SID: _____

PUNJAB ENGINEERING COLLEGE (Deemed to be University)

End-term Examination

Programme **Btech** EE
Course Name: Electromagnetic Theory and Quantum Physics
Maximum Marks: 50

Semester: **20-21-2**
Course Code: PY 1201
Time allowed: 2 Hours

NOTE: 1. All questions are compulsory
2. SHOW ALL CALCULATIONS / STEPS

No	Questions	Marks
1	An infinitely long cylindrical dielectric of radius b contains charge within its volume of density $\rho_v = a\rho^2$, where a is a constant. Find the electric field strength, E, both inside and outside the cylinder.	6
2	Two perfect dielectrics have relative permittivities $\varepsilon_{r1} = 2$ and $\varepsilon_{r2} = 8$. The planar interface between them is the surface $x - y + 2z = 5$. The origin lies in region 1. If $\mathbf{E}_1 = 100\mathbf{a}_x + 200\mathbf{a}_y - 50\mathbf{a}_z$ V/m, find $\mathbf{E}_2$.	6
3	Verify the divergence theorem for a vector field $\vec{D} = 3x^2\vec{a_x} + (3y+z)\vec{a_y} + (3z - x)\vec{a_z}$ in the region bounded by the cylinder $x^2 + y^2 = 9$ and the planes x=0, y=0, z=2.	7
4	Assume that $\vec{A} = 50\rho^2 \hat{a}_z$ Wb/m in a certain region of free space. (a) Find $\vec{H}$ and $\vec{B}$. (b) Find $\vec{J}$. (c) Use $\vec{J}$ to find the total current crossing the surface $0 \le \rho \le 1$, $0 \le \varphi < 2\pi$, $z = 0$. (d) Use the value of H_φ at $\rho = 1$ to calculate $\oint \vec{H} \cdot d\vec{L}$ for $\rho = 1$, $z = 0$.	1+1+2+2 =6
5	Let $\mu_{r1} = 2$ in region 1, defined by $2x + 3y - 4z > 1$, while $\mu_{r2} = 5$ in region 2 where $2x + 3y - 4z < 1$. In region 1, $\vec{H}_1 = 50\,\hat{a}_x - 30\,\hat{a}_y + 20\,\hat{a}_z$ A/m. Find (a) $\vec{H}_{N1}$; (b) $\vec{H}_{T1}$; (c) $\vec{H}_{T2}$; (d) $\vec{H}_{N2}$; (e) θ_1, the angle between $\vec{H}_1$ and $\hat{a}_{N21}$; (f) θ_2, the angle $\vec{H}_2$ between and $\hat{a}_{N21}$.	1x 6 =6
6	**(6.1)** The electric field component of a uniform plane wave traveling in seawater $(\sigma = 4\frac{S}{m}, \varepsilon = 81\epsilon_0, \mu = \mu_0)$ is $\vec{E} = 8\,e^{-0.1z}\cos(\omega t - 0.3z)\,\hat{a}_x$ V/m. (b) Determine the average power density. (b) Find the depth at which the power density is reduced by 20 dB.	(3+3)+1 = 7

P.T.O.

	(6.2) Check if $\vec{B}=\frac{10}{\rho}(\cot \omega t - 2\rho)\,\hat{a}_{\varphi}$ is genuine EM field, assume that the field exist in charge free region	
7	(a) An X-ray photon is found to have doubled its wavelength on being scattered by 90°. Find the energy and wavelength of incident photon. (b) Derive time independent Schordinger wave equation.	(3+4) =7
8	(a) Evaluate the first three energy levels (eV) of an electron enclosed in a box of width 10Å. Compare it with those of glass marble of mass 1 gram, contained in a box of width 20 cm. Can these levels of the marble be measured experimentally? (b) What are the main reasons for different properties exhibited by nanoparticles as compared to their bulk counterpart?	(3+2) =5

— End —

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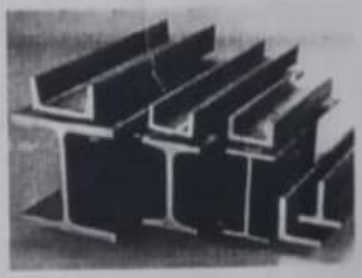
Punjab Engineering College (Deemed University)
End-Term Examination

