7.2.1

Best Practice 1

Best Outgoing Student

SANJEEVAN ENGINEERING & TECHNOLOGY INSTITUTE, PANHALA

Panhala

Eligibility Criteria and Guidelines for Best Outgoing Student Rolling Trophy Year 2017-18

1. **Eligibility**

   a) The student **should not** have **failed/ reappeared [no dead or live ATKT]** in any **subject** in the University Examination throughout the course.

   b) The student **should not be involved in any disciplinary** case throughout the stay in the institute.

2. **Criteria for Selection (Total Marks 130)**

   a) **Academic Performance (Max. Marks 100)-** Overall average percentage of marks obtained in University examination will be awarded as marks. E.g. 80% means 80 marks.

   b) **Participation in Sports and Co-curricular Activities (Max. Marks 20) –**

Technical Events	07 Marks
Cultural Events	04 Marks
Sports Events	04 Marks
NSS	03 Marks
Leadership	02 Marks

   *Marks will be calculated out of 20 per year based on participation in various events and averaged over four years.

   c) **Overall Attendance (Max. Marks 10)-**

Above 90%	10 Marks
Above 85%	08 Marks
Above 80%	06 Marks
Above 75%	04 Marks

   *Marks will be calculated per year and averaged over four years.

SANJEEVAN ENGINEERING & TECHNOLOGY INSTITUTE, PANHALA

Application for Best Outgoing Student

NAME OF STUDENT -   BRANCH –

(i)   Results- **Enter average percentage of each academic year and attach Xerox of mark list**

FE	SE	TE	BE Sem I

(ii)   Technical activities **(give details of the events participated in and the position secured, if any, Attach xerox of the certificates in the same order as they appear in the form)**

YEAR	Inter college		Intra-college	
	Participated	Winner	Participated	Winner
FE				
SE				
TE				
BE				

(iii)   Sports activities **(give details of the events participated in and the position secured, if any, Attach xerox of the certificates in the same order as they appear in the form)**

YEAR	Intercollege		Intra-college	
	Participated	Winner	Participated	Winner
FE				
SE				
TE				
BE				

(iv)   Cultural activities **(give details of the events participated in and the position secured, if any, Attach xerox of the certificates in the same order as they appear in the form)**

YEAR	Inter college		Intra-college	
	Participated	Winner	Participated	Winner
FE				
SE				
TE				
BE				

(v)   **NSS participation**

Year	Events participated in
FE	
SE	
TE	
BE	

Leadership qualities (various posts held, for example, GS, Tech Sec., CR, event head etc)

Event	Post held	Year

Signature of student -   **Signature of HOD –**

Date: 29/12/2017

Notice

All the following **coordinators of SYMPHONY 2018** are hereby inform that, they should **create** their committee proposed budget that identifies expected expenditures and same should be submit to budget committee coordinator till 03/01/2018.

Kindly keep all the expenditure bills with you and submit it after annual function till 17/01/2018.

Budget committee Co-Ordinator

Prof. A. P. Redekar

Cultural Co-Ordinator

Prof. S. A. Agnihotri

Copy to:

Sr. No.	Name of Committee	Name of Coordinator	Received Signature
1	Prize distribution	Prof. S. J. Patil	
2	Food	Prof. S. A. Babar	
3	Stage and Decoration	Prof. M. H. Momin	
4	Fishpond/Rose day/Chocolate day	Prof. P. U. Mohite and Prof. Na. G. Khan	
5	Mr. and Miss SETI	Prof. P. G. Bendre	
6	Funny Games	Prof. A. B. Chavan	
7	Best outgoing students	Prof. S. K. Pisal	
8	Anchoring	Prof. J. J. Gavade	
9	Invitation	Prof. S. N. Shinde	
10	Discipline	Mr. R. A. Ingavale	

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Phone : 0231 - 2686623 / 24 / 28   Fax : 0231 - 2686629   Mobile : 9545451966, 9545453831

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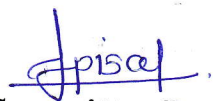Website : www.seti.edu.in   Email : principal@seti.edu.in / office@seti.edu.in   **EN 6315**

Date 29/12/2017

Notice for Selection of BEST OUTGOING STUDENT

It has been decided to give a prize on **Annual day function** of the Institute to the "**Best outgoing student**" of the college. The selection will be made by a committee of teachers.

Now it has been decided that student who have **75% attendance** are eligible. The prescribed proforma is available with **Prof. S. K. Pisal from Automobile Engineering Department** and is to be submitted latest by **7 January 2017.**

Committee Incharge

Principal

Date 09/01/2018

Notice

All Heads of Department hereby requested to attend meeting scheduled on 09/01/2018 at 1:00 p.m. for selection **"Best Outgoing Student".**

Venue: Automobile Engineering Dept.

B.O.S. Coordinator

Mr. S.K. Pisal

Cultural Coordinator

Mr. S.A. Agnihotri

Dept.   Sign

Automobile —

Mechanical —

Electrical   —

Electronics
&Telecomm — 9/1/18

Computer   — 9/1/18

Civil   — 09/01/18

SANJEEVAN ENGINEERING & TECHNOLOGY INSTITUTE, PANHALA

Panhala

Eligibility Criteria and Guidelines for Best Outgoing Student Rolling Trophy Year 2017-18

1. **Eligibility**

   a) The student **should not** have **failed/ reappeared [no dead or live ATKT]** in any **subject** in the University Examination throughout the course.

   b) The student **should not be involved in any disciplinary** case throughout the stay in the institute.

2. **Criteria for Selection (Total Marks 130)**

   a) **Academic Performance (Max. Marks 100)-** Overall average percentage of marks obtained in University examination will be awarded as marks. E.g. 80% means 80 marks.

   b) **Participation in Sports and Co-curricular Activities (Max. Marks 20) –**

Technical Events	07 Marks
Cultural Events	04 Marks
Sports Events	04 Marks
NSS	03 Marks
Leadership	02 Marks

   *Marks will be calculated out of 20 per year based on participation in various events and averaged over four years.

   c) **Overall Attendance (Max. Marks 10)-**

Above 90%	10 Marks
Above 85%	08 Marks
Above 80%	06 Marks
Above 75%	04 Marks

   *Marks will be calculated per year and averaged over four years.

SANJEEVAN ENGINEERING & TECHNOLOGY INSTITUTE, PANHALA

Application for Best Outgoing Student

NAME OF STUDENT - Korgode Mayuri Rajaram   **BRANCH -** Electrical

(i) Results- **Enter average percentage of each academic year and attach Xerox of mark list**

FE	SE	TE	BE Sem I
83.86	75.23	74.56	

83 86 + 75 23 + 74.56 / 3 = 77.88

(ii) Technical activities **(give details of the events participated in and the position secured, if any, Attach xerox of the certificates in the same order as they appear in the form)**

YEAR	Inter college (1)		Intra-college (2)	
	Participated (1)	Winner (2)	Participated	Winner (2)
FE	—	—	—	—
SE	—	—	—	—
TE	Transformer Design & Testing 2day	—	=	—
BE			—	—

1

(iii) Sports activities **(give details of the events participated in and the position secured, if any, Attach xerox of the certificates in the same order as they appear in the form)**

YEAR	Intercollege		Intra-college	
	Participated	Winner	Participated	Winner
FE				
SE				
TE				
BE				

0

(iv)   Cultural activities (give details of the events participated in and the position secured, if any, Attach xerox of the certificates in the same order as they appear in the form)

YEAR	Inter college		Intra-college	
	Participated	Winner	Participated	Winner
FE	I	-		
SE	Traditional, Fashion show, drama	Winner in Rangoli compitition		
TE	-	Winner in Rangoli compti-tion Winner in Mehandi compitition		
BE	Traditional, Fashion show, drama, dance			

(4)

(v)   NSS participation

Year	Events participated in
FE	
SE	P
TE	Energy Audit
BE	Ban on china product.

{ No valid proof }

Leadership qualities (various posts held, for example, GS, Tech Sec., CR, event head etc)

Event	Post held	Year
Teacher's day	Student Council	2015-16

02

Signature of student - Prayowele

Signature of HOD –

P P Kulkarni

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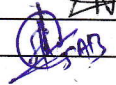## Nomination Form for Best Outgoing Student Award

Name of the Department

Name of the student: __Reshma Keshav Ghatage.__ Roll No. : _____

(A) Academic Excellence: Results

Semester	I	II	III	IV	V	VI	*SUK Rank If Any	Total Score Out of 80
% of Marks			77	76	70	69	00.	29.2 out of 60
**Convert % of marks out of 10	7.3	7.3	7.7	7.6	7.0	6.9		43.8

* SUK Rank : Rank 1 – 20/20 points , Rank 2 – 18/20 points , Rank 3 – 16/20 etc Otherwise Put 00/20** If % of marks = 8 % then 7.58 points out of 10Attach Rank Certificate issued by Shivaji University Kolhapur and statement of marks of each semester

Score here after will be calculated by the undersigned.

(B) Co-Curricular Activities: Achievements during FE to BE

(1) Paper Presentation

i)National Level

Sr.No	Title of the Paper	Date & Venue	Prize(if any)	Score Out of 10
				0

**Attach Certificates issued by the relevant Authorities.

ternational Level

Sr.No	Title of the Paper	Date & Venue	Prize(if any)	Score Out of 10
				0

**Attach Certificates issued by the relevant Authorities.

(2)Project /Model Competition : Achievements during FE to BE

Sr.No	Title of the Project	Date & Venue	Prize(if any)	Score Out of 10
				0

**Attach Certificates issued by the relevant Authorities.

Total Score 52.8

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(C) Extra-Curricular Activities : Achievements during FE to BE

(1)Elocution/Quiz Competition : Achievements during FE to BE

Sr.No	Title of the Project	Date & Venue	Prize(if any)	Score Out of 10
1.	Kurukshetra.	27th Sept 2014 Ashokrao Mane, Wathar	Participated.	03

Attach Certificates issued by the relevant Authorities.

(2) Event Management-Organizational Skills : Participation during FE to BE

Sr.No	Title of the Event	Date & Venue	Signature of Event Coordinator	Score Out of 10
1	Entrepreneurship Devel. Camp.	2-6 feb2016, SETI		04
2	Seed IT Idol-	2016/ Shivaji Uni Koth.Uni		

Attach Certificates issued by the relevant Authorities

(3)Leadership :Worked as Member -Student Council / Office bearer-ISTE /Office bearer-Student Association of the Department.

Sr.No	Position Held	Academic Year	Signature of Student council staff/HOD/ISTE Coordinator	Score Out of 10
1.	Placement Coordinator	2016-2017		00

(D) Sports : Participation during FE to BE

Sr.No	Sports Event-Title	Academic Year	Level : College/zonal /Inter-zonal/national /International	Signature of Physical Director	Score Out of 40
i)	VolleyBall	2016-17.	College.		
ii)	BasketBall.	2016-17	college.		02

** International Level -10,national Level-10, Inter zonal Level -10, Zonal Level-10,College Level-10

(E) Social Activities : Participation during FE to BE

Sr.No	Activity	Academic Year	Signature HOD	Score Out of 10
				0

** Do not include Blood Donation/Money Donations / Tree Plantations

(F) Competitive Examinations : Achievements during FE to BE

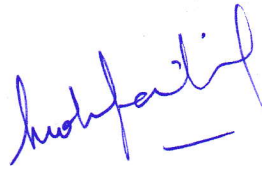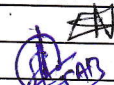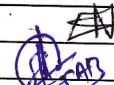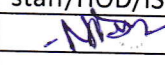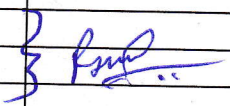| Sr.No	Name of the Exam	Academic Year	Exam Score	Score Out of 10

** Attach Score Cards issued by the relevant Authorities

(G) Placement Status

Name of the compony	Package offered	Signiture of T&P Officer	Score out of 10

Note: 1. The scores without relevant signatures will not be considered

2. The incomplete applications will not be considered for silection

Signature of the Student

Signature of the HOD

HOD
Computer Engineering
Sanjeevan Engineering & Technology Institute
Somwar Peth, Panhala, Dist. Kolhapur. (416 201)

Holy-wood Academy, Kolhapur's

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(C) Extra-Curricular Activities : Achievements during FE to BE

(1)Elocution/Quiz Competition : Achievements during FE to BE

Sr.No	Title of the Project	Date & Venue	Prize(if any)	Score Out of 10
1.	Kurukshetra.	27th sept 2014 Ashokrao Mane, Waithor	Participated.	03

Attach Certificates issued by the relevant Authorities.

(2) Event Management-Organizational Skills : Participation during FE to BE

Sr.No	Title of the Event	Date & Venue	Signature of Event Coordinator	Score Out of 10
1	Entrepreneurship Devel"camp.	2-6 feb 2016, SETI	EN	04
2	Seed IT Idol -	2016/Shivaji Uni Kolh. uni	CAB	

Attach Certificates issued by the relevant Authorities

(3)Leadership :Worked as Member -Student Council / Office bearer-ISTE /Office bearer-Student Association of the Department.

Sr.No	Position Held	Academic Year	Signature of Student council staff/HOD/ISTE Coordinator	Score Out of 10
1.	Placement Coordinator	2016-2017	NBM	0 0

(D) Sports : Participation during FE to BE

Sr.No	Sports Event-Title	Academic Year	Level : College/zonal /Inter- zonal/national /International	Signature of Physical Director	Score Out of 40
i)	Volly Ball	2016-17.	College.		
2)	Basket Ball.	2016-17.	college.	fmf	02

** International Level -10,national Level-10, Inter zonal Level -10, Zonal Level-10,College Level-10

(E) Social Activities : Participation during FE to BE

Sr.No	Activity	Academic Year	Signature HOD	Score Out of 10
				0

** Do not include Blood Donation/Money Donations / Tree Plantations

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(F) Competitive Examinations : Achievements during FE to BE

Sr.No	Name of the Exam	Academic Year	Exam Score	Score Out of 10

** Attach Score Cards issued by the relevant Authorities

(G) Placement Status

Name of the compony	Package offered	Signiture of T&P Officer	Score out of 10

Note: 1. The scores without relevant signatures will not be considered

2. The incomplete applications will not be considered for silection

Signature of the Student

Signature of the HOD

HOD
Computer Engineering
Sanjeevan Engineering & Technology Institute
Somwar Peth, Panhala, Dist. Kolhapur. (416 201)

Holy-wood Academy, Kolhapur's

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EUPHORIA 2017

BEST OUTGOING STUDENT 2016-17

NOTICE

Date- 27/12/2016

All the students are hereby informed that the nomination forms for the best outgoing student of the academic year 2016-17 are available on our institute web site. The aspiring students should download the same and submit it the duly completed and also countersigned by the respective head of the department and submit it to the undersigned on or before 04/01/2017, Wednesday 4. 30 PM, The soft copy of the form is also available with the undersigned the interested students also can collect the same during office hours.

The marking scheme is also given in the form.

COORDINATOR

Prof. Kulkarni R S

Mech Engg Department

BEST OUTGOING STUDENT 2016-17

Holy-wood Academy, Kolhapur's

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Notice

Date   09/01/2017

For selection of **Best Outgoing student**, H.O.D and committee member meeting is planned on date 10 January 2017. All heads of department are requested to attend meet without fail at 2:30 pm.

Venue: Mechanical Engineering Department Common facility room

Sr. No	Department	Head/ Member signature
1.	Automobile Engineering-----Not eligible	
2.	Mechanical Engineering	
3.	Civil Engineering	
4.	Electrical Engineering	
5.	Electronics and Telecommunication	
6.	Computer Engineering	
7.	General engineering	
8.	Committee member	

Coordinator

Sanjeevan Engineering and Technology Institute, Panhala
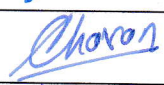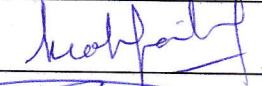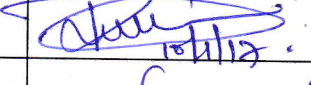
Best Outgoing student

Date: 07/01/2017

Form No	Name of Nominee	Branch	Score	Rank
1	PradnyaRajendraChaugule	Civil	76.82	III
2	**GhodakeHimanshuShivaji**	**Mechanical**	**105.18**	**I**
3	BhosaleSangramVikram	Civil	57.3	VII
4	Pimple Aditya Vidyadhar	Mechanical	66.23	V
5	ShikhareSushnat Krishna	Mechanical	65.30	VI
6	Patil AkshayBalasaheb	Mechanical	75.68	IV
7	ShindeAniketRamakant	Electrical	81.02	II
8	GhatageReshmaKeshav	Computer Science	52.08	VIII

To,

All H.O.D.

Sr. No	Department	Signature
1.	Electronics and Telecommunication	
2.	Civil Engineering	
3	Computer Science	
4.	Electrical Engineering	
5.	Mechanical Engineering	
6.	General Engineering	

- Since Automobile Engineering department HOD was not invited because his son was nominated for best outgoing student.

