rounding off.

R-8.3

CGPA- The CGPA is the weighted average of the grade points obtained in all the courses (Theory/term work/practical/oral/presentation) of first semester to eighth semester for the students admitted in the First year and third to eighth semester for the students directly admitted at Second year. It is calculated in the same manner as the SGPA.

R-8.3

In case of a student passing a failed course or in case of improvement, the earlier grade would be replaced by the new grade in calculation of the SGPA and CGPA.

9. RESULT:

Based on the performance of the student in the semester examinations, the University of Pune will declare the results and issue the Semester Grade sheets.

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R-9.1

The class shall be awarded to a student on the CGPA calculated as mentioned in Rule no. R 8.3. The award of the class shall be as per Table 12.

TABLE 12 -CGPA and Class awarded

Sr. No.	CGPA	Class of the Degree awarded
1.	7.75 or More than 7.75	First Class with Distinction
2.	6.75 or more but less than 7.75	First Class
3.	6.25 or more but less than 6.75	Higher Second Class
4.	5.5 or more but less than 6.25	Second Class

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