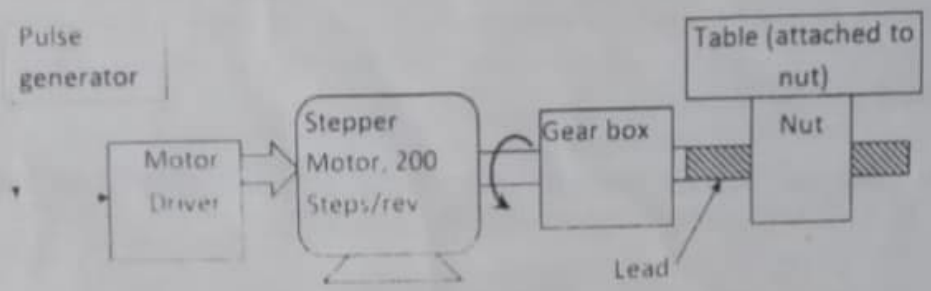
SET B

SID: 2010076
Year Semester: 2021 2nd
Course Code: ES-1501
Time allowed: 2 Hours

Programme: B.Tech.
Course Name: **Introduction to Manufacturing**
Maximum Marks: **60**

Note:
- Assume suitably and state assumptions as required, if any.
- Write your **answers to the points and make proper schematic** (figure) wherever it is necessary.
- Please check question paper & answer sheet for any discrepancy & ensure that paper name/code is correct.
- Use of unfair means, programmable electronic devices or mobiles is not allowed and can invite F grade.

Questions	Marks
Q1 – List the different methods of producing channels shapes as shown in Figure [I, .C, L, T] and explain any one method in detail?	2+4
	
Q2 - Write about the shrinkages in casting and explain how to deal with them?	4
Q3 - Explain any three types of welded joints (with proper sketch)? Discuss the principle of MMAW (manual metal arc welding) with its sketch.	3+3
Q4 – Describe different IOT communication models with suitable examples.	4
Q5 – What is sensor resolution? Differentiate between analog and digital sensor with suitable examples.	1+3
Q6 – Choose a suitable non-traditional process for the following cases:	1x6
a) Cavity sinking and standard Hole Drilling b) Shallow Pocketing c) Process with the lowest metal removal rate d) Coining e) Rifle barrels f) Sharpening of needles	

Q7 – Differentiate between electropolishing and electrochemical machining (with their sketches). Comment on their advantage, limitation and application.	3+3
Q8 – (a) Define BLU in CNC?	
(b) There is a stepper motor rotating at 20 rpm and is connected with a table through gear box, lead screw-nut connection as shown in Fig. 1. The tab e has single axis of motion and is developing a speed of 40 mm/min along that axis due to motor rotation. The stepper motor covers one rotation in 200 steps and moves one step per pulse of the pulse generator. The Basic length unit (BLU) of the drive is?	1+5
 Fig 1	
Q9 – Significance of RAMP ON & RAMP OFF and Tool Cutter Compensation with respect to CNC Programming?	2+2+2
Q10 – What are the different robot configuration? Differentiate each with their proper schematic	1+5
Q11 – Describe the manufacturing process of Aero Engines (starting from its building components to final assembly and quality inspection)	6

$\frac{40\ mm/min}{200 \times 20\ r/min} = \frac{1}{100}$

Punjab Engineering College, Chandigarh
End-Term Examination, 25th August 2021

Programme: B.E (Aero, Metallurgical .Production & Electrical Engineering)
Year/Semester: 2020-21(2nd Sem.)
Course Name: Introduction to Mechatronics **Course Code: ES-3101**
Maximum Marks: 100 **Time allowed: 2.00 Hours**

Notes:

- All questions are compulsory.
- Unless stated otherwise, the symbols have their usual meanings in context with subject. Assume suitably and state, additional data required, if any.
- The candidates, before starting to write the solutions, should check the question paper for any discrepancy, and also ensure that they have been delivered the question paper of right **course code**.