Coordinator

Principal

(Dr. G. V. Mulgund)

Holy-wood Academy, Kolhapur's

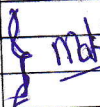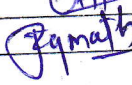# SANJEEVAN ENGINEERING AND TECHNOLOGY INSTITUTE

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Nomination Form for Best Outgoing Student Award

Name of the Department – Civil Engineering

Name of the student: **TORASKAR PRATIKSURESH**   Roll No. : 38

(A) Academic Excellence: Results

Semester	I	II	III	IV	V	VI	*SUK Rank If Any	Total Score Out of 80
% of Marks	70.52	64.15	68.63	59.0	59.5	62.5		
**Convert % of marks out of 1C	7.52	6.415	6.863	5.90	5.95	6.25		38.428 −1 = 37.42

* SUK Rank : Rank 1 – 20/20 points , Rank 2 – 18/20 points , Rank 3 – 16/20 etc Otherwise Put 00/20** If

% of marks = 75.8 % then 7.58 points out of 10Attach Rank Certificate issued by Shivaji University

Kolhapur and statement of marks of each semester

Score here after will be calculated by the undersigned.

(B) Co-Curricular Activities: Achievements during FE to BE

(1) Paper Presentation

i)National Level

Sr.No	Title of the Paper	Date & Venue	Prize(if any)	Score Out of 10
1)	Multistorey car parking	27 & 28/7/13 SBGI, Miraj		01
2)	Poster presentation	9/3/13 SETI,Panhala		

**Attach Certificates issued by the relevant Authorities.

ii)International Level

Sr.No	Title of the Paper	Date & Venue	Prize(if any)	Score Out of 10

**Attach Certificates issued by the relevant Authorities.

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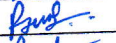Phone : 02328 - 235241, 235493   Fax : 02328 - 235241   Mobile : 9545451966, 9545453831
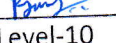Website : www.seti.edu.in   Email : principal@seti.edu.in / office@seti.edu.in / setipanhala@gmail.com

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(2)Project /Model Competition : Achievements during FE to BE

Sr.No	Title of the Project	Date & Venue	Prize(if any)	Score Out of 10
1)	Concrete Cube contest	1/10/14 KIT COEK		
2)	NIrmanica model making	11/10/14 Walchand,sangli		03
3)	Surveying Assessor	21/2/14 JJMCOEJ		
4)	Point load testing	9/3/13 SETI		

**Attach Certificates issued by the relevant Authorities.

(C) Extra-Curricular Activities : Achievements during FE to BE

(1)Elocution/Quiz Competition : Achievements during FE to BE

Sr.No	Title of the Project	Date & Venue	Prize(if any)	Score Out of 10
1)	Quiz	2013 BVCOEK		
2)	Express yourself	14/3/15 DYPCET		03
3)	Kaunbanega CEO	20/9/14 ADCET, Ashta		

Attach Certificates issued by the relevant Authorities.

(2) Event Management-Organizational Skills : Participation during FE to BE

Sr.No	Title of the Event	Date & Venue	Signature of Event Coordinator	Score Out of 10
1)	Parikrama 2013	2013 SETI	GCK	
2)	Parikrama 2014 Central	2014 SETI	GCK	
3)	Parikrama 2014 Food Committee	2014 SETI	GCK	
4)	Parikrama 2014 Decoration	2014 SETI	J.S.Meadeo	03
5)	Euphoria 2013	2013 SETI	VHD	
6)	Euphoria 2014	2014 SETI	VHD	
7)	Euphoria 2015	2015 SETI	V. A. Patil	
8)	Euphoria 2016	2016 SETI	V. A. Patil.	
9)	Organized **CURRENCYexhibition**	2014 SETI	J.S.meadeo	
10)	Departmental activities, functions and guest lectures	2014,2015 SETI	S.A.Agnihotri	

Attach Certificates issued by the relevant Authorities

Holy-wood Academy, Kolhapur's

SANJEEVAN ENGINEERING AND TECHNOLOGY INSTITUTE

Sanjeevan Knowledge City, Somwar Peth, Panhala, Tal. Panhala, Dist. Kolhapur - 416 201.

Phone : 02328 - 235241, 235493   Fax : 02328 - 235241   Mobile : 9545451966, 9545453831

Website : www.seti.edu.in   Email : principal@seti.edu.in / office@seti.edu.in / sepanhala@gmail.com

■ Approved By AICTE - New Delhi   ■ Recognized by Govt. of Maharashtra & DTE   ■ Affiliated to Shivaji University, Kolhapur

(3)Leadership :Worked as Member -Student Council / Office bearer-ISTE /Office bearer-Student Association of the Department.

Sr.No	Position Held	Academic Year	Signature of Student council staff/HOD/ISTE Coordinator	Score Out of 10
1)	Class Representative	2013-14	m mohite HOD, civil. V.A. Patil J.B. Metkari	10
2)	Vice president CESA	2014-15		
3)	Committee head CESA	2015-16		
4)	Cultural Secretary SETI	2015-16		
5)	Member of student council	2015-16		

(D) Sports : Participation during FE to BE

Sr.No	Sports Event-Title	Academic Year	Level : College/zonal /Inter-zonal/national /International	Signature of Physical Director	Score Out of 40
1)	Cricket	2012-13	College		02
2)	Cricket	2013-14	College		
3)	Swimming	2014-15	College		
4)	Cricket (Winner)	2015-16	College		
5)	Football (Runner).	2015-16	College		

** International Level -10,national Level-10, Inter zonal Level -10, Zonal Level-10

(E) Social Activities : Participation during FE to BE

Sr.No	Activity	Academic Year	Signature HOD	Score Out of 10
1)	RankalaSwachataabhiyan by Akhilbhartiyavidhyarthiparishad	2014-2015		02
2)	Book donation to ananth ashram on Diwali by ABVP	2014-2015		

** Do not include Blood Donation/Money Donations / Tree Plantations

Holy-wood Academy, Kolhapur's

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(F) Competitive Examinations : Achievements during FE to BE

Sr.No	Name of the Exam	Academic Year	Exam Score	Score Out of 10

** Attach Score Cards issued by the relevant Authorities

(G)Placement Status

Name of the company	Package offered	Signature of T&P Officer	Score out of 10

Note: 1.The scores without relevant signatures will not be considered

2. The incomplete applications will not be considered for selection

Signature of the Student

Signature of the HOD

Holy-wood Academy, Kolhapur's

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EUPHORIA 2016

BEST OUTGOING STUDENT 2016

SCORE SHEET

Sr No	Name of the Student	Department	SCORES							
			(A) 80	(B) 30	(C) 30	(D) 40	(E) 10	(F) 10	(G) 10	Total 210
01	BhushanKambale	Mech	39.27	01	03	02	01	00	00	46.27
02	MasurkarNachiket	ETC	38.23	02	08	02	01	00	00	51.23
03	GauriSuryawanshi	ETC	43.34	00	10	00	01	00	00	54.34
04	Toroskar Pratik	Civil	38.42	04	16	02	02	00	00	62.42
05	AmolPatil	Civil	37.70	10	01	02	01	00	00	51.70
06	PatilAbhijeet	Auto	37.86	02	04	08	10	00	00	61.86
07	RohiniDinde	Mech	36.06	05	14	02	01	00	00	58.06

Committee members

B.m.mohite

R.J.Kulkarni

S.L.Ghodake.

J.B.Melkari

V.S.Mane.

S.K.Pisal

SANJEEVAN ENGINEERING AND TECHNOLOGY INSTITUTE, PANHALA
Annual social function 2014-15
APPLICATION FORM FOR BEST OUTGOING STUDENT (Year 2014-15)

Name of the Student: - _____

Name of the Branch: - _____

A. Academic Performance of last three Years

Year	Marks obtained out of	Percentage	Avg. percentage
Diploma/FE			
SE			
TE			
Marks scored out of 100			

B. Co curricular Activities in last three years: -

Activity	Nos.
Paper Presentation (International/ National/Univ. Level)	
Seminar/Workshops Attended	
Quiz competitions/Technical Exhibitions	
Marks scored out of 100	

C. Sports Activities (Last three years): -

Activity	Nos.
National Level	
State Level	
University/Lead college Level	
Marks scored out of 25	

D. Extracurricular Activities (Last three years): -

Activity	Nos.
Singing/Drama/one act play etc (State/University/college)	
Any other	
Any other	
Marks scored out of 25	

E. Social contribution to community: -

Activity	Nos.
Blood Donation	
Tree Plantation/Promotion of Non conventional Energy sources	
News paper articles	
Marks scored out of 25	
Total Score (A+B+C+D+E) out of 200	

Note -Please attach the Xerox copies of the documents supporting the claim

Verified by HOD -   Seal of HOD

SANJEEVAN ENGINEERING AND TECHNOLOGY INSTITUTE, PANHALA
Annual social function 2014-15
BEST OUTGOING STUDENT (Year 2014-15)

Date – 06/01/2014

Head of the respective departments are hereby requested to go through the format for the best outgoing student attached herewith. Minimum criteria for student eligibility are as follows.

1. He should be regular student
2. He must have cleared each year i.e. FE/SE/TE respectively in one attempt. For diploma holders consider SE & TE passing.
3. The aggregate marks of three years (FE/Diploma + SE + TE) together must be not less than 60 %.
4. He has to produce the originals of documents to support his claim at the time of verification.

You are requested to distribute the application forms among the eligible students.

The filled forms along with necessary Xerox of supporting documents should be verified by the respective department heads. The Xerox copies attached with the form must be attested by the respective department heads. The verified copies should be submitted it to committee in charge up to evening of 9th Jan 2015.

Prof. S.L. Ghodake

I/C Best Outgoing Student Committee

SANJEEVAN ENGINEERING AND TECHNOLOGY INSTITUTE, PANHALA
Annual social function 2014-15
APPLICATION FORM FOR BEST OUTGOING STUDENT (Year 2014-15)

Name of the Student: - **PATOLE RUTURAJ SHARAD.**

Name of the Branch: - **MECHANICAL ENGINEERING.**

A. Academic Performance of last three Years

Year	Marks obtained out of	Percentage	Avg. percentage
Diploma/FE	890 out of 1350	65.93%	(70.67% ~70
SE	1264 out of 1700	74.35%	69.67 ~ 70
TE	1203 out of 1750	68.74%	
		Marks scored out of 100	

B. Co curricular Activities in last three years: -

Activity 4 paper presentation. 2 times RunnerUp.	Nos.
Paper Presentation (International/ National/Univ. Level) 10/8/5	8
Seminar/Workshops Attended International student conference, Two times Winner of Auto-CAD. '00	5
Quiz competitions/Technical Exhibitions 2 times winner in Quiz, International Student 10	~~10~~ 8
Runer Up in Campus fest, Assembly, conference Marks scored out of 100	

C. Sports Activities (Last three years): -

Activity	Nos.
National Level 10	—
State Level / District . 8	—
University/Lead college Level 7	—
District level Running Marathon. Marks scored out of 25	

D. Extracurricular Activities (Last three years): -

Activity	Nos.
Singing/Drama/one act play etc (State/University/college) 10/9/8	—
Any other Student Technical Head of Mech Dept 2012-2015. 8 Member of College student Council 2012-2013.	8.
Any other Merit Scholarship Shivaji University 2013. 7	7.
1st rank in Advanced English Speaking Course. Organising, leading every activity of Mech Marks scored out of 25 Dept.	

E. Social contribution to community: -

Activity	Nos.
Blood Donation - 1 times at SETI, Panhala, 2013. 7	5
Tree Plantation/Promotion of Non conventional Energy sources 8	—
News paper articles 10	—
Marks scored out of 25	

Total Score (A+B+C+D+E) out of 200	111

Note -Please attach the Xerox copies of the documents supporting the claim

Verified by HOD -

Seal of HOD
HOD
Mechnical Engineering
Sanjeevan Engineering & Technology Institute
Somwar Peth, Panhala, Dist. Kolhapur. (416 201)

SANJEEVAN ENGINEERING AND TECHNOLOGY INSTITUTE, PANHALA
Annual social function 2014-15
SCORE SHEET
BEST OUTGOING STUDENT (Year 2014-15)

A. Academic Performance of last three Years

B. Co curricular Activities in last three years: -

C. Sports Activities (Last three years): -

D. Extracurricular Activities (Last three years): -

Sr. No.	Name of the student	Branch	Scored Marks					Total 200	Remarks
			A 100	B 25	C 25	D 25	E 25		
1	Hujare Pradip Ramchandra	Mech	65	17	04	12	00	96	
2	*Patole Ruturaj Sharad*	*Mech*	*70*	*21*	*0*	*15*	*5*	*111*	*Winner*
3	Londhe Sachin Deepak	Mech	61	09	00	13	24	107	
4	Bangi Juber Moh. Sarif	Auto	61	10	02	08	14	95	
5	Kashid Vivek Vishnu	Auto	63	04	06	08	05	86	
6	Satpute Abhishek Deepak	CSE	67	19	04	07	08	105	
7	Ms. Gavane Sheetal T	CSE	63	04	00	10	00	77	
8	Ms. Bhosale Priyanka S	ENTC	70	06	00	06	00	82	
9	Mordekar Anahata S	ENTC	62	03	00	09	06	80	
10	Ms. Anisha Aravindakumar	ENTC	64	10	00	04	00	78	
11	Chavare Amol Bhimrao	ENTC	72	04	04	02	00	82	
12	Shinde Abhijeet Krishnat	ENTC	66	03	07	08	05	89	
13	Ms. Patil Supriya Ganpati	ELE	65	07	00	04	00	76	

E. Social contribution to community: -

Note -

a) There Is no entry from civil engineering department

b) Mr. Patole Ruturaj Sharad has been declared as winner as he scored highest marks amongst all the students

1) Mr. S. L. Ghodake   HOD Automobile

2) Mr. S. G. Aravindakumar   HOD Mechanical

3) Mrs . M R Kandgaonkar   HOD Electrical

4) Mr. J. B. Metkari   HOD CSE

5) Mr. S. T. Jadhav   HOD ENTC

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25/01/2014

NOTICE

All the students of Final year are hereby informed that, nominations for the award of **Best Outgoing Student, 2014** can be submitted to Prof. P. A. Patil (Mechanical Department) within prescribed format on or before 3rd February, 2014.

Prescribed application form is to be collected from Prof. P.A. Patil (Mechanical Department) on or before 31st January 2014.

Note: Late application will be rejected.

Convener,

Best Outgoing Student Committee

"Best Outgoing Student, 2013-14"

seti
SANJEEVAN ENGINEERING
& TECHNOLOGY INSTITUTE

Holy-wood Academy, Kolhapur's

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Application Form

"Best Outgoing Student, 2013-14"

A. General Information:

1. Name of the student: Omkar Chandrakant Pisal

2. Class and Branch: B.E Mechanical

3. Date of Birth: 08/02/1993

B. Academic Qualification*:

Name of the Exam	Semester	Passing Year	Percentage
First Year / Diploma	I	2010	66.22
	II	2011	66.22
Second Year	I	2011	64.73
	II	2012	59.20
Third Year	I	2012	59.29
	II	2013	60.22

55 / 100

* Students should not have backlogs and should be all clear throughout the semesters

C. Sports Activities**:

Sr. No.	Year	Name of the Event and level	Position held (Participation/Runner-up/Winner)	Remark (If any)
1.	2010-2011	Basket Ball- Lead college level	Participation	
2.	2010-2011	swimming - college level	Participation	
3.	2011-2012	Basket Ball - Lead college level	Participation	
4.	2012-2013	Basket Ball - Lead college level	Participation	
5.	2013-2014	Basket Ball -Lead College level	Participation	
6.				

D. Cultural Activities**:

Sr. No.	Year	Name of the Event and level	Position held (Participation/Runner-up/Winner)	Remark (If any)
1.	2012-2013	District Youth festival University level	Participation	
2.	2013-2014	District Youth festival University level	Participation	
3.	2010-2011	Annual Gathering(Dance)	Participation	
4.	2011-2012	Annual Gathering (Dance)	Participation	
5.	2012-2013	Annual Gathering (Dance)	Participation	
6.				

E. Paper Presentation / Conferences**:

Sr. No.	Year	Name of the Event and level	Position held (Participation/Runner-up/Winner)	Remark (If any)
1.	2012	Techno Cracy National level	Participation	
2.	2013	Abhigyan International Conference	Participation	
3.	2014	Abhigyan International Conference	Participation	
4.	2013	Solar Splash W/S National level	Participation	

Students should have participated or a winner at University Level/ State Level/ National level/ International Level (for last three years only)

F. Social Contribution***:

G. Special achievements or any other***:

1) Group Discussion Contest -2013 ; Lead College Activity, University level.

2) Qualified for Symbosis International University (SNAP) 2014, Qualified SNAP test, 2014

*** Students can attach the photocopies of photograph (if any)

Note:
- Attested photocopies of all semester mark sheets, certificates and photocopies of photographs (if any) should be attached as an enclosure without which application will be rejected.
- Late applications will be rejected.
- Attach separate sheet/sheets if required.

Enclosure: (✓ tick mark at relevant fields)

- ☑ Photocopies of all semester mark sheet
- ☑ Photocopies of certificates (if any)
- ☐ Photocopies of Photographs (if any)
- ☐ Registration no. for Publication (if any)

Name of the Student with Signature: *Omkar Chandrakant Pisal*

O C Pisal

H. O. D. Signature with Date: *31/01/2014*

Holy-Wood Academy, Kolhapur's

SANJEEVAN ENGINEERING AND TECHNOLOGY INSTITUTE

Sanjeevan Knowledge City, Panhala, Tal. Panhala, Dist. Kolhapur - 416201

CERTIFICATE

The Management, Principal and staff of

Sanjeevan Engineering & Technology Institute, Panhala

confer upon

Koigade Mayuri Rajaram of Electrical Engineering Department

the recognition of

THE BEST OUTGOING STUDENT

for the year 2017-18.

In testimony whereof are set the Seal of the Institute and

the signatures of the Chairman, Joint Secretary and the Principal.

Prof. S. L. Ghodake
I/c. Principal

Shri. N. R. Bhosale
Joint Secretary

Shri. P. R. Bhosale
Chairman

Best Out going student award ceremony during Annual Social Function

Best Practice 2

Awareness among rural area towards higher education

Sample presentation of awareness for higher education program

Career Opportunities After HSC...

An Informative Presentation

By

Prof.Manik A.Patil

Sanjeevan Engineering & Technology Institute, Panhala

Friday, January 11, 2019

Which Career To Choose...???

- Lot of alternatives

- Each alternative competes with other

- Choosing careers based on academics, personality & desire

- Imbalance between options and expectations of parents and friends

Career Opportunities After HSC...

Medical

Civil Services

Defense

Engineering

HSC

Talent Based

Graduate

Home Sciences

Agriculture
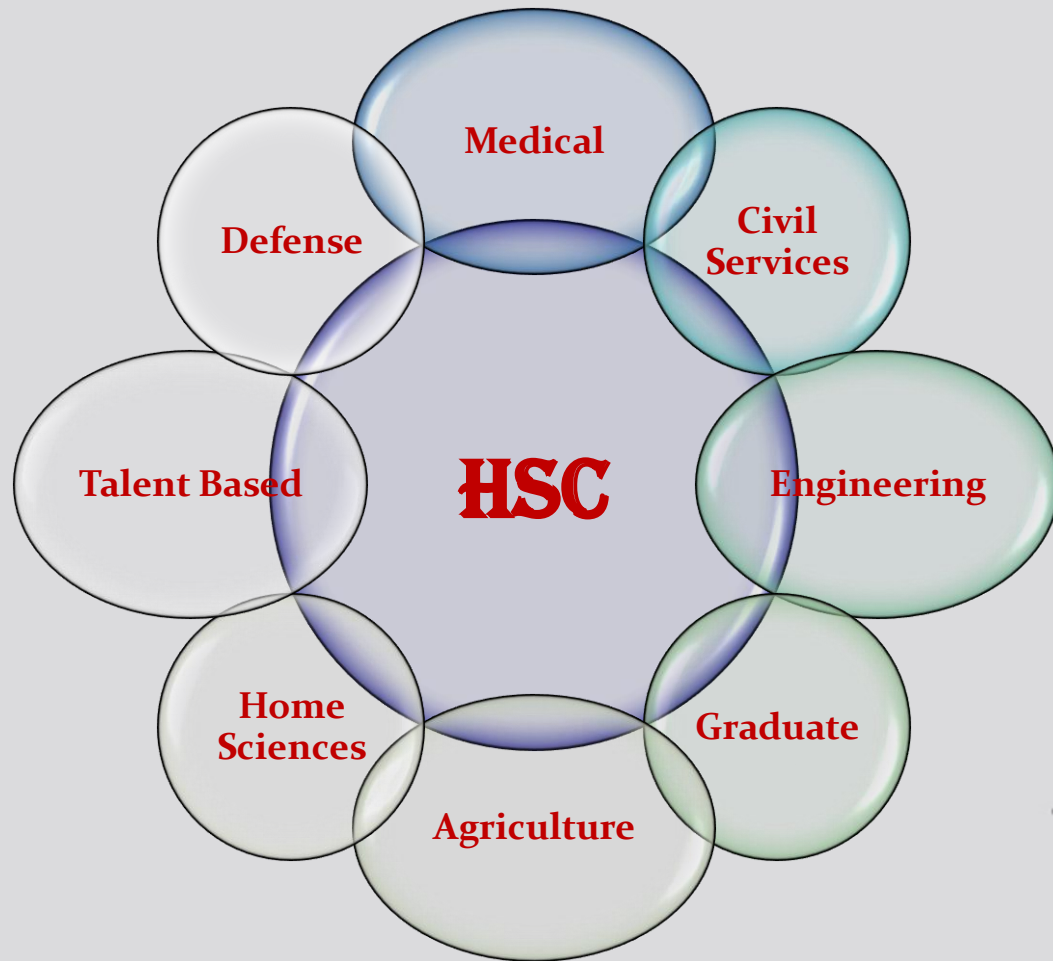
Career In Engineering...???

What is Engineering?

Engineering . . .

- Is using math and science to solve practical problems
- Requires creativity, persistence, and a desire for improvement

Which involve engineering?

Providing water

Solving problems

CO2

Creating cars

Gadgets galore

Fashion & beauty

Sports

Food

Health & medicine

Built environment

What does it take to be an Engineer?

You don't have to be a genius to be an Engineer...

People who become Engineers:

- Are CURIOUS about how things work
- Solve interesting life problems
- Design and experiment
- Calculate using math and science
- Work with others as a team

Sound like you???
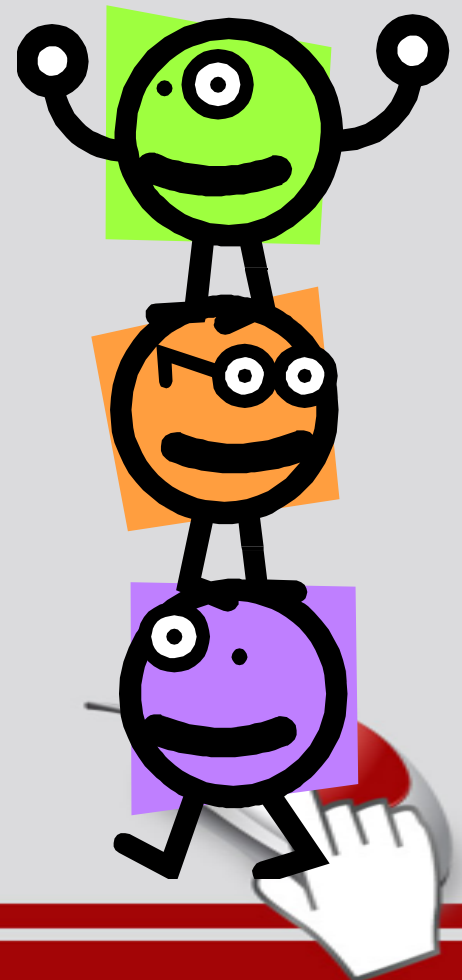
Why be an Engineer?

- **Fun**
  - Great variety in your work
  - You get to build or improve things
  - You get to use your creative ideas to solve problems
  - You get to work on a team

- **Lots of Job Opportunities**
  - High Salary (FOR A GOOD QUALITY ENGINEER)
  - Jobs Abroad

- **Your Education Continues**
  - You will need to continue studying to remain relevant

Engineering Disciplines

- Aerospace
- Agricultural
- Automobile
- Biomedical
- Chemical
- Civil
- Computer Hardware
- Electrical
- Electronics

- Health and Safety
- Industrial
- Environmental
- Marine and Ocean
- Materials
- Mechanical
- Mining and Geological
- Nuclear
- Petroleum

How do you become an Engineer?

- **EDUCATION**
  - Middle and High School
    - Do well in your math classes – this is the foundation of your engineering education!!
    - Prepare yourself for college:
      - Algebra I & II
      - Geometry
      - Trigonometry
      - Calculus
      - Chemistry
      - Physics
      - Computer Programming
      - Advanced placement classes are ideal

Automobile Engineering

A career as an automobile engineer is for people who are driven and passionate about cars. Automobile engineers must be innovative, eager workers, they must not get carried away.
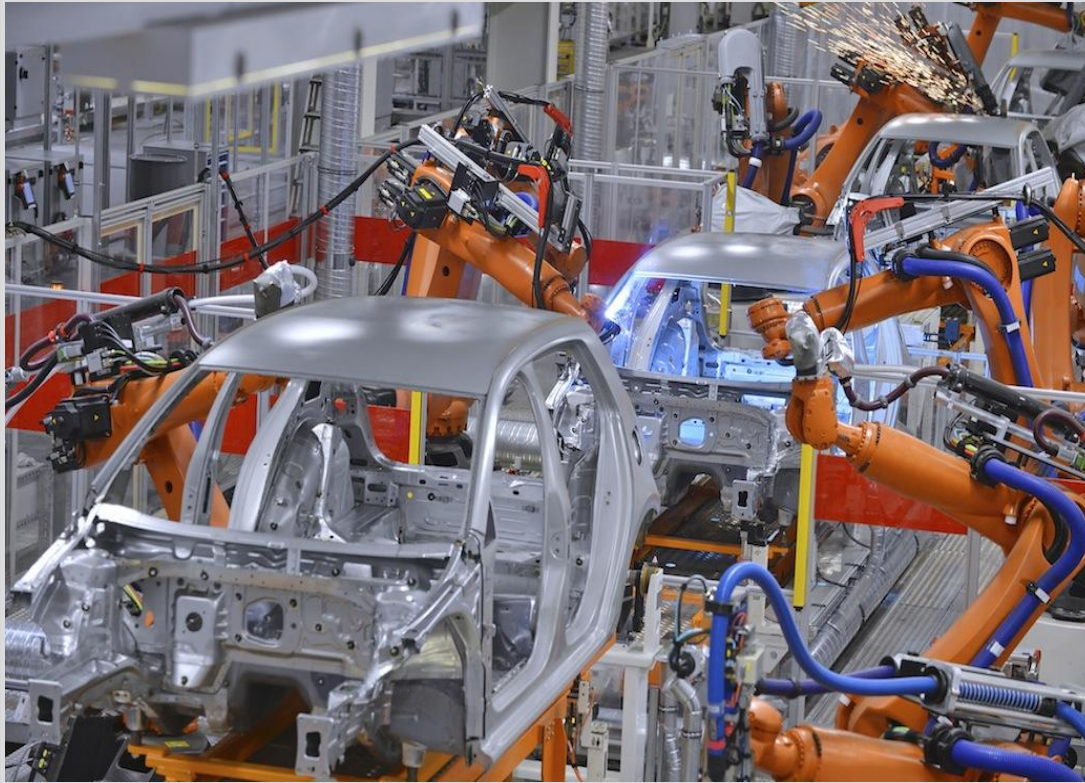
Scope of Automobile Engg.

- Designing, development and manufacturing of vehicles

- Creating blueprint of vehicles and its components

- Maintenance and Services Engineers in automobile workshops, aircraft industries, aviation, marine vessels, and diesel power stations

Civil Engineering

Plan the design, construction, and maintenance of various civil structures.
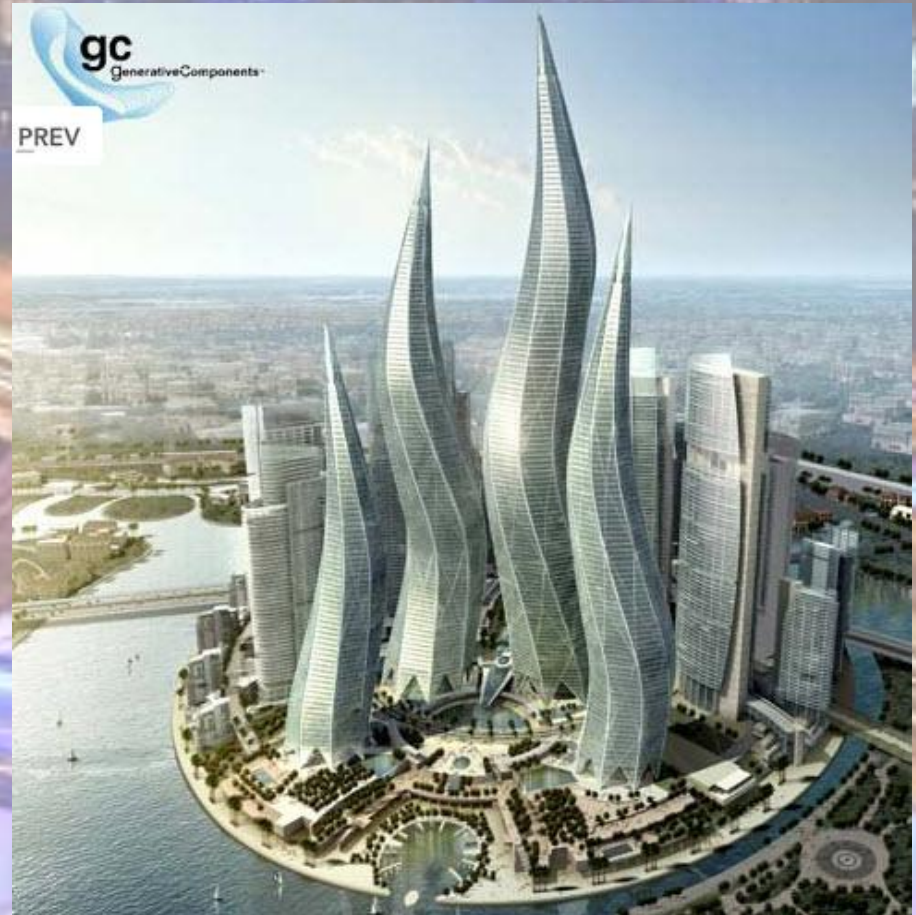
Scope of Civil Engg.

- ✓ **Build tunnels or bridges**
- ✓ **Design roller coasters**
- ✓ **Create airports**
- ✓ **Determine weather safety designs for buildings**

Computer Engineering

Research, design, develop, and test computer systems and computer-related equipment.
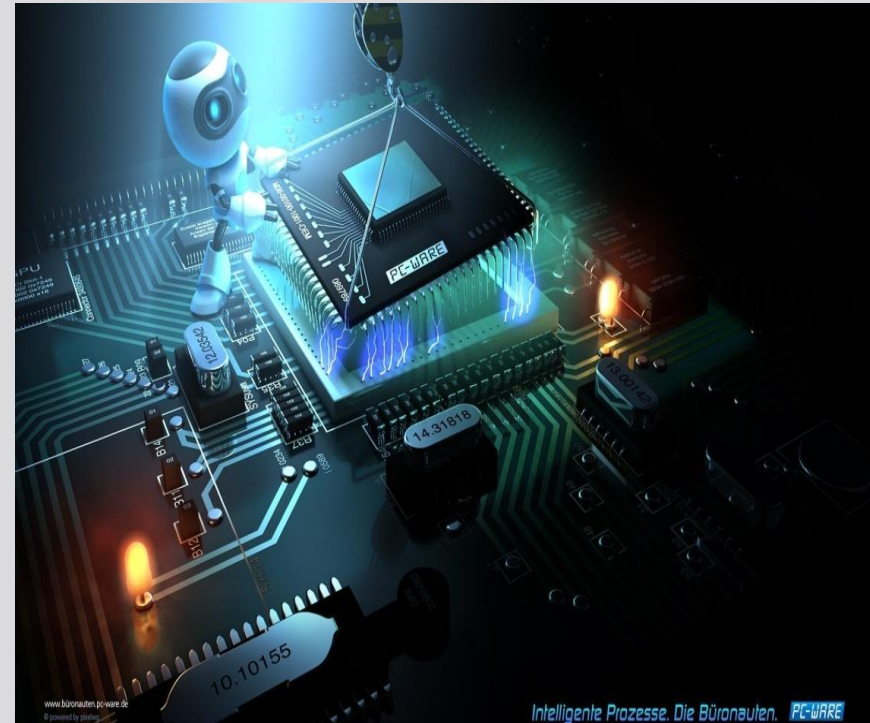
Scope of Computer Engg.