		Marks
1.(a)	Differentiate between open loop and closed loop systems with the help of components used in the temperature control system. Draw and explain with this example.	4+4+5
(b)	Draw self-explanatory diagrams for any four sensors /transducers for measurement of displacement.	3x4=12
2. (a)	A thermocouple equipped for measurement of temperature produced 0.150μV. Design and draw a non-inverting amplifier for signal conditioning arrangement to obtain output of 4.65mV. The value of the input resistor is 1.5 k Ohms.	12
(b)	An intelligent system equipped with OR -gate for coded display for RAM and SHYEN, controlled by input pulse trains of 01011010 at terminal A of the OR-gate. The input pulse train to the terminal B is 0110000.Determine input letter position to output for RAM for '0' input at terminal A and output SHYEN for '1' input at terminal A of the OR- gate. Design and Draw the circuit.	13
3. (a)	Which register of ALU unit is used to identify the result of the function? Show different types of result of the functions for which it is used with its bit position	13
(b)	Draw self-explanatory diagrams for 2 Mechanicals, 2 Electrical and 2 Hydraulic pneumatic actuators. Also, write their working principles.	12
4. (a)	What are functions of robots? Also, write types of motions involved in robotic system?	3+4
(b)	Design with a self-explanatory diagram, equipped with sensors system, mechanism and controller algorithm for logical implementation of the decision for an intelligent dining table system with 03 features only.	3+3+7+5

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PUNJAB ENGINEERING COLLEGE, CHANDIGARH
END-TERM EXAMINATION
August 2021

Programme: **B. Tech(EE)**
Course Name: **Communication Skills & Ethics**
Maximum Marks: **50**

Year/Semester: **2021/20212**
Course Code: **HS1101**
Time allowed: **2:00Hours**

Notes:

- All questions arecompulsory.
- The candidates, before starting to write the solutions, should please check the question paper for any discrepancy and also ensure that they have been delivered the question paper of the right coursecode.

Q. No.	Questions	Marks
1.	How do you define interviewing skills? What are the important components we need to focus on a job interview?(Word Limit: 250)	11
2.	Write an essay based on the analysis and interpretation of the pictures given below by establishing interconnection between the pictures. Describe a title to the essay. (Word Limit: 300) Pic1 Village Life  Pic2 City Life 	12
3.	Read the following article and answer the questions that follow by marking a Tick against one of the four choices given below each question: The phrase "What is it like ?" stands for a fundamental thought process. Howdoes one go about observing and reporting on things and events that occupy segmentsof earth space ? Of all the infinite variety of phenomena on the face of the earth, how doesone decide what phenomena to observe ? There is no such thing as a complete descriptionof the earth or any part of it, for every microscopic point on the earth's surface differs fromevery other such point. Experience shows that the things observed are already familiar,because they are like phenomena that occur at home or because they resemble the abstractimages and models developed in the human mind. How are abstract images formed? Humans alone among the animals possesslanguage; their words symbolize not only specific things but also mental images of classesof things. People can remember what they have seen or experienced because they attach aword symbol to them.During the long record of our efforts to gain more and more knowledge about theface of the earth as the human habitat, there has been a continuing interplay between thingsand events. The direct observation through the senses is described as a percept; the mentalimage is described as a concept. Percepts are what some people describe as reality, incontrast to mental images, which are theoretical, implying that they are not real. The relation of Percept to Concept is not as simple as the definition implies. It is nowquite clear that people of different cultures or even individuals in the same culture developdifferent mental images of reality and what they perceive is a reflection of thesepreconceptions. The direct observation of things and events on the face of the earth is soclearly a function of the mental images of the mind of the observer that the whole idea ofreality must be reconsidered.Concepts determine what the observer perceives, yet concepts are derived from thegeneralizations of previous percepts. What happens is that the educated observer is taughtto accept a set of concepts and then sharpens or changes these concepts during aprofessional career. In any one field of scholarship, professional opinion at one timedetermines what concepts and procedures are acceptable, and these form a kind of model ofscholarly behaviour.	12

1.The problem raised in the passage reflects on
(A) thought process
(B) human behaviour
(C) cultural perceptions
(D) professional opinion

2.According to the passage, human beings have mostly in mind
(A) Observation of things
(B) Preparation of mental images
(C) Expression through language
(D) To gain knowledge

3.Concept means
(A) A mental image
(B) A reality
(C) An idea expressed in language form
(D) All the above

4.The relation of Percept to Concept is
(A) Positive
(B) Negative
(C) Reflective
(D) Absolute