- ✓ Design networks
- ✓ Build computer systems
- ✓ Analyze system requirements

Electrical Engineering

Design, develop, and test the manufacture of electrical equipment and large-scale electrical systems.
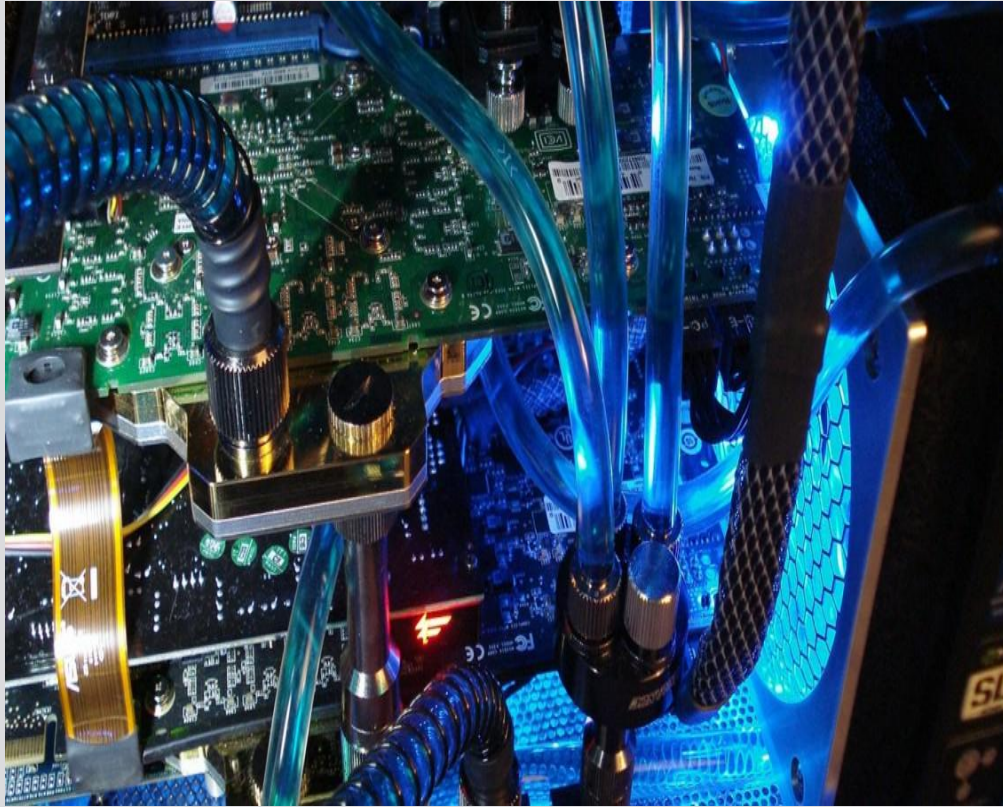
Scope of Electrical Engg.

- ✓ **Design an effective radar system**
- ✓ **Determine new ways to harness electrical power**
- ✓ **Test aircraft electrical equipment**
- ✓ **Oversee electric utilities**

Electronics & Telecommunication Engg.

- Electronic communications engineers engage in research, **design**, development and testing of the electronic equipment used in **various** communications
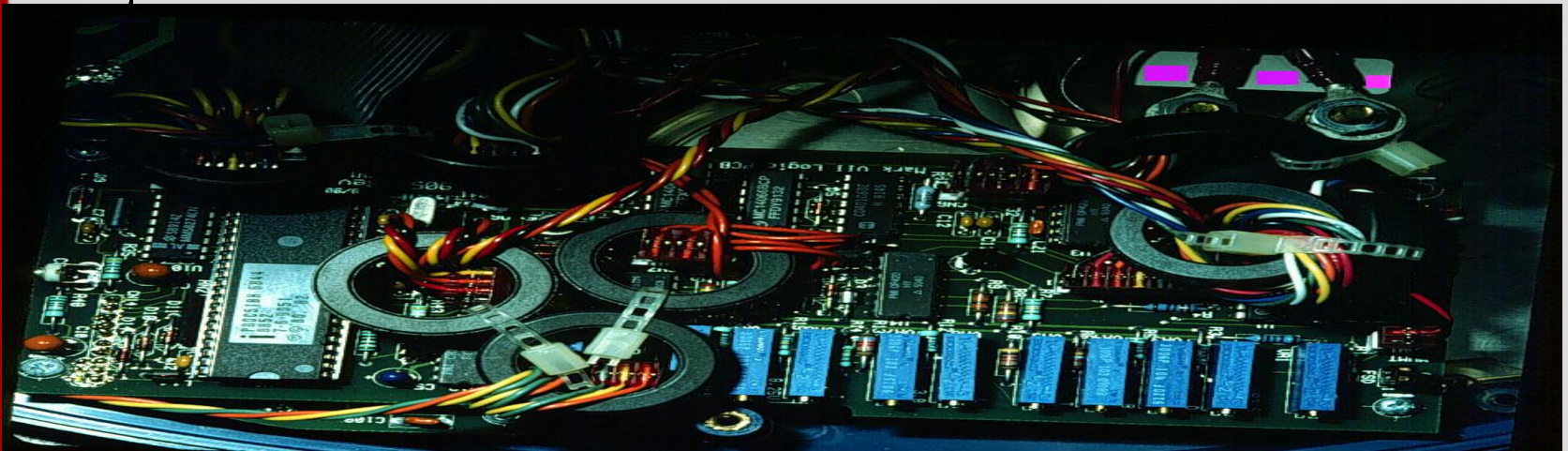
Scope of E & TC Engg.

- Consumer electronics manufacturing companies
- Telecommunication & IT industries
- Health care equipment manufacturing
- Mobile Internet technologies
- Power Electronics, and other industries like steel, petroleum and chemical industry, directing control and testing production process.

Mechanical Engineering

Research, develop, design, manufacture, and maintain devices that produce or consume power.

Best Practices: 2
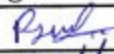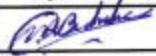
Photographs of Awareness program among rural area towards higher education
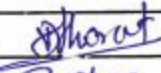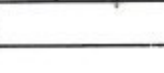
1.PANHALA - Surrounding Area (Rakshi & Ghungurwadi)

Sr. No.	Name of Staff	Department	Sign
1	**Ranjit Ingawale Co-Ordinator**	Sports	
2	Nitin Bahadure	Auto	
3	Abhijeet Lambe	Library	
4	Sachin Patil	Computer	
6	Satish Patil	ETC	
7	Mahesh Ayarekar	Mechanical	
8	Vijay Patil	Workshop	
9	Shital Patil	Office	
10	Kiran Jadhav	Mechanical	
11	Rajaram Buran	Peon	
12	Pramod Mane	Peon	
13	Sagar Patil	Peon	

2.Ambawade - Mitharwadi

Sr. No.	Name of Staff	Department	Sign
1	**Umesh Todkar**	Library	

3.Malkapur - Bambawde - Kokrud - Salashi - Pishavi

Sr. No.	Name of Staff	Department	Sign
1	**A T Bhosale**	Mechanical	
2	J.B.Metkari	CSE	
3	Ravi Bendre	Elect	
4	Arun Bagade	Office	
5	Amol Belekar	CSE	
6	P. R. Kamble	Computer	
7	D.R. Shelar	Elect	
8	Vikas Thorat	Mech	
9	S.M.Nikam	CSE	
10	Sandip Patil	Peon	
11	Babaso Patil	Peon	
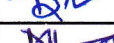
4.Kale-Sangrul-kuditre

Sr. No.	Name of Staff	Department	Sign
1	**Sangram Patil Co-Ordinator**	Library	
2	Nilesh Medsing	Computer	
3	Rohit Mane	Peon	
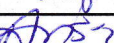
5.Kotoli-Asurle-Porle-sule-Waghurde

Sr. No.	Name of Staff	Department	Sign
1	**Sambhaji Patil Co-Ordinator**	**E&Tc**	
2	Vikram Patil	General	
3	Vijay Udale	Auto	
4	Ajinkya Patil	Civil	
5	Sangram Chopade	General Engg.	
6	Mahadev Khadke	Peon	

6.Kodoli-Pargaon

Sr. No.	Name of Staff	Department	Sign
1	**Chetan Gaikwad (Co-Ordinator)**	**E&TC**	
2	Sardar Deshmukh	Mech	
3	Nagesh Karnik	Elect	
4	Amit Thoke	Civil	
5	S T Jadhav	ETC	
6	V. T. Metkari	Elect	
7	Shivraj Patil	Mech	
8	A.S.Shelake	Mech	
9	Birajdar S M	Civil	
10	M. H. Momin	Civil	
11	R S Nejkar	CSE	
12	Anil Parit	Peon	

7.Radhanagari- Murgud - Gargoti -Kagal

Sr. No.	Name of Staff	Department	Sign
1	**Mangesh Hajare (Co-Ordinator)**	**Computer**	
2	P. B. Gurav	Diploma	
3	Y. R. Naik	Elect	
4	N. S. Jadhav	Elect	
5	P. S. Atigre (Transfered to KOP 1 Team)	Mech	
6	A. M. Bhandare	Elect	
7	Ajay Ghatge	Office	
8	Shubham V. Patil	Diploma	
9	Ketan Shinde	Auto	
10	Gunpal Anna Desai	Peon	

8.Kolhapur 1

Sr. No.	Name of Staff	Department	Sign
1	**A. N. Naik (Co-Ordinator)**	**Mech**	
2	Amol Chavan	Mech	
3	A. P. Redekar	Elect	
4	M. M. Bepari	Auto	
5	R. U. Urunkar	Mech	
6	S. M. Kamble	Workshop	
7	A. P. Bhosale	Auto	
8	Amol Katkar	Mech	
9	Smt.Nilofer. G. Khan	General	
10	Smt..Nasreen. G. Khan	General	
11	Smt.D.M.Kertugi	Elect	
12	Smt..S.N.Patil	Elect	
13	Mulla T M	Diploma	
14	P.M.Deshpande	Office	
15	Ram Yadav	Workshop	
16	Amit Kadam	Peon	

17. P.S.Atigre (Asst.Prof.) Mech Dept P.S.Ati...
18. P.P.Kulkarni Elect De...

(19)

9.Kolhapur 2

Sr. No.	Name of Staff	Department	Sign
1	**Shrivallabh Chavan (Coorrdinator)**	**Civil**	Dhavan 3/4/2018
2	G C Koli	Mech	
3	C. R. Dongarsane	ETC	
4	Smt.P. L Gaikwad	CSE	
5	Smt.Gauri R.Desai	ETC	
6	Smt.Anikta A.Kulkarni	General	In group 8 Kolhapr 1
7	Arvindkumar S. G	Mech	
8	Smt. Tejashree Divase	Diploma	Divase
9	Smt.Pornima Patil	Diploma	
10	S. V. Patil	Diploma	
11	Revdekar Nitin	Diploma	left
12	Smt.P G Bendre	Elect	
13	V S Mane	ETC	
14	S. N. Shinde	ETC	
15	H D Bhosale	Civil	
16	N.B.Tharkar	Diploma	
17	D.P.Dinde	Diploma	
18	Smt.Arati Sarnaik	Diploma	
19	Sandip Lad	Office	
20	Pramod Gharage	Office	
21	Vinod Solapure	Peon	
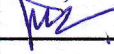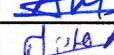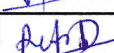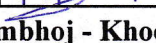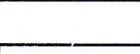
10.Gadhinglaj

Sr. No.	Name of Staff	Department	Sign
1	Amar Kekare	Mech	
2	Ningappa S.Nidsossi	Mech	
3	Prasad Udale	Peon	

11.Jat-Kavathemahankal
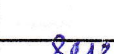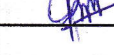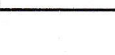
Sr. No.	Name of Staff	Department	Sign
1	**J. S. Mevekari (Co-Ordinator)**	**Civil**	
2	Smt.A. M. Momin	Civil	
3	Appasaheb Bannenvar	TPO	
4	Abhideep Dhende	Civil	
5	Nishant V.Patil	Auto	
6	Ramchandra Dhanawade	Peon	

12.Ichalkaranji - Rukadi - Jaysingpur - Narande - Kumbhoj - Khochi

Sr. No.	Name of Staff	Department	Sign
1	**S. S. Pujari (Co-Ordinator)**	~~Diploma~~ CSE	
2	A.B.Kolekar	Genaral Engg	
3	S. N. More	CSE	
4	Khandu Jadhav	CCF	
5	S D Anuse	Mech	
6	Satish Pallakhe	Store	
7	Smt.P. P.Shendge	E & Tc	
8	Sardar Shinde	Peon	

9. Ashok bagal (Peon)

13.Joytiba - Kerli - Nigave - Vadange - Ambewadi

Sr. No.	Name of Staff	Department	Sign
1	**Dhananjay Patil (Co-Ordinator)**	**Mech**	
2	Rohit Patil	Workshop	
3	S S Kumbhar	Auto	
4	Ranjit Mane	Mech	
5	Ajit Katkar	Mech	
6	Ramchandra Bahadure	Peon	

14.Male - Shahapur - Mangale - Kande - Devale

Sr. No.	Name of Staff	Department	Sign
1	S K Pisal (Co-Ordinator)	Auto	
2	Virkar Dipak	Auto	
3	Yogesh Sanagar	Workshop	
4	S. V. Acharya	Elect	
5	Amol Solase	Diploma	
6	Ramdas Vhetam	Office	
7	Sachin Paymal	Office	
8	Chandrakant Parit	Peon	

15.Chandgad

Sr. No.	Name of Staff	Department	Sign
1	J J Gavade (Co-Ordinator)	Civil	
2	S.A.Agnihotri	Civil	
3	Arvind Gurav	Peon	

16.Sagaon -Natoli-Chikhali-Punvat-Kandur

Sr. No.	Name of Staff	Department	Sign
1	V. H. Deokar (Co-Ordinator)	Mech	
2	R S Kulkarni	Mech	
3	U. S. Ghorpade	Mech	
4	Samrat Babar	CSE	
5	S P Jadhav	Auto	
6	Hindurao Bhosale	Peon	

17.Ashta-Islampur- Shigaon - Bavachi

Sr. No.	Name of Staff	Department	Sign
1	P S Landage (Co-Ordinator)	CSE	
2	S V Vanmore	ETC	
3	S M Shinde	Civil	
4	Ashok Bagal — transfer to Sch. train	Peon	

18.Tisangi

Sr. No.	Name of Staff	Department	Sign
1	Sadashiv Patil	Workshop	

FOLLOW UP COMMITTEE

Sr. No.	Name of Staff	Department	Sign
1	Vishal Patil	Gene Engg	
2	Manik Patil	Auto	
3	P B Gurav	Elect	
4	H.H.Pawar	Gen. Engg	
5	Sangram Chopade	Gen. Engg	

6. S.S.Pujari   CSE

Admission Incharge   **Principal**   **Jt.Secretary**   **Chairman**

Sample MOCK test paper

Note :

i) All Questions are compulsory

ii) Darken (●) the appropriate circle(○) of the most correct option/response with black ball point pen.

Physics

1) Length of a cylinder was measured using a vernier callipers several times and following observations are recorded 1.12, 1.11, 1.13, 1.10, 1.14, 1.15, 1.16 then percentage error in measurement is :

A) 5%   B) 3%   C) 1.5%   D) 1%

2) If capacitance of conductor is given by $C = \dfrac{Q}{V}$ where V is potential and Q is charge then its dimensional formula is :

A) $[M^1 L^2 T^{-2} I^{-1}]$ B) $[I^1 T^1]$

C) $[M^{-1} L^{-2} T^3 I^2]$ D) $[M^{-1} L^{-2} T^4 I^2]$

3) Which of the following is a unit vector?

A) $\hat{i} + \hat{j}$ B) $\cos\theta\hat{i} - \sin\theta\hat{j}$

C) $\sin\theta\hat{i} + 2\cos\theta\hat{j}$ D) $\dfrac{1}{\sqrt{3}}(\hat{i} + \hat{j})$

4) Dot product of two unit vectors which are perpendicular to each other is :

A) zero   B) one

C) null vector   D) unit vector

5) A stone is thrown vertically downward with a velocity of 5 m/s from top of tower of height 30 m, stone will hit the ground with velocity $(Take\, g = 10m/s^2)$:

A) 5 m/s   B) 15 m/s   C) 20 m/s   D) 25 m/s

6) A body starts from rest accelerates uniformly to attain a velocity of 20 m/s in 30 second, then acceleration of body is :

A) $3m/s^2$ B) $2m/s^2$

C) $1m/s^2$ D) $0.67m/s^2$

7) The centre of mass of triangle shown in figure has coordinates :

A) $x = \dfrac{b}{2}, y = \dfrac{h}{2}$ B) $x = \dfrac{b}{2}, y = \dfrac{h}{3}$
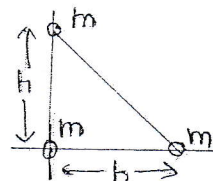
C) $x = \dfrac{b}{3}, y = \dfrac{h}{3}$ D) $x = \dfrac{b}{3}, y = \dfrac{h}{3}$

8) Three point masses m1, m2 and m3 are placed at the corners of a thin massless rectangular sheet (1.2 × 1m) as shown. Centre of mass will be located at the point.

A) (0.8, 0.6) m   B) (0.6, 0.8) m

C) (0.4, 0.4) m   D) (0.5, 0.6) m

9) There is a small hole of diameter 2 mm in the wall of a water tank at a depth of 10 m below free surface of water. The velocity of efflux of water from the hole will be nearly :

A) 0.014 m/s   B) 1.4 m/s

C) 0.14 m/s   D) 14 m/s

10) According to Bernoulli''s equation the expression which remains constant is :

A) $P + \dfrac{1}{2}\rho V^2$ B) $P + \dfrac{1}{2}\rho V^2 - \rho gh$

C) $P + \rho gh$ D) $P + \dfrac{1}{2}\rho V^2 + \rho gh$

11) When two notes are simultaneously sounded together and if they produce unpleasant sensation in the air, there is :

A) conchord   B) beats

C) discord   D) overtones

12) The velocity of sound is generally greater in solids than in gases because :

A) the density of solids is high but the elasticity is low

B) both the density and the elasticity of solids are high

C) both the density and the elasticity of solids are low

D) the density of solids is low but the elasticity is high

13) SI unit of principal specific heat is :

A) J/kg K   B) J/g K

C) erg/gK   D) erg/kg K

14) SI unit of molar specific heat is :

A) J/kg mol K   B) cal/kg mol K

C) cal/gm mol K   D) cal/mol

15) A ray of light from a denser medium strikes a rarer medium at an angle of incidence i. If the reflected and refracted rays are mutually perpendicular to each other, then the critical angle will be :

A) $\sin^{-1}(\tan i)$ B) $\cot^{-1}(\tan i)$

C) $\sin^{-1}(i)$ D) $\sin^{-1}(90 - i)$

16) Colour of light is determined by :

A) amplitude   B) wavelength

C) frequency   D) phase

17) For magnification using simple microscope, object must be :

A) Within the focal length of lens

B) at the focal length of lens

C) at infinity

D) between infinity and focus

18) Focal length of lens is depends upon :

A) radii of curvature of both the surfaces

B) material of lens

C) surrounding medium

D) all the above

19) Electric flux per unit area is :

A) flux density   B) magnetic induction

C) electric potential   D) both (A) and (C)

20) One of the charges is increased by 10% and other is reduced by 10%. The new force of repulsion at the same distance would be :

A) 100 N   B) 121 N   C) 210N   D) 99 N

21) Thermistor is :

A) An ohmic device

B) A non-ohmic device

C) Both (A) and (B)

D) None of these

22) Five cells each of internal resistance 0.2Ω and e.m.f. 2V are connected in series with a resistance of 4Ω. The current through the external resistance is:

A) 5A   B) 4A   C) 2A   D) 1A

23) Which of the following gives the value of magnetic field due to a small current element according to Biot-Savart's law?

A) $\dfrac{i\Delta l \sin\theta}{r^2}$ B) $\dfrac{\mu_0}{4\pi}\dfrac{i\Delta l \sin\theta}{r}$

C) $\dfrac{\mu_0}{4\pi}\dfrac{i\Delta l \sin\theta}{r^2}$ D) $\dfrac{\mu_0}{4\pi}\dfrac{i\Delta l \sin\theta}{r^3}$

24) Two parallel wires carrying same current of 1A and kept at a distance 10m from each other experiences a force :

A) 2×10^{-8}N   B) 10^{-6}N

C) 2×10^{-6}N   D) 0.5×10^{-8}N

25) Which of the following does not produce magnetic dipole moment ?

A) a bar magnet

B) current carrying coil

C) a current carrying solenoid

D) a stationary charge

26) North pole of Earth"s magnet is towards :

A) geographic north pole of earth

B) geographic south pole of earth

C) the centre of earth

D) equator of earth

27) X-rays are not used in radar because they are not:

A) partially absorbed by target

B) electromagnetic waves

C) reflected by target

D) sound waves

28) Green house effect keeps the earth surface:

A) cold in night   B) warm in night

C) moist in night   D) dusty and cold

29) A body is allowed to slide down a frictionless inclined track under gravity from a height of 10 cm. The track ends in a circular loop of diameter D. The body is just able to complete the circular track, then the diameter of the track will be

A) 4 cm   B) 8 cm   C) 6 cm   D) 2 cm

30) Two particles of equal masses are revolving with the same speed in concentric circular paths of radii R_1 and R_2, respectively. The ratio of their centripetal force is

A) $\dfrac{R_2}{R_1}$ B) $\left(\dfrac{R_1}{R_2}\right)^2$ C) $\sqrt{\dfrac{R_1}{R_2}}$ D) $\dfrac{R_1}{R_2}$

31) The mean radius of the earth is R, its angular speed about its own axis is ω and the acceleration due to gravity at the earth"s surface is g. What will be the radius of the orbit of a geostationary satellite ?

A) $\left(\dfrac{R^2 g}{\omega}\right)^{1/3}$ B) $\left(\dfrac{R^2 \omega^2}{g}\right)^{1/3}$

C) $\left(\dfrac{R^2 g}{\omega^2}\right)^{1/3}$ D) $\left(\dfrac{Rg}{\omega^2}\right)^{1/3}$

32) The K.E. of a satellite moving in a circular orbit around a planet is 1.5×10^{10} J. What is its potential energy?

A) 0.75×10^{10}J   B) -3×10^{10}J

C) 3×10^{10}J   D) 6×10^9J

33) The position vector of a particle of mass 10 g, about the origin is $4\hat{i} + 3\hat{j}$ m. If it moves with a linear velocity of $4\hat{i}$ m/s, then its angular momentum will be

A) $12\,\hat{k}$ Js   B) $0.2\,\hat{k}$ Js

C) $-0.12\,\hat{k}$ Js   D) $-1.2\,\hat{k}$ Js

34) When a particle performs a U.C.M. of diameter 10 cm, its projection along the diameter of the circle, performs a S.H.M. of amplitude

A) 10 cm   B) 5 cm   C) 20 cm   D) 2.5 cm

35) There are two identical springs, each of spring constant 240 N/m, one of them is compressed by 10 cm and the other is stretched by 10 cm.What is the difference in the potential energies stored in the two springs?

A) Zero   B) 1.2 J   C) 4 J   D) 12 J

36) A square frame of side L is dipped in a soap solution.When it is taken out of the solution, a film is formed on it. If the surface tension is T, then force acting on it is:

A) 2TL   B) 16TL   C) 4TL   D) 8TL

37) The speed of sound in air and water is 340 m/s. and 1420 m/s respectively. If sound waves have a wavelength of 2m in air, then the frequency of the same sound waves in water will be

A) 100 Hz   B) 125 Hz   C) 340 Hz   D) 170 Hz

38) Sound waves of frequency 660 Hz and travelling with a velocity of 330 m/s are incident normally on a perfectly reflecting wall. The shortest distance at which the air particles have the maximum amplitude of vibration is

A) $\frac{1}{2}$ m   B) $\frac{1}{4}$ m   C) $\frac{1}{8}$ m   D) $\frac{1}{16}$ m

39) If E is the kinetic energy per mole of a gas, and T is the absolute temperature, then the universal gas constant is given by

A) $R = \frac{3T}{2E}$ B) $R = \frac{2E}{3T}$ C) $R = \frac{3E}{2T}$ D) $R = \frac{2T}{3E}$

40) Polarising angle for water is 53°4 . If light is incident at this angle on the surface of water and reflected, the angle of refraction is

A) 53°4   B) 126°56   C) 36°56   D) 30°4

41) In a Youngs double slit experiment, the separation of the two slits is doubled. To keep the same spacing of fringes, the distance D of the screen from the slits should be made

A) 2D   B) D   C) $\frac{D}{2}$ D) 3D

42) Three capacitors of capacities 12 μ F, 6 μ F and 4 μ F are connected in series and a potential difference of 20 V is applied to their combination.What is the charge on the capacitor of 4 μ F ?

A) 20 μ C   B) 40 μ C   C) 30 μ C   D) 50 μ C

43) In an experiment to find the internal resistance of a cell by a potentiometer, a balance was obtained for 50 cm length of the potentiometer wire, with a cell of e.m.f. 2V. When the cell was shunted by a resistance of 2 Ω , the balancing length of the potentiometer wire was 40 cm. What was the internal resistance of the cell ?

A) 0.25 Ω   B) 0.75 Ω   C) 0.5 Ω   D) 1 Ω

44) A proton moving with a velocity of 2.5×10^7 m/s, enters a magnetic field of 2 T, making an angle of 30 with the magnetic field. The force acting on the proton

A) 2×10^{-12} N   B) 3×10^{-12} N

C) 4×10^{-12} N   D) 6×10^{-12} N

45) A metallic square loop ABCD is moving in its own plane with a velocity v in a uniform magnetic field perpendicular to its plane as shown in the figure.Electric field is induced

A) in AD, but not in BC

B) in BC, but not in AD

C) neither in AD nor in BC

D) in both AD and BC

46) The threshold frequency for a photosensitive surface corresponds to an energy of 6.5 eV. If the stopping potential for radiations incident on this surface is 3 V, then the energy of the incident radiation will be

A) 3.5 eV   B) 7 eV   C) 9.5 eV   D) 13 eV

47) The half life of a radioactive material is 6.93 hour. After how many hours will only one-twentieth of the material be left over ? Take $\log_e (20) = 3.0$.

A) 15 h   B) 20 h   C) 25 h   D) 30 h

48) In an intrinsic semiconductor, the number of conduction electrons is 6×10^{19} per cubic metre. How many holes are there in a semiconductor of size 1cm × 1cm × 1mm ?

A) 6×10^{19} B) 6×10^{15}

C) 6×10^{12} D) 6×10^{10}

49) A muon is a particle that has the same charge as that of an electron but is 200 times heavier than it. If we have an atom in which the muon revolves round a proton instead of an electron, then what will be the orbital magnetic moment of the muon in the ground state of such an atom ? [Given that Bohr magneton = $9.28 \times 10^{-24} Am^2$]

A) $4.64 \times 10^{-26} Am^2$ B) $9.28 \times 10^{-26} Am^2$

C) $8.27 \times 10^{-26} Am^2$ D) $7.64 \times 10^{-26} Am^2$

50) A male voice after modulation transmission sounds like that of a female voice in the receiver. The problem is due to

A) poor selection of modulation index (selected 0<m<1)

B) poor bandwidth selection of amplifiers

C) poor selection of carrier frequency

D) loss of energy in transmission

Chemistry

51) The total number of orbitals in a main shell is equal to

A) n^2 B) n C) 2n D) $2n^2$

52) Among the following, the false statement is

A) 4s-subshell has more energy than 3d

B) The maximum number of orbitals possible for M-shell is 9

C) Maximum number of electrons that can be present in N-shell is 32

D) The maximum number of unpaired electrons present in 4d-subshell is 5

53) Which one of the following molecular orbitals has two nodal planes?

A) π (2py) B) σ (2s) C) σ^* (2pz) D) π^* (2py)

54) Hybridisation explains

A) the valency of the atom only

B) both, the valency of atom and shape of the molecule

C) both, the shape of the molecule and equivalent nature of all the bonds

D) both valency of atom and equivalent nature of all the bonds

55) The pH of an acid buffer is given by

A) $pH = \log K_a + \log \dfrac{[salt]}{[acid]}$

B) $pH = K_a + \log \dfrac{[salt]}{[acid]}$

C) $pH = -\log K_a - \log \dfrac{[salt]}{[acid]}$

D) $pH = -\log K_a + \log \dfrac{[salt]}{[acid]}$

56) For an acid pK_a = 3.8740 and for a base pK_b = 4.7447. The pH of the aqueous solution of their salt will be

A) less than 7 B) more than 7

C) 7 D) unpredictable

57) Which one of the following is an example of elimination reaction?

A) methane$\rightarrow$ methyl chloride

B) alcohol$\rightarrow$ alkene

C) alkene$\rightarrow$ alkyl halide

D) ethylene$\rightarrow$ ethanol

58) In steam distillation, the necessary condition(s) is/are

A) the impurities must be non-volatile

B) the liquid to be purified must be immiscible with water

C) both these

D) none of these

59) Which one of the following represents an electrophilic substitution?

A) Friedal Crafts reaction

B) Wurtz reaction

C) Kolbes reaction

D) Dehydrohalogenation

60) In the sulphonation of benzene the electrophile is

A) $\overset{\oplus}{S}O_2$ B) SO_2 C) SO_2 D) HSO_4^-

61) Which of the following is not a colligative property ?

A) Optical activity

B) Elevation in boiling point

C) Osmotic pressure

D) Lowering of vapour pressure

62) Two liquids X and Y form an ideal solution. At 300K, vapour pressure of the solution containing I mol of X and 3 mol of Y is 550 mm Hg. At the same temperature, if 1 mol of Y is further added to this solution, vapour pressure of the solution increases by 10 mm Hg. Vapour pressure (in mm Hg) of X and Y in their pure states will be, respectively

A) 200 and 300   B) 300 and 400

C) 400 and 600   D) 500 and 600

63) The favourable conditions for a spontaneous reaction are

A) $T\Delta S > \Delta H, \Delta H = +ve, \Delta S = +ve$

B) $T\Delta S > \Delta H, \Delta H = +ve, \Delta S = -ve$

C) $T\Delta S = \Delta H, \Delta H = -ve, \Delta S = -ve$

D) $T\Delta S = \Delta H, \Delta H = -ve, \Delta S = +ve$

64) The difference between heat of reaction at constant pressure and constant volume for the reaction $C_{(s)} + \frac{1}{2}O_{2(g)} \rightarrow CO_{2(g)}$ is (Assume that R=0.002 kcal and temperature=TK)

A) T cal   B) $-T$ cal   C) $-\frac{T}{2}$ D) $\frac{T}{2}$

65) During the working of the Daniell cell, which of the following happens?

A) the size of the Zn rod as well as the intensity of the colour of $CuSO_4$ solution remain unchanged

B) the size of the Zn rod is reduced and the blue colour of $CuSO_4$ solution becomes faint

C) the size of the Zn rod remains same but the blue colour of $CuSO_4$ solution becomes faint

D) the size of the Zn rod is reduced but there is no change in the intensity of colour of the $CuSO_4$ solution

66) When 0.5 amp of current was passed for 200 seconds, 0.34 gm of copper was deposited, the electrochemical equivalent of copper will be

A) 34   B) 3.4   C) 0.034   D) 0.0034

67) Which of the following is generally bleached by bleaching powder ?

A) Straw   B) Ivory

C) Roll of cotton   D) Silk

68) The noble gas used for the treatment of cancer is

A) Helium   B) Argon

C) Krypton   D) Radon

69) Which of the following is used in preparation of optical glass of camera having high refractive index ?

A) Ceric compounds

B) CeO_2

C) Oxides of lanthanoids

D) Gadolinium sulphate

70) The magnetic moment of a divalent ion in aqueous solution with atomic number 25 is

A) 2.9 B.M.   B) 5.9 B.M.

C) 6.9 B.M.   D) 9.9 B.M.

71) Dimethyl ether is an isomer of

A) Ethanol   B) Acetone

C) Propanal   D) Ethanal

72) Phenol is bifunctional compound because

A) It is acidic and contain -OH

B) It reacts with Na to give phenoxide

C) It reacts with both Na and Zn to give phenoxide and benzene respectively

D) both (a) and (c)

73) The structure of methyl-2-methyl propanoate is

A) $(C_2H_5)_2CH-COOCH_3$

B) $C_2H_5-CH_2COOCH_3$

C) $(CH_3)_2CH-COOCH_3$

D) $C_2H_5COOC_2H_5$

74) Which of the following undergoes oxidation and reduction simultaneously in the presence of 50% NaOH?

A) Acetaldehyde   B) Acetone

C) Benzoic acid   D) Benzaldehyde

75) Tripeptide contains _____ peptide linkages.

A) 3   B) 2   C) 6   D) 9

76) Which of the following is starch?

A) $C_6H_{12}O_6$ B) $(C_6H_{10}O_5)_n$

C) $(C_6H_{12}O_6)_6$ D) $C_{12}H_{22}O_{11}$

77) The correctly reported total of 19.3102, 4.70 and 5.7 will have significant figures equal to

A) 6   B) 2   C) 4   D) 3

78) The weight of 112 mL of oxygen at NTP is

A) 0.64 g   B) 0.96 g   C) 0.32 g   D) 0.16 g

79) Among the following, the highest electronegative element has the outer configuration as

A) $3p^1$ B) $3p^3$ C) $3p^7$ D) $3p^6$

80) The ionization potential increases with

A) increase in atomic radius

B) decrease in charge on nucleus

C) decrease in screening effect

D) decrease in atomic number

81) Which one of the following has the lowest vapour pressure at room temperature?

A) Benzene   B) Ethanol

C) Water   D) Chloroform

82) The pressure exerted by 1 mole of methane in a 0.25 litre container at 300K, using van der waal's equation, is [Given: a = 2.253 atm $L^2 mol^{-2}$, b=0.0428L mol^{-1}]

A) 152.51 atm   B) 82.82 atm

C) 190.52 atm   D) 70.52 atm

83) Which one of the following statements is false about zeolite?

A) They have open structure

B) They are aluminosilicates

C) They have three dimensional structures

D) None of these

84) The dispersed phase and the dispersion medium in fog are reversed in case of

A) aerosol   B) foam

C) emulsion   D) sol

85) In the reaction, $Zn + I_2 \rightarrow ZnI_2$, the species which is reduced is

A) Zn   B) I^- C) I_2 D) Zn^{2+}

86) In the reaction, $C + H_2O$, H_2O acts as a/an

A) oxidising agent   B) reducing agent

C) both these   D) none of these

87) The metal(s), which give salt-like hydrides is/are

A) Li   B) Mg

C) Be   D) both (a) and (c)

88) The volume of 10 volume H_2O_2 solution that decolourises 200 mL of 2 N $KMnO_4$ solution in acidic medium is

A) 112 mL   B) 336 mL   C) 220 mL   D) 224 mL

89) Which one of the following has the configuration of Kr?