5. In the passage, the earth is taken as
(A) The Globe
(B) The Human Habitat
(C) A Celestial Body
(D) A Planet

06. Percept means
(A) Direct observation through the senses
(B) A conceived idea
(C) Ends of a spectrum
(D) An abstract image

4	Highlight the stages of Kohlberg's theory of moral development. List the two objectives of business ethics.	5 1
5	a. Differentiate between (i) Eustress and Distress. (ii) Empathy and Sympathy b. Summarize the Pickle jar theory c. Define Emotional Intelligence and Social Intelligence.	2 + 2 3 2

Punjab Engineering College (Deemed to be University), CHANDIGARH
End Term Examination (20212)

Programme: B.E. (Electrical, Metallurgical &Production)
Course Name: Probability and Statistics
Maximum Marks: 50

Year/Semester: 20212
Course Code: MA1301
Time allowed: 2 hrs

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NOTES:

- All questions are compulsory
- The candidates before starting to write the solutions, should please check the question paper for any discrepancy and also ensure that they have been delivered the question paper of right course code.

Q.No.	Questions	Marks
Q 1	A shipment of 7 television sets contains 2 defective sets. A hotel makes a random purchase of 3 of the sets. If X is the number of defective sets purchased by the hotel, find the probability distribution of X. Also find the mean and variance of X.	4
Q2	A Tea company produces blends of tea with each blend containing various proportions of Kangra, Aasam and other teas. The proportion of Kangraand Aasam in a blend are random variables X and Y respectively with the joint density function $f(x,y)=\begin{cases}24xy, & 0\le x\le 1 \ , \ 0\le y\le 1 \ , \ x+y\le 1\\ 0, & elsewhere\end{cases}$ a) Find the probability that in a given box the Kangra tea accounts for over half the blend. b) Find the probability that the proportion of Kangra tea is less than 1/8 if it is known that the blend contains 3/4 Aasam tea.	4
Q3	Consider a random variable X with density function $f(x)=\begin{cases}\frac{1}{5}, & 0\le x\le 5\\ 0 \ elsewhere,\end{cases}$ a) Find the mean and variance of X. b) Demonstrate that Chebyshev's theorem holds for $k=3$.	4
Q4	According to a study published by a group of University of Massachusetts sociologists, approximately 60% of the Valium users in the state of Massachusetts first took Valium for psychological problems. Find the probability that among the next 8 users from this state who are interviewed, (a) exactly 3 began taking Valium for psychological problems. (b) at least 5 began taking Valium for problems that were not psychological.	4
Q 5	The heights of 1000 students are normally distributed with a mean of 174.5 centimeters and a standard deviation of 6.9 centimeters. Assuming that the heights are recorded to the nearest half-centimeter, how many of these students you would expect to have heights (a) less than 160.0 centimeters. (b) equal to 175.0 centimeters.	4
Q6	Find the moment generating function of X, if X is a random variable having Chi-squared distribution.	4
Q7	A local company manufactures telephone wire. The average length of wire is 52 inches with a standard deviation of 6.5 inches. At most, what percentage of the telephone wire from this company exceeds 71.5 inches? Assume that the distribution is symmetric about the mean.	5

Q 8	A new rocket-launching system is being considered for deployment of small, short-range rockets. The existing system has p = 0.8 as the probability of a successful launch. A sample of 40 experimental launches is made with the new system and 34 are successful. What can we assert with 95% confidence about the possible size of our error if we estimate the proportion of successful launches to be 0.85? How large a sample is needed if we wish to be 95% confident that our sample proportion will be within 0.02 of true proportion?	5
Q 9	The IQ's of 16 students from one area of a city showed a mean of 107 and a standard deviation of 10, while the IQ's of 14 students from another area of the city showed a mean of 112 and a standard deviation of 8. Is there a significant difference between the IQ's of two groups at 1% and 5% level of significance?	5
Q 10	In the publication Relief from Arthritis published by Thorsons Publishers, Ltd., John E. Croft claims that over 40% of those who suffer from osteoarthritis receive measurable relief from an ingredient produced by a particular species of mussel found off the coast of New Zealand. To test this claim, the mussel extract is to be given to a group of 7 osteoarthritis patients. If 3 or more of the patients receive relief, we shall not reject the null hypothesis that $p = 0.4$; otherwise, we conclude that $p < 0.4$. (a) Evaluate α assuming that $p = 0.4$. (b) Evaluate β for the alternative $p = 0.3$.	6
Q 11	Past experience indicates that the time required for high school seniors to complete a standardized test is a normal random variable with a mean of 35 minutes. If a random sample of 20 high school seniors took an average of 33.1 minutes to complete this test with a standard deviation of 4.3 minutes, test the hypothesis at the 0.05 level of significance that $\mu = 35$ minutes against the alternative that $\mu < 35$ minutes.	5