A) Cs   B) Na^+ C) K^+ D) Rb^+

90) Reaction given in passage is spontaneous because

A) NaOH formed is ionic

B) $CaCO_3$ is removed from the reaction mixture

C) reaction is exothermic

D) reaction is endothermic

91) Ozone in atmosphere is destroyed by

A) $Cl\overset{\bullet}{O}$ B) $\overset{\bullet}{O}$ C) $\overset{\bullet}{Cl}$ D) $\overset{\bullet}{N}$

92) Now-a-days in dry-cleaning of clothes, tetrachloroethene is replaced by

A) Liq. CO_2 B) H_2O_2

C) any of these   D) none of these

93) The unit cell with the crystallographic dimension $a = b \neq c, \alpha = \beta = 90°, \gamma = 120°$ is

A) rhombic   B) trigonal

C) tetragonal   D) hexagonal

94) Which equation represent first order integration equation ?

A) $K = t\ln\dfrac{a}{a-x}$ B) $K = \dfrac{1}{t}\ln\dfrac{a-x}{a}$

C) $K = \dfrac{1}{t}\ln\dfrac{a}{a-x}$ D) $K = t\ln\dfrac{a-x}{a}$

95) In the extraction of copper from its sulphide ore, the metal is formed by reduction of Cu_2O with

A) Cu_2S B) FeS   C) CO   D) C

96) The compounds $[Cr(H_2O)_6]Cl_3$ and $[Cr(H_2O)5C_1]Cl_2.H_2O$ are examples of

A) Linkage isomerism

B) Hydrate isomerism

C) Ionisation isomerism

D) Co-ordination isomerism

97) PVC plastics are produced by the polymerisation of

A) Vinyl acetate   B) Allyl chloride

C) Vinyl chloride   D) Ethylene

98) Which of the following reacts with HNO_2 to evolve nitrogen gas?

A) Diethyl amine   B) Ethyl amine

C) Dimethyl amine   D) Methyl cyanide

99) Hairs are the natural fibres of

A) polyester   B) cellulose

C) Proteins   D) oils and fats

100) The chemical substances which neutralise enough of acid in the gastric juices and give relief from acid indigestion, heart burns and gastric ulcers are called

A) Antibiotics   B) Analgesics

C) Antacids   D) Antipyretic

Mathematics

101) The genera! solution of the equation $\cot\theta - \tan\theta = \sec\theta$ is $(n \in I)$:

A) $n\pi + \pi/6$ B) $2n\pi + \pi/6$

C) $2n\pi \pm \pi/6$ D) $n\pi + (-1)^n \pi/6$

102) The value of K for which $(\cos x + \sin x)^2 + K \sin x \cos x - 1 = 0$ is equal to:

A) -1 B) 1   C) -2 D) 2

103) The value of $\dfrac{4\tan 7\frac{1}{2}^\circ \left(1 - \tan^2 7\frac{1}{2}^\circ\right)}{1 - 6\tan^2 7\frac{1}{2}^\circ + \tan^4 7\frac{1}{2}^\circ}$ is equal to:

A) $\sqrt{3}$ B) $\dfrac{1}{\sqrt{3}}$ C) $2 - \sqrt{3}$ D) 1

104) If $K \sin A \cos A(\cos^2 A - \sin^2 A) = \sin 4A \Rightarrow K =$

A) 1   B) 2   C) 3   D) 4

105) If a $\triangle ABC$, the value of $\sin A + \sin B + \sin C$ is

A) $4 \sin \dfrac{A}{2} \sin \dfrac{B}{2} \sin \dfrac{C}{2}$ B) $4 \cos \dfrac{A}{2} \cos \dfrac{B}{2} \cos \dfrac{C}{2}$

C) $4 \cos \dfrac{A}{2} \sin \dfrac{B}{2} \sin \dfrac{C}{2}$ D) $4 \cos \dfrac{A}{2} \sin \dfrac{B}{2} \cos \dfrac{C}{2}$

106) If $A + B + C = 180°$, then $\sin^2 A + \sin^2 B + \sin^2 C =$

A) $2 + 2 \sin A \sin B \sin C$

B) $1 + 4 \sin A \sin B \sin C$

C) $2 + 2 \cos A \cos B \cos C$

D) $1 - 4 \cos A \cos B \cos C$

107) The straight lines $3x + 4y - 5 = 0$ and $4x = 3y + 15$ intersect at the point P. On these lines the points Q and R are chosen so that $PQ = PR$. The slopes of the lines QR passing through (1,2) are

A) $-7, 1/7$ B) $7, 1/7$ C) $7, -1/7$ D) $3, -1/3$

108) The angle subtented by the line segment AB joining the points $A\left(\sqrt{3}, -1\right)$ and $B\left(\sqrt{3}, 1\right)$ at the origin is

A) $\dfrac{\pi}{6}$ B) $\dfrac{\pi}{4}$ C) $\dfrac{\pi}{3}$ D) $\dfrac{\pi}{5}$

109) For the parabola $y^2 + 8x - 12y + 20 = 0$

A) vertex is (2,6)   B) focus is (0,6)

C) latusrectum 4   D) All of these

110) The equation of the circle drawn on the diagonal of the rectangle as its diameter whose sides are x=-2, x=5, y=-2 and y=3 is

A) $x^2 + y^2 - 3x - y - 12 = 0$

B) $x^2 + y^2 - 3x - y - 10 = 0$

C) $x^2 + y^2 - 3x - y - 16 = 0$

D) $x^2 + y^2 - 3x - y - 15 = 0$

111) If $f(x) = \sqrt{x^3 - 2}$ and $g(x) = \sqrt[3]{x^2 + 11}$ then $(f \circ g)(-4) =$

A) 3   B) 4   C) 5   D) 6

112) The domain of $f(x) = \dfrac{\sin^{-1}(x - 3)}{\sqrt{9 - x^2}}$ is:

A) [2,3]   B) [1, 2)   C) [1,2]   D) [2,3)

113) If E and F are two independent events such that $< PE) < 1$ and $0 < P(F) < 1$, then

A) E and F^c are independent

B) E^c and F^c are independent

C) $P\left(\dfrac{E}{F}\right) + P\left(\dfrac{E^c}{F^c}\right) = 1$

D) All of the above

114) The probability of the impossible event is

A) 1   B) $\dfrac{1}{2}$ C) 0   D) $\dfrac{1}{3}$

115) If three G.M. be inserted between 2 and 32, then the third G.M. will be:

A) 8   B) 4   C) 16   D) 12

116) The nth term of $\sqrt{3}, \dfrac{1}{\sqrt{3}}, \dfrac{1}{3\sqrt{3}}, \dfrac{1}{9\sqrt{3}}, \ldots\ldots$ is:

A) $\left(\dfrac{1}{3}\right)^{n - 3/2}$ B) $3^{n - 3/2}$

C) $3^{\frac{1}{2} + n}$ D) $3^{\frac{1}{2} - n}$

117) If statements t and f represent a tautology and a contradiction (fallacy) respectively, and p is any given statement, then : $p \vee f \equiv$

A) t   B) f   C) p   D) 2

118) The negation of the statement $(\sim p \vee \sim q)$ is

A) $p \to q$ B) $p \vee q$

C) $\sim p \wedge \sim q$ D) $p \wedge q$

119) If $A = \begin{bmatrix} 1 + i & -i \\ i & 1 - i \end{bmatrix}$, where $i = \sqrt{-1}$, and $A^2 - 2A + I = 0$, then: $A^{-1} =$

A) $\begin{bmatrix} 1 - i & i \\ -i & 1 + i \end{bmatrix}$ B) $\begin{bmatrix} 1 - i & -i \\ i & 1 + i \end{bmatrix}$

C) $\begin{bmatrix} 1 + i & i \\ -i & 1 - i \end{bmatrix}$ D) $\begin{bmatrix} 1 + i & -i \\ i & 1 - i \end{bmatrix}$

120) If A and B are square matrices of the same order, then : adj. (AB) =

A) (adj. A) (adj. B)

B) (adj. B) (adj. A)

C) (adj. A) + (adj. B)

D) (adj. A) - (adj. B)

121) In $\triangle ABC$,
$(b+c)\cdot\cos A + (c+a)\cdot\cos B + (a+b)\cdot\cos C =$

A) $a + b + c$ 　　　　 B) $a - b + c$

C) $a + b - c$ 　　　　 D) none of these

122) If $\cot\theta - \tan\theta = \sec\theta$, then $\theta =$

A) $n\pi + (-1)^n \cdot (\pi/6)$ 　　 B) $n\pi + (\pi/2)$

C) $2n\pi + (3\pi/2)$ 　　 D) none of these

123) Lines jointly given by $x^2 - 9y^2 - x + 3y = 0$ intersect each other in the point

A) $\left(\dfrac{-1}{2}, \dfrac{1}{6}\right)$ 　　　　 B) $\left(\dfrac{1}{2}, \dfrac{-1}{6}\right)$

C) $\left(\dfrac{1}{2}, \dfrac{1}{6}\right)$ 　　　　 D) $\left(\dfrac{1}{3}, \dfrac{2}{3}\right)$

124) If the line $2x-y = 0$ is the bisector of an angle between the two lines $x^2 + 2hxy - 3y^2 = 0$, then : h =

A) $-\dfrac{3}{8}$ 　 B) $\dfrac{8}{3}$ 　 C) $\dfrac{2}{3}$ 　 D) $-\dfrac{8}{3}$

125) If $\bar{a}\cdot i = 4$, then $\bar{a}\cdot[j \times (2j-3k)] =$

A) 12 　　 B) 2 　　 C) 0 　　 D) –12

126) If $\bar{a}\cdot(\bar{b}\times\bar{c}) = 3$, then

A) $\bar{c}\cdot(\bar{a}\times\bar{b}) = -3$ 　　 B) $\bar{a}\cdot(\bar{c}\times\bar{b}) = -3$

C) $\bar{b}\cdot(\bar{a}\times\bar{c}) = 3$ 　　 D) $(\bar{a}\times\bar{c})\cdot\bar{b} = 3$

127) Value of k such that the line $\dfrac{x-4}{1} = \dfrac{y-2}{1} = \dfrac{z-k}{2}$ lies in the plane $2x-4y + z = 7$ is

A) 7 　　　　　　 B) –7

C) no real value 　　　 D) 4

128) Equation of plane perpendicular to the YZ – plane and passing through $(1,-2,4)$ and $(3,-4,5)$ is

A) $y + 2z = 5$ 　　　　 B) $2y + z = 5$

C) $y + 2z = 6$ 　　　　 D) $2y + z = 6$

129) If $f(x) = ax^2 + b$, if $0 \leqslant x < 1 = x + 3$, if $1 < x \leqslant 2$ $= 4$, if $x = 1$, then the values of (a, b) for which $f(x)$ cannot be continuous at $x = 1$ are

A) (2,2) 　　 B) (3,1) 　　 C) (4,0) 　　 D) (5,2)

130) If $f(x) = 4(3^x)$, if $x < 0 = x + 2k + 1$, if $x \geqslant 0$ is continuous at $x = 0$, then $k = \ldots$

A) -1 　　 B) 0 　　 C) 1 　　 D) 2

131) If $(a-b\tan y)(a + b\tan x) = a^2 + b^2$, then $\dfrac{dy}{dx} =$

A) 0 　　　　　　 B) 1

C) $\tan^{-1}\left(\dfrac{b}{a}\right)$ 　　　 D) $\dfrac{1}{1 + x^2}$

132) $y = 3x^2 - 6x$, then $x^2 y_2 - 2xy_1 =$

A) $-2y$ 　　 B) $2y$ 　　 C) 0 　　 D) y

133) Height of a cone, inscribed in a sphere of radius r, having greatest curved surface is

A) $\dfrac{2r}{3}$ 　 B) $\dfrac{4r}{3}$ 　 C) $\dfrac{r}{3}$ 　 D) $\dfrac{3r}{2}$

134) If displacement x at time t is $x = \sqrt{1+t^2}$, then acceleration is

A) $\dfrac{1}{x}$ 　 B) $\dfrac{1}{x^2}$ 　 C) $\dfrac{1}{x^3}$ 　 D) x^3

135) $\displaystyle\int \dfrac{1}{1 + e^x}\, dx =$

A) $x + \log(1 + e^x) + c$ 　　 B) $\log(1 + e^{-x}) - c$

C) $-\log(1 + e^{-x}) + e$ 　　 D) $x - e^x + c$

136) If $f(x) = \dfrac{1}{1-x}$, then $\displaystyle\int (f\circ f\circ f)(x)\,dx =$

A) $x + c$ 　 B) $\dfrac{x^2}{2} + c$ 　 C) $\dfrac{x^3}{3} + c$ 　 D) $\dfrac{x^4}{4} + c$

137) $\displaystyle\int_0^1 \tan(2x-1)\,dx =$

A) 0 　　 B) $\tan 1$ 　　 C) 1 　　 D) –1

138) $\displaystyle\int_0^{\pi/4} \dfrac{1-\tan x}{1 + \tan x}\,dx =$

A) $\log\left(\dfrac{1}{2}\right)$ 　　　　 B) $\log 2$

C) $-\log 2$ 　　　　 D) $\log(\sqrt{2})$

139) Area enclosed between the curve $y^2 = x$ and the line $y = x$ is

A) 1 　 B) $\dfrac{1}{3}$ 　 C) $\dfrac{1}{6}$ 　 D) $\dfrac{1}{5}$

140) Area under the line $4x-y+2=0$, above the X-axis, bounded by the lines $x=0$ and $x=3$ is (in sq. units)

A) 12   B) 24   C) 25   D) 27

141) $\left(\dfrac{d^2y}{dx^2}\right)^3 + \left(\dfrac{dy}{dx}\right)^4 = x^5$

A) 2,1   B) 2,3   C) 2,4   D) 2,5

142) General solution of $\dfrac{x}{dx} = \dfrac{y}{dy}$ is

A) $xy = c$ B) $x = cy$

C) $y = cx$ D) $e^x = e^y + c$

143) Items produced by a company are supposed to contain 5 % defective items. Probability that a sample of 8 items will contain less than 2 defective items is

A) $\dfrac{27}{20}\left(\dfrac{19}{20}\right)^7$ B) $\dfrac{541}{400}\left(\dfrac{19}{20}\right)^6$

C) $\dfrac{153}{20}\left(\dfrac{1}{20}\right)^7$ D) $\dfrac{35}{16}\left(\dfrac{1}{20}\right)^6$

144) As an answer to a question, two options are given only one of which is correct. Then the probability of correctly answering at least 6 of the 10 questions is ...

A) $\dfrac{210}{512}$ B) $\dfrac{120}{512}$

C) $\dfrac{193}{512}$ D) none of these

145) If direction ratios of two lines are $2, -6, -3$ and $4, 3, -1$, then direction ratios of a line perpendicular to them are

A) 2,3,3   B) $3, -2, 6$ C) 1,2,3   D) $2, -3, 6$

146) In three dimensional space, the equation $xy = 0$ represents

A) a pair of lines

B) a plane

C) a pair of perpendicular planes

D) a pair of parallel planes

147) Equations of the line passing through $(1, 2, 3)$ and $(-3, 4, 3)$ are

A) $\dfrac{x-1}{-4} = \dfrac{y-2}{-2} = \dfrac{z-3}{0}$ B) $\dfrac{x-1}{-4} = \dfrac{y-2}{-2}$

C) $\dfrac{x-1}{2} = 2-y = \dfrac{z-3}{0}$ D) $\dfrac{x-1}{-3} = \dfrac{y-4}{2} = \dfrac{z-3}{3}$

148) Distance of the point $(3, 8, 2)$ from the line $\dfrac{x-1}{2} = \dfrac{y-3}{4} = \dfrac{z-2}{3}$, measured parallel to the plane $3x + 2y - 2z + 15 = 0$, is

A) 4   B) 7   C) 8   D) 5

149) Which of the following statements is true ?

A) Every L.P.P. has an optimal solution.

B) An L.P.P. has a unique solution.

C) If an L.P.P. has two optimal solutions, then it has infinitely many optimal solutions.

D) Every L.P.P. has two optimal solutions.

150) Distribution function $F(x)$ of a d.r.v. X is Then : $P[(X \leqslant 5)|(X > 3)] = ...$

x	1	2	3	4	5	6
$F(x)$	0.2	0.37	0.48	0.62	0.85	1

A) 0.38   B) 0.57

C) 0.71   D) none of these

STUDENT'S NAME (IN BLOCK LETTERS ONLY)

Roll Number

Centre Code

Category

- GEN
- OBC 1
- OBC 2
- SC
- ST
- PH

Mobile Number

OMR answer sheet with bubbles for questions 1–180 and data fields.

Answer Sheet

MH-CET Group Test

Total Questions : 150

Total Marks : 200

1	C	2	D	3	B	4	A	5	D	6	D	7	C	8	C	9	D	10	D	11	C
12	B	13	A	14	A	15	A	16	C	17	A	18	D	19	A	20	D	21	B	22	C
23	C	24	A	25	D	26	B	27	C	28	B	29	B	30	A	31	C	32	B	33	C
34	B	35	A	36	D	37	D	38	C	39	B	40	C	41	A	42	B	43	C	44	C
45	D	46	C	47	D	48	C	49	A	50	B	51	A	52	A	53	D	54	C	55	D
56	A	57	B	58	C	59	B	60	C	61	A	62	C	63	A	64	A	65	B	66	D
67	C	68	D	69	B	70	B	71	A	72	D	73	C	74	D	75	B	76	B	77	D
78	D	79	C	80	C	81	C	82	B	83	D	84	B	85	C	86	A	87	A	88	D
89	D	90	B	91	C	92	A	93	D	94	C	95	A	96	B	97	C	98	B	99	C
100	C	101	D	102	C	103	B	104	D	105	B	106	C	107	A	108	C	109	D	110	C
111	C	112	D	113	D	114	C	115	C	116	A	117	C	118	D	119	A	120	B	121	A
122	A	123	C	124	D	125	D	126	B	127	A	128	C	129	D	130	C	131	B	132	A
133	B	134	C	135	C	136	B	137	A	138	D	139	C	140	B	141	B	142	B	143	B
144	C	145	B	146	C	147	C	148	B	149	C	150	C								

Total Questions : 150   **Total Marks : 200**

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1) $L_m =$
$$\frac{1.12 + 1.11 + 1.13 + 1.10 + 1.14 + 1.15 + 1016}{7}$$
$$= \frac{7.91}{7} = 1.13 cm$$
Average absolute error
$\Delta L_m =$
$$\frac{0.01 + 0.02 + 0.00 + 0.03 + 0.01 + 0.02 + 0.03}{7}$$
$$= \frac{0.12}{7} = 0.017$$
$$Relative\, error = \frac{\Delta L_m}{L_m} = \frac{0.017}{1.13} = 0.01504$$
$$Percentage\, error = \frac{\Delta L_m}{L_m} \times 100$$
$$= 0.01504 \times 100 = 1.5\%$$

2) $[Q] = [I^1 T^1]$
$$[V] = \frac{[Work]}{[Charge]} = \frac{[M^1 L^1 T^{-2}]}{[T^1 I^1]} = [M^1 L^{-2} T^{-3} I^{-1}]$$
$$[Capacity] = \frac{[T^1 I^1]}{[M^1 L^2 T^{-3} I^{-1}]} = [M^{-1} L^{-2} T^4 I^2]$$

3) **Unit vector has a magnitude equal to 1.**
Here, $\sqrt{\cos^2\theta + \sin^2\theta} = 1$

5) $v^2 = u^2 + 2as$
$v^2 = (5)^2 + 2 \times 10 \times 30$
$v^2 = 25 + 600 = 625; v = 25 m/s$

6) $u = 0; v = 20 = 20 m/s, t = 30 \sec ond$
$$a = \frac{v - u}{t} = \frac{20 - 0}{30} = \frac{2}{3} m/s^2 = 0.67 m/s$$

7) $x = \frac{0 \times + b \times m + 0 \times m}{m + m + m} = \frac{b}{3}$
$y = \frac{0 \times m + 0 \times m + h \times m}{m + m + m} = \frac{h}{3}$

8) $m_1 = 1.6 kg; (x_1, y_1) = (0, 0)$
$m_2 = 2 kg; (x_2, y_2) = (1.2, 0)$
$m_3 = 2.4 kg; (x_3, y_3) = (0, 1)$
∴ **Coordinates of centre of mass will be**
$$x_{CM} = \frac{m_1 x_1 + m_2 x_2 + m_3 x_3}{m_1 + m_2 + m_3}$$
$$= \frac{(1.6)(0) + (2)(1.2) + (2.4)(0)}{1.6 + 2 + 2.4}$$
$X_{CM} = 0.4 m$
$$y_{CM} = \frac{m_1 y_1 + m_2 y_2 + m_3 y_3}{m_1 + m_2 + m_3}$$
$$= \frac{(1.6)(0) + (2)(0) + (2.4)(1)}{1.6 + 2 + 2.4}$$
$y_{CM} = 0.4 m$
∴ **Coordinates of centre of mass** $= (0.4, 0.4) m$

9) $v = \sqrt{2gh}$
$= \sqrt{2 \times 10 \times 10} = 1.414 \times 10 = 14.14 m/s$

15) **When reflected and refracted rays are mutually perpendicular and ray travels from densor to rarer then** $\mu = \frac{1}{\tan i}$
$$= \frac{1}{\sin i_c} \quad \therefore i_c = \sin^{-1}(\tan i)$$

20) $F = 100N, Now F'' = K.\frac{90}{100} \times \frac{110}{100}$
$$= \frac{99}{100} \text{ times}$$
∴ **News Force** $F'' = \frac{99}{100} \times F = 99N$

22) $I = \frac{nE}{nr + R} = \frac{5 \times 2}{5 \times 0.2 + 4} = \frac{10}{5} = 2A$

23) **Magnetic field is given as,**
$$B = \frac{\mu_0}{4\pi} \frac{i \Delta l \sin\theta}{r^2}$$

24) $F = \frac{\mu_0}{2\pi} \frac{I_1 I_2}{a} = \frac{2 \times 10^{-7} \times 1}{10} = 2 \times 10^{-8} N$

29) $h = \frac{5r}{2} \quad \therefore D = 2r = \frac{4h}{5} = 8 m$

30) $\frac{f_1}{f_2} = \frac{\frac{mv^2}{R_1}}{\frac{mv^2}{R_2}} = \frac{R_2}{R_1}$

31) **For a geostationary satellite, moving in a circular orbit of radius**
r with a speed v_o.
$$v_o = \sqrt{\frac{GM}{r}} = \sqrt{\frac{gR^2}{r}} \quad \therefore g = \frac{GM}{R^2}$$
$$\therefore T = \frac{2\pi r}{v_0} = \frac{2\pi r}{\left(\frac{gR^2}{r}\right)^{1/2}} = \frac{2\pi r^{3/2}}{\sqrt{gR^2}}$$
But $T = \frac{2\pi}{\omega} \quad \therefore \frac{2\pi r}{\omega} = \frac{2\pi r^{3/2}}{\sqrt{gR^2}}$
$$\therefore r^{3/2} = \frac{\sqrt{gR^2}}{\omega}$$
$$\therefore r^3 = \frac{gR^2}{\omega^2} \quad \therefore r = \left(\frac{gR^2}{\omega^2}\right)^{1/3}$$

32) **P.E.=-2(K.E.)=** $-3 \times 10^{10} J$

33) $\vec{L} = \vec{r} \times \vec{P} = m(\vec{r} \times \vec{v})$
$= 10 \times 10^{-3} [(4 \vec{i} + 3 \vec{j}) \times 4 \vec{i}]$
$= 10^{-2} [-12 \vec{k}] = -0.12 \vec{k} \text{ Js}$

34) **Diameter = 2A** ∴ **A = 5 cm**

35) **P.E. stored in a spring** $= \frac{1}{2} Kx^2$
where x is the extension or compression. In both cases, work is done on the spring.
∴ **For same x, the same potential energy wiil be stored in the springs.**
∴ **The difference between the energies is zero.**

36) $T = \frac{F}{L}$
Force acting on a single side=2TL
Force acting on the four sides=8TL.

37) $n_{air} = \frac{Va}{\lambda a} = \frac{340}{2} = 170 \text{ Hz}$
There is no change in frequency when they travel in water.

38) $\lambda = \dfrac{v}{n} = \dfrac{660}{330} = \dfrac{1}{2}$ m

$\therefore$ Shortest distance for maximum amplitude [antinode]

is $\dfrac{\lambda}{4} = \dfrac{1}{8}$ m
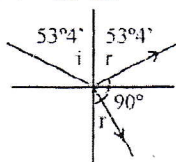
39) $E = \dfrac{3}{2} RT \therefore R = \dfrac{2E}{3T}$

40) $i = r \therefore$ **Angle of reflection $= 53°4$**

and since the reflected and refracted rays are perpendicular

to each other, when the ray is incident at the polarising

angle.

$\therefore 53°4 + 90° + r = 180°$

$\therefore r = 90° - 53°4 = 36°56$

41) $\begin{aligned} X &= X \\ \dfrac{\lambda D}{d} &= \dfrac{\lambda D}{2d} \\ \therefore D &= 2D \end{aligned}$

42) $\dfrac{1}{C} = \dfrac{1}{4} + \dfrac{1}{6} + \dfrac{1}{12} = \dfrac{6}{12}$

$\therefore C = 2\mu F$

$Q = CV = 2 \times 10^{-6} \times 20 = 40\mu C$

Every capacitor has the same charge.

43) $r = R\left[\dfrac{l_1 - l_2}{l_2}\right] = 2\left[\dfrac{50 - 40}{40}\right] = 0.5\Omega$

44) $F = qvB \sin \theta$

$= (1.6 \times 10^{-19}) \times (2.5 \times 10^7) \times 2 \times \sin 30° = 4 \times 10^{-12} N$

45) **Electric field is induced in both AD and BC. Option (d). Induced e.m.f. is produced in AD and BC, as the magnetic field is perpendicular to the sides as well as their velocity.**

46) $hv = hv_0 + eV_S$

$hv_0 = 6.5$ eV and $eV_S = 3$ eV

$\therefore hv = 6.5 + 3 = 9.5$ eV

47) **For the material, $T_{1/2} = 6.93$ h**

$\therefore \lambda = \dfrac{0.693}{6.93} = 0.1$ **hour**

For the decay, $\dfrac{N}{N_0} = e^{-\lambda t} \therefore \dfrac{1}{20} = e^{-\lambda t}$

$\therefore e^{\lambda t} = 20 \therefore \lambda t = \log_e(20) = 3$ **(given)**

$\therefore 0.1 \times t = 3 \therefore t = \dfrac{3}{0.1} = 30$ **hours**

48) **In a pure semiconductor, no. of electrons=no. of holes**

Volume of the semiconductor

$= 10^{-2} \times 10^{-2} \times 10^{-3}$

$= 10^{-7} m^3$

$\therefore$ **No. of holes** $= 10^{-7} \times 6 \times 10^{19} = 6 \times 10^{12}$

49) **The Bohr magneton is the magnetic moment associated with an electron due to its orbital motion in the ground state of the hydrogen atom and its value is given by**

$M_0 = \dfrac{eh}{4\pi m_e} = 9.28 \times 10^{-24} Am^2$

In this case, the mass of the muon = 200 m_e

But its charge = e

$\therefore$ **Its orbital magnetic moment**

$= \dfrac{eh}{4\pi(200m_e)} = \dfrac{9.28 \times 10^{-24}}{200} = 4.64 \times 10^{-26} Am^2$

50) **The frequency of the female voice (pitch) is more than**

that of a male voice.

In this case male voice after modulation sounds like a

female voice in the receiver. This indicates that the

frequency at the receiver end is more than that at the

transmitter end. This happens due to poor bandwidth

selection of the amplifier. In A.M., the bandwidth is

twice the frequency of the modulating signal.

51) **Total no. of orbitals $= n^2$**

53) **(d) is an antibonding π –molecular orbital**

$\therefore$ **Two nodal planes**

56) **Solution is acidic. pH < 7.**

61) **Refer colligative properties.**

62) $P_T = P_X^\circ X_X + P_Y^\circ X_Y$

$X_X =$ **mol fraction of X**

$X_Y =$ **mol traction of Y**

$550 = P_X^\circ\left(\dfrac{1}{1+3}\right) + P_Y^\circ\left(\dfrac{3}{1+3}\right)$

$= \dfrac{P_X^\circ}{4} + \dfrac{3P_Y^\circ}{4}$

$550(4) = P_X^\circ + 3P_Y^\circ ....(1)$

Further 1 mol of Y is added and total pressure increases by 10 mm Hg.

$550 + 10 = P_X^\circ\left(\dfrac{1}{1+4}\right) + P_Y^\circ\left(\dfrac{4}{1+4}\right)$

$560(5) = P_X^\circ + 4P_Y^\circ ....(2)$

By solving (1) and (2). we get

$P_X^\circ = 400mmHg\ P_Y^\circ = 600mmHg$

63) **For spontaneous reaction, $\Delta S > 0$, $\Delta H < 0$ and $\Delta G < 0$.**

64) $\Delta H = \Delta U = \Delta nRT . \Delta n = +\dfrac{1}{2}R = 2cal$

65) **Zn dissolves to give Zn^{2+} ion at anode and Cu^{2+} deposited**

at cathode.

66) $W = ZIt \therefore Z = \dfrac{0.34}{0.5 \times 200}$

67) **It is used as bleaching agent for cotton linen and wood pulp.**

However delicate article like straw, silk, ivory, etc. are not

bleached by bleaching powder.

68) Rn is used in cancer treatment.
69) CeO_2 is used.
70) $\mu = \sqrt{n(n+2)}$ B.M
   Electronic configuration of ion (25)
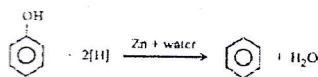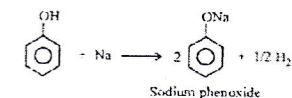 $= 1s^2 2s^2 2p^6 3s^2 3p^6$
   $3d^5 5s^2$
   No. of unpaired electrons (n)=5
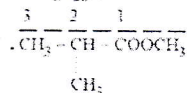 $\mu = \sqrt{5(5+2)} = \sqrt{35} = 5.9$ B.M
71) Alcohols and ethers are functional isomers.
72)

73) Methyl–2–methyl propanoate
   Methyl ester of 2–Methyl propanoic acid

74) Benzaldehyde undergoes Cannizarro"s reaction.
75) Formula of tripeptide contains 2 peptide linkages.
76) General molecular formula of starch.
78) 22400 mL of O_2 at NTP occupied by = 32 g O_2
   112 mL of O_2 at NTP occupied
   $= \dfrac{32}{2400} \times 112 g O_2$
   $= 0.16 g O_2$
82) van der waals' equation is
   $\left(P + \dfrac{a}{V^2}\right)(V - b) = RT$
   $\left[P + \dfrac{2.253}{(0.25)^2}\right](0.25 - 0.0428) = 0.0821 \times 300$
   $\therefore P = 82.82 atm$
88) Normality of 10 volume H_2O_2
   $= \dfrac{\text{Volume strength}}{5.6} = \dfrac{10}{5.6} N$
   Applying normality equation,
   $N_1 V_1 (H_2O_2) = N_2 V_2 (KMnO_4)$
   $\dfrac{10}{5.6} \times V_1 = 2 \times 200$
   or $V_1 = \dfrac{2 \times 200 \times 5.6}{10} = 224 cm^3$
90) $CaCO_3$ is removed from the reaction mixture to produce more NaOH.
93) Refer Bravais lettice
94) Derivation of rate law.
95) Bessemerisation
96) Positions of H_2O .
97) Vinyl chloride on polymerisation gives PVC.
98) Primary amines with nitrous acid evolve nitrogen gas.
99) Hair contain protein.
100) Definition

101) $\cot \theta - \tan \theta = \sec \theta$
   $\cos^2 \theta - \sin^2 \theta = \sin \theta$
   $\Rightarrow 1 - \sin^2 \theta - \sin^2 \theta - \sin \theta = 0$
   $\Rightarrow 2\sin^2 \theta + \sin \theta - 1 = 0$
   $\Rightarrow \sin \theta = -1, 1/2$ but $\sin \theta \neq -1$
   when $\sin \theta = -1, \cos \theta = 0,$
   therefore $\sin \theta = \dfrac{1}{2} = \sin \pi/6$
   $\Rightarrow \theta = n\pi + (-1)^n \pi/6$.
102) Given expression
   $= 1 + 2 \sin x \cos x + K \sin x \cos x - 1 = 0$
   $\Rightarrow K \sin x \cos x = -2 \sin x \cos x$
   $\therefore K = -2$
103) $\tan 4\theta = \dfrac{4 \tan \theta (1 - \tan^2 \theta)}{1 - 6\tan^2 \theta + \tan^4 \theta}$
   $\therefore \dfrac{4 \tan 7\frac{1}{2}^\circ \left(1 - \tan^2 7\frac{1}{2}^\circ\right)}{1 - 6\tan^2 7\frac{1}{2}^\circ + \tan^4 7\frac{1}{2}^\circ}$
   $= \tan\left(4\left(7\frac{1}{2}^\circ\right)\right) = \tan 30^\circ = \dfrac{1}{\sqrt{3}}$.
104) $\sin 4A = \sin(3A + A)$
   $= \sin 3A \cos A + \cos 3A \sin A$
   $= (3 \sin A - 4 \sin^3 A) \cos A$
   $+ (4 \cos^3 A - 3 \cos A) \sin A$
   $= 3 \sin A \cos A - 4 \cos A \sin^3 A$
   $+ 4 \sin A \cos^3 A - 3 \sin A \cos A$
   $= 4 \sin A \cos A (\cos^2 A - \sin^2 A)$
   $\Rightarrow K = 4$
105) In $\triangle ABC$, $A + B + C = 180^\circ$
   $\Rightarrow \sin A + \sin B + \sin C$
   $= 2 \sin \dfrac{A+B}{2} \cos \dfrac{A-B}{2} + 2 \sin \dfrac{C}{2} \cos \dfrac{C}{2}$
   $=$
   $2 \sin\left(\dfrac{\pi}{2} - \dfrac{C}{2}\right) \cos \dfrac{A-B}{2} + 2 \cos \dfrac{C}{2} \sin\left(\dfrac{\pi}{2} - \overline{\dfrac{A+B}{2}}\right)$
   $= 2 \cos \dfrac{C}{2} \cos \dfrac{A-B}{2} + 2 \cos \dfrac{C}{2} \cos \dfrac{A+B}{2}$
   $= 2 \cos \dfrac{C}{2} \left[\cos \dfrac{A-B}{2} + \cos \dfrac{A+B}{2}\right]$
   $= 2 \cos \dfrac{C}{2} \left(2 \cos \dfrac{A}{2} \cos \dfrac{B}{2}\right)$
   $= 4 \cos \dfrac{A}{2} \cos \dfrac{B}{2} \cos \dfrac{C}{2}$
107) The given equations are $3x + 4y - 5 = 0$ ...(i)
   and $4x - 3y - 15 = 0$ ...(ii)
   Since, these lines are perpendicular to each other, so
   $\angle QPR$ is right angle. Also we have $PQ = PR$.
   Therefore, $\triangle PQR$ is a right angle isosceles triangle.
   $\angle PQR = \angle PRQ = 45^\circ$
   Slope of $PQ = -\dfrac{3}{4}$ and slope of $PR = \dfrac{4}{3}$
   Let slope of $QR = m$
   $\therefore \tan 45^\circ = \left|\dfrac{\frac{4}{3} - m}{1 + \frac{4}{3}m}\right|$
   $\Rightarrow m = \dfrac{1}{7}, -7$