Statistical Values:

$\sum_{x=0}^{6} p(x;12) = 0.0458,\ \sum_{x=0}^{7} p(x;12) = 0.0895,\ \sum_{x=0}^{8} p(x;10) = 0.3328,\ \sum_{x=0}^{5} p(x;10) = 0.0671$

$\sum_{x=0}^{3} b(x;8,0.6) = 0.1737,\ \sum_{x=0}^{2} b(x;8,0.6) = 0.0498,\ \sum_{x=0}^{4} b(x;8,0.6) = 0.4059.$

$\sum_{x=0}^{2} b(x;7,0.4) = 0.4199,\quad \sum_{x=0}^{2} b(x;7,0.3) = 0.6471,\ \sum_{x=0}^{10} b(x;12,0.7) = 0.9150$

$\sum_{x=0}^{11} b(x;12,0.7) = 0.9862,\quad \sum_{x=0}^{12} b(x;12,0.9) = 1,\ \sum_{x=0}^{10} b(x;12,0.9) = 0.3410$

$z_{0.9821} = -2.1, z_{0.9265} = -1.45, z_{0.8264} = 0.94, z_{0.05} = 1.645, z_{0.0351} = 1.81, z_{0.025} = 1.96,$

$z_{0.0192} = 2.07, z_{0.0179} = 2.1, z_{0.01} = 2.33, z_{0.005} = 2.58,$

$t_{025,4} = 2.776, t_{05,4} = 2.132, t_{05,5} = 2.015, t_{025,5} = 2.571, t_{0.01,8} = 2.896,$

$t_{0.005,8} = 3.355,\ t_{005,10} = 2.28, t_{01,28} = 2.4, t_{005,28} = 2.76,\ t_{025,28} = 2.05, t_{05,28} = 1.7$

$t_{0.005} = 3.25(v = 9), t_{0.01} = 2.821(v = 9), t_{0.05} = 1.729(v = 19), t_{0.025} = 2.093(v = 19)$

The following table gives the values of $F(z) = \int_{-\infty}^{z} \frac{1}{\sqrt{2\pi}} e^{-\frac{z^2}{2}} dz$

z	−1.91	−2.085	−1.391	−.657	.0571	.77	1.485	1.83	1.04	.6	−1.8	1.4
$F(z)$	.0281	.0185	.0853	.2562	.5219	.7794	.9312	.9664	.8508	.7257	.0359	.9192
z	1.5	−2.17	−2.41	−1.15	2.02	0.75	1.65	−1.64	0.11	0.04	−2.14	1
$F(z)$	.9332	.0150	.0080	.1251	.9783	.7734	.9505	.0505	.5438	.5160	.0162	.8413

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Punjab Engineering College (Deemed to be university)

End-Term Examination

Programme: B.Tech.(Aero, Prod, Metta, Electrical) **Year/Semester: 20212/2nd sem**