108) m_1 = slope of line OA = $-\dfrac{1}{\sqrt{3}}$

m_2 = slope of line OA = $\dfrac{1}{\sqrt{3}}$

$\tan\theta = \left|\dfrac{m_1 - m_2}{1 + m_1 m_2}\right| = \left|\dfrac{-\dfrac{1}{\sqrt{3}} - \dfrac{1}{\sqrt{3}}}{1 + \left(-\dfrac{1}{\sqrt{3}}\right)\left(\dfrac{1}{\sqrt{3}}\right)}\right| = \sqrt{3}$

$\therefore \theta = \dfrac{\pi}{3}$

109) Given equation of parabola is

$y^2 + 8x - 12y + 20 = 0$

$\Rightarrow (y-6)^2 + 8x - 16 = 0$

$\Rightarrow (y-6)^2 = 16 - 8x$

$\Rightarrow (y-6)^2 = -4(2x - 4)$

Let $Y = y - 6$ and $X = 2x - 4$

Also, $Y = 0$ and $X = 0$

$\therefore y - 6 = 0 \Rightarrow y = 6$

and $x - 4 = 0 \Rightarrow x = 2$

$\therefore$ **Vertex is (2,6).**

Focus is (0,6).

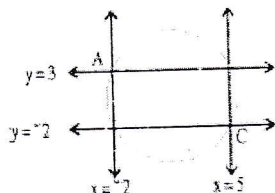**Latusrectum** $= 4 \times 1 = 4$

Axis $X = 4$

110) End points of diameter AC are

A (–2, 3) and C (5,–2).

Equation of circle with AC as diameter is

$(x + 2)(x - 5) + (y - 3)(y + 2) = 0$

$x^2 + y^2 - 3x - y - 16 = 0$

111) $(f \circ g)(-4) = f[g(-4)] = f(3) = 5$.

112) $f(x) = \dfrac{\sin^{-1}(x - 3)}{\sqrt{9 - x^2}}$ **is defined when**

$-1 \leqslant x - 3 \leqslant 1$ and $9 - x^2 > 0$

$\therefore 2 \leqslant x \leqslant 4$ and $9 > x^2$,

i.e, $-3 < x < 3 \Rightarrow x \in [2, 3)$

113) $\because P(E \cap F) = P(E).P(F)$

Now, $P(E \cap F^c) = P(E) - P(E \cap F)$

$= P(E)[1 - P(F)]$

$= P(E).P(F^c)$

and $P(E^c \cap F^c) = 1 - P(E \cup F)$

$= 1 - [P(E) + P(F) - P(E \cap F)]$

$[1 - P(E)][1 - P(F)]$

$= P(E^c)P(F^c)$

Also, $P(E/F) = P(E)$

and $P(E^c / F^c) = P(E^c)$

$\Rightarrow P(E/F) + P(E^c / F^c) = 1$

114) n (impossible event)=0

$\therefore$ p (impossible event)=0

$\therefore$ (3) is correct answer.

118) $\sim(p \vee \sim q) = \sim(\sim p) \wedge \sim(\sim q)$

$= p \wedge q$

119) $\because A^2 - 2A + I = 0$

$\therefore 2A - A^2 = I$

$\therefore A(2I - A) = I = AA^{-1}$

$\therefore A^{-1} = 2I - A = \begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix} - \begin{bmatrix} 1+i & -i \\ i & 1-i \end{bmatrix}$

$= \begin{bmatrix} 1-i & i \\ -i & 1+i \end{bmatrix}$

121) Simplify each term and then use Projection Rule.

122) $\because \cot\theta - \tan\theta = \sec\theta \therefore \dfrac{\cos\theta}{\sin\theta} - \dfrac{\sin\theta}{\cos\theta} = \dfrac{1}{\cos\theta}$

$\therefore \cos^2\theta - \sin^2\theta = \sin\theta$ [$\because \cos\theta \neq 0 \therefore \sin\theta \neq 0$]

$\therefore 1 - 2\sin^2\theta = \sin\theta \therefore 2\sin^2\theta + \sin\theta - 1 = 0$

$\therefore (2\sin\theta - 1)(\sin\theta + 1) = 0$

$\therefore \sin\theta = 1/2 = \sin\pi/6$ **or** $\sin\theta = -1$, **impossible**

(why ?)

$\therefore \theta = n\pi + (-1)^n \cdot (\pi/6)$

123) $L_1 \cup L_2 : 4x^2 - y^2 + 2x + y = 0$

$\therefore (4x^2 - y^2) + (2x + y) = 0$

$\therefore (2x + y)(2x - y) + (2x + y) = 0$

$\therefore (2x + y)(2x - y + 1) = 0$

$\therefore$ we may take

$L_1 : 2x + y = 0, L_2 : 2x - y + 1 = 0$.

124) $L_1 \cup L_2 : 1x^2 + 2hxy - 3y^2 = 0$

$\therefore a = 1, 2h = ?, b = -3$

$\therefore B_1 \cup B_2 : \dfrac{x^2 - y^2}{1 - (-3)} = \dfrac{xy}{h}$

$\therefore hx^2 - 4xy - hy^2 = 0$ ...(1)

If $B_1 : 2x - y = 0$, **i.e.,** $y = 2x$, **then from (1),**

$hx^2 - 4x(2x) - h(2x)^2 = 0$

$\therefore hx^2 - 8x^2 - 4hx^2 = 0$

$\therefore h - 8 - 4h = 0 \therefore -8 = 3h$

$\therefore h = -\dfrac{8}{3}$

125) $\overline{a} \cdot [j \times (2j - 3k)]$

$= \overline{a} \cdot [2(i \times j) - 3(i \times k)]$

$= \overline{a} \cdot [2(\overline{0}) - 3(\hat{i})] = -3(\overline{a} \cdot i)$

$= -3(4) = -12$

126) $\overline{a} \cdot (\overline{c} \times \overline{b}) = \overline{a} \cdot \{-(\overline{b} \times \overline{c})\}$

$= -\{\overline{a} \cdot (\overline{b} \times \overline{c})\}$

$= -3$

127) $\because$ **Line** $\rightarrow (4, 2, k)$

$\therefore (4, 2, k)$ **lies on** $2x - 4y + z = 7$

$\therefore 2(4) - 4(2) + k = 7$

$\therefore k = 7$

128) Note that a plane perpendicular to YOZ–plane is parallel to X–axis.

129) If f is continuous at $x = 1$, then :

$a(1)^2 + b = 4$, i.e., $a + b = 4$

$\therefore$ If f is not continuous at $x = 1$,

then : $a + b \neq 4$

130) $\because f(x) = 4(3^x)$ if $x < 0$

$\therefore f(0) = 4(3^0) = 4(1) = 4$

Also, $\because f(x) = x^2 + 2k + 2$ if $x \geqslant 0$

$\therefore f(0) = 0^2 + 2k + 2 = 2k + 2$

But f is continuous at x = 0.

$\therefore f(0_+) = f(0_-)$

$\therefore 2k + 2 = 4 \therefore 2k = 2 \therefore k = 1$

131) $(a-b\tan y)(a+b\tan x) = a^2 + b^2$

$\therefore a - b.\tan y = \dfrac{a^2 + b^2}{a + b\tan x}$

$\therefore b\tan y = a - \dfrac{a^2 + b^2}{a + b\tan x} = ... = \dfrac{b(a\tan x - b)}{a + b\tan x}$

$\therefore y = \tan^{-1}\left[\dfrac{\tan x - \dfrac{b}{a}}{1 + \dfrac{b}{a}.\tan x}\right] = ...$

132) $y = 3x^2 - 6x ....(1)$

$y' = 6x + 6 ....(2)$

$y'' = 6 ....(3)$

$\therefore x^2 y'' - 2xy' = x^2(6) - 2x(6x + 6)$

$\therefore 6x^2 - 12x^2 - 12x$

$-6x^2 - 12x$

$-2(3x^2 + 6x)$

$= -2(y) ....from(1)$

$\therefore x^2 y'' - 2xy' = -2y$

134) $x = \sqrt{1 + t^2} \quad \therefore x^2 = 1 + t^2 ...(1)$

$\therefore 2x\dfrac{dx}{dt} = 2t \quad \therefore \dfrac{dx}{dt} = v = \dfrac{t}{x}$

$\therefore a = \dfrac{dv}{dt} = \dfrac{x(1) - t(dx/dt)}{x^2} = \dfrac{x - t(t/x)}{x}$

$= \dfrac{x^2 - t^2}{x^3} = \dfrac{1}{x^3} \text{ ... from (1)}$

135) Divide N and D by e^x.

136) $f(x) = \dfrac{1}{1 - x}$

$\therefore (f \circ f)(x) = f[f(x)] = f\left(\dfrac{1}{1 - x}\right)$

$= \dfrac{1}{1 - \dfrac{1}{1 - x}} = \dfrac{1 - x}{-x}$

$\therefore (f \circ f \circ f)(x) = f[[f \circ f)(x)] = f\left(\dfrac{1 - x}{-x}\right)$

$= \dfrac{1}{1 - \left(\dfrac{1 - x}{-x}\right)} = \dfrac{-x}{-1} = x$

$\therefore \int (f \circ f \circ f)(x)dx = \int x\,dx = \dfrac{x^2}{2} + c$
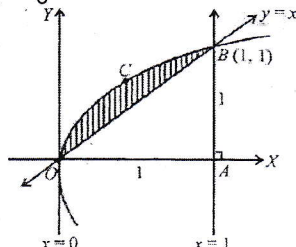
137) $I = -I$

138) $\dfrac{1 - \tan x}{1 + \tan x} = \dfrac{1 - (S/C)}{1 + (S/C)} = \dfrac{C - S}{S + C} = \dfrac{f'}{f}$

139) $A = OABCO - A(\triangle OAB)$

$= \int_0^1 \sqrt{x}\,dx - \dfrac{1}{2}(OA)(OB)$

$= \dfrac{2}{3}[x\sqrt{x}]_0^1 - \dfrac{1}{2}(1)(1)$

$= \dfrac{2}{3} - \dfrac{1}{2} = \dfrac{1}{6}$

140) $A = \int_0^3 (4x + 2)dx = [2x^2 + 2x]_0^3$

$= 2(9) + 2(3) = 24$

141) Highest Term is $(y_2)^3$

order = 2, degree = 3

142) $\dfrac{x}{dx} = \dfrac{y}{dy} \quad \dfrac{dx}{x} = \dfrac{dy}{y}$

$\int \dfrac{1}{x}dx = \int \dfrac{1}{y}dy$

$\log x = \log y + \log c$

$\log x = \log(cy)$

$x = cy$

143) $n = 8, p = 5/100 = 1/20$

$\therefore q = 1 - p = 19/20$

$\therefore P(X \leqslant 2)$

$= p(X = 0) + p(X = 1) + p(X = 2)$

$= {}^8C_0\left(\dfrac{19}{20}\right)^8 + {}^8C_1\left(\dfrac{1}{20}\right)\left(\dfrac{19}{20}\right)^7 + {}^8C_2\left(\dfrac{1}{20}\right)^2\left(\dfrac{19}{20}\right)^6$

$= \left(\dfrac{19}{20}\right)^6\left[(1)\left(\dfrac{19}{20}\right)^2 + (8)\left(\dfrac{1}{20}\right)\left(\dfrac{19}{20}\right) + (28)\left(\dfrac{1}{20}\right)^2\right]$

$= \left(\dfrac{19}{20}\right)^6 . \left[\dfrac{361}{400} + \dfrac{152}{400} + \dfrac{28}{400}\right]$

$= \left(\dfrac{19}{20}\right)^6 . \left[\dfrac{541}{400}\right]$

144) $n = 10, p = \dfrac{1}{2}, q = 1 - p = \dfrac{1}{2}$

$\therefore p(r) = {}^{10}C_r\left(\dfrac{1}{2}\right)^r . \left(\dfrac{1}{2}\right)^{10-r} = \left(\dfrac{1}{2}\right)^{10} . {}^{10}C_r$

$\therefore P(X \geqslant 6) = p(6) + p(7) + p(8) + p(9) + p(10)$

$= \left(\dfrac{1}{2}\right)^{10}({}^{10}C_6 + {}^{10}C_7 + {}^{10}C_8 + {}^{10}C_9 + {}^{10}C_{10})$

$= \dfrac{1}{1024}({}^{10}C_4 + {}^{10}C_3 + {}^{10}C_2 + {}^{10}C_1 + {}^{10}C_0)$

$= \dfrac{1}{1024}(210 + 120 + 45 + 10 + 1)$

$= \dfrac{386}{1024} = \dfrac{193}{512} = 0.3769$

145) $(2, -6, -3) \times (4, 3, -1) = \begin{vmatrix} i & j & k \\ 2 & -6 & -3 \\ 4 & 3 & -2 \end{vmatrix}$

$= (15, -10, 30)$

$= 5(3, -2, 6)$

146) $\because xy = 0$

$\therefore x = 0 \text{ or } y = 0$

$\therefore YZ$–plane or ZY–plane

$\therefore$ a pair of perpendicular planes

147) d.R.s. of the line passing through two points
(x_1, y_1, z_1)
and (x_2, y_2, z_2) are $a = x_2 - x_1, b = y_2 - y_1, z = z_2 - z_1$
and then, equations of the line are
$$\frac{x - x_1}{a} = \frac{y - y_1}{b} = \frac{z - z_1}{c}$$
Here : $L \to (1, 2, 3)$ and $(-3, 4, 3)$
$\therefore$ d.R.s. of L : $-3-1, 4-2, 3-3$
$\therefore : -4, 2, 0$
$\therefore$ dividing by (-2) : $2, -1, 0$
$\therefore a = 2, b = -1, c = 0$
$\therefore$ equations of L, are
$$\frac{x-1}{2} = \frac{y-2}{-1} = \frac{z-3}{0}$$
$$\therefore \frac{x-1}{2} = 2 - y = \frac{z-3}{0}$$

148) Let A = (3, 8, 2). If P is any point on the line
$$\therefore \frac{x-1}{2} = \frac{y-3}{4} = \frac{z-2}{3} = r,$$
then P=(1+2r, 3+4r, 2+3r).
$\therefore$ direction Ratios of line AP are
$(1 + 2r) - 3, (3 + 4r) - 8, (2 + 3r) - 2,$
i.e., $2r - 2, 4r - 5, 3r$.
If line AP is parallel to the plan
$3x + 2y - 2z + 15 = 0$,
then it is perpendicular to its normal with d.R s.
$3, 2, -2$.
$\therefore 3(2r - 2) + 2(4r - 5) - 2(3r) = 0$
$\therefore 6r - 6 + 8r - 10 - 6r = 0$
$\therefore 8r = 16 \therefore r = 2$
$\therefore P = (1 + 2 \times 2, 3 + 4 \times 2, 2 + 3 \times 2) = (5, 11, 8)$
$\therefore AP = \sqrt{\ldots} = 7$

150) Converting cumulative frequencies into simple individual
frequencies, the probability distribution of X is
$$P[(X \leqslant 5)|(X > 3)] = \frac{P[(X \leqslant 5) \cap (X > 3)]}{P(X > 3)}$$
$$= \frac{P(3 < X \leqslant 5)}{P(X > 3)}$$
$$= \frac{P(X = 4 \text{ or } 5)}{P(X = 4 \text{ or } 5 \text{ or } 6)}$$
$$= \frac{0.14 + 0.23}{0.14 + 0.23 + 0.15}$$
$$= \frac{0.37}{0.52} \approx 0.7115$$

x	1	2	3	4	5	6
$P(X = x)$	0.20	0.17	0.11	0.14	0.23	0.15