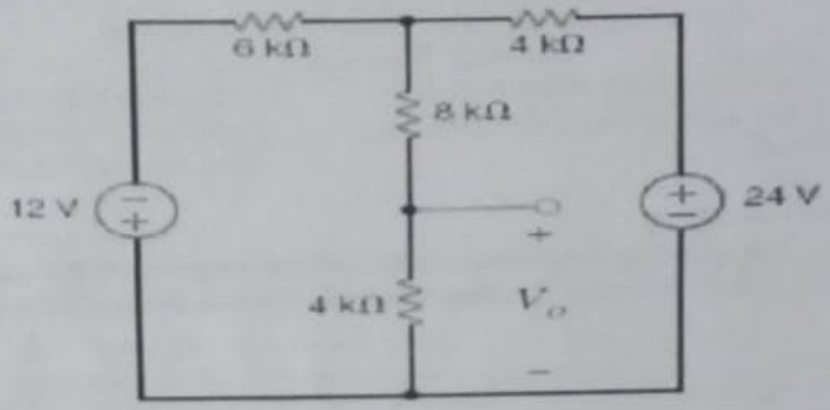
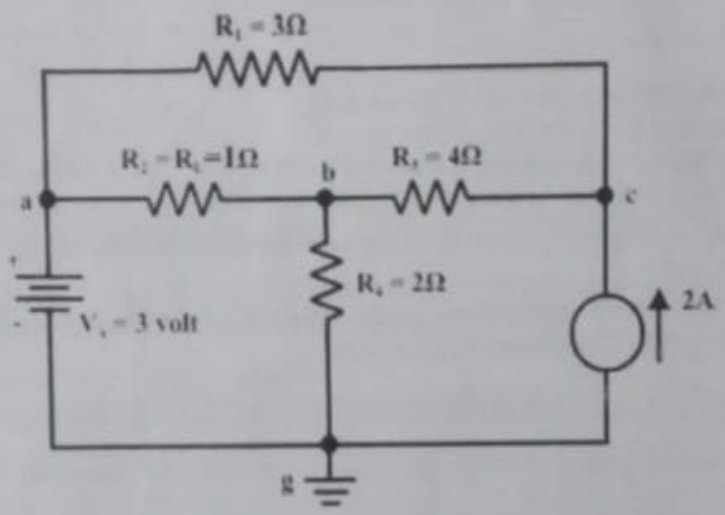
Course Name: Intro. to Electronics & Electrical Engg. **Course Code: ES1401**

Maximum Marks: 50 **Time Allowed: 2 Hours**

Notes:

- **All Questions are compulsory.**
- **The candidates, before starting to write the solutions, should please check the question paper for any discrepancy and also ensure that they have been delivered the question paper of right course code.**

Sr. No.		Question	Marks
1.	(a)	Explain the concept of Enhancement and Depletion type MOSFET along with their drain and transfer characteristics. Also, explain the term "Pinch off voltage"?	4
	(b)	Design Low pass and high pass filter using an OPAMP.	3
	(c)	For a BJT: (a) Given α=0.998, determine IC if IE = 4 mA. (b) Determine α if IE=2.8 mA and IB = 20 μA. (c) Find IE if IB =40 μA and α is 0.98.	3
	(d)	What is a Clamper circuit? list some of the applications where these circuits are used?	2
2.	(a)	Draw the logic circuit represented by the equation $Y = \overline{A} + \overline{B} + \overline{C}$. For what input combinations, output will be high?	2
	(b)	Draw the logic diagram of clocked RS flip flop. Write its truth table also.	2
	(c)	Draw the logic diagram of an adder circuit that can add two four bit numbers.	2
	(d)	Name and define any two ADC specifications.	2
	(e)	What is serial in parallel out shift register?	1
3.	(a)	What are the pros and cons of Amplitude and Angle Modulation Techniques?	2
	(b)	A modulating signal m(t)= 2cos(2π×10^3t) is an amplitude modulated with a carrier signal c(t)=5cos(2π×10^6t). Write the expression of amplitude modulated wave. What would be the frequency of upper and lower side band.	2
	(c)	A sinusoidal modulating waveform of amplitude 4V and a frequency of 5 KHz is applied to FM generator, which has a frequency sensitivity of 30 Hz/volt. Calculate the frequency deviation, modulation index, and bandwidth.	2

4.	(a)	Use the mesh analysis to find V_o in the following circuit. 	3
	(b)	For the circuit shown in fig, find the current through $R_L = R_2 = 1\Omega$ resistor ($I_{a\text{-}b}$ branch) using Thevenin's theorem & hence calculate the voltage across the current source (V_{cg}). 	4
	(c)	What is Back EMF? Explain significance of Back EMF?	3
	(d)	Derive EMF Equation of Transformer.	3
	(e)	What are advantages and uses of synchronous motor?	1
5.	(a)	Define Precision, Sensitivity and resolution for a measurement of a system?	3
	(b)	What is Energy meter? In this context discuss the Electrolytic motor and motor meter.	3
	(c)	Write down the difference between Analog instruments and digital instruments. How many types of induction meter are available in the market?	3