UNIVERSITY OF PUNE

[4363]-207

T. E. (Printing), Examination - 2013

Statistical Process Control

(2008 Pattern)

[Total No. of Questions : 6] **[Total No. of Printed Pages :3]**

[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

(1) All questions are compulsory.

(2) Assume suitable data, if necessary.

*(3) Answers to the **two sections** should be written in **separate answer-books**.*

(4) Neat diagram must be drawn wherever necessary.

(5) Black figures to the right indicate full marks.

SECTION-I

Q1.

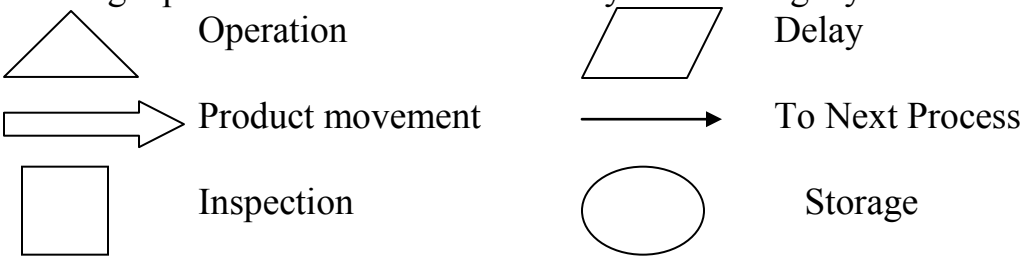
a) Explain the 'Ishikawa' tool used in SPC along with its application, advantages and limitations if any. [8]

b) Explain the concept Quality and the role of SPC in achieving the quality with suitable examples. [8]

OR

Q1.

a) With following symbols, prepare a flowchart for the process of 'Book Binding Operation' with reference to any one binding style. [16]



Q2. Explain the role of Histogram in SPC with suitable examples, and explain the different shapes of Histogram [16]

OR

Q2. From the given data, arrange the data, prepare frequency distribution table and draw the Histogram on the Graph paper. [16]

4.522	4.510	4.555	4.534	4.550	4.528
4.544	4.535	4.539	4.517	4.553	4.518
4.536	4.526	4.546	4.542	4.525	4.537
4.526	4.536	4.530	4.540	4.531	4.532
4.529	4.538	4.535	4.533	4.520	4.543
4.538	4.518	4.525	4.524	4.535	

Note: From G Chart, the recommended number of groups should be 7 for number of measurements between 30 to 40.

Q3. Explain the concept 'Process Variation'. And also types of variations with diagram and suitable examples. [18]

OR

Q3. Explain how process distribution curve helps in investigating the process problems with the help of suitable examples and diagrams [18]

SECTION-II

Q4.

a) Prepare X- MR chart from the given data on graph paper [12]

Sample No.	1	2	3	4	5	6	7	8	9	10
Measurement	.751	.747	.752	.750	.751	.750	.748	.749	.750	.752

Note: take fractional values up to four digits

Use n=2

Shewhart's Constants: E_2=2.659

D_3=0

D_4=3.267

b) What is X-MR Chart? And where it is applicable? [4]

OR

Q4.

a) The specification limits are 0.520 to 0.530. Twenty pairs of measurements are given in order by column in the following table. Set up the precontrol chart and analyze each sample pair. [16]
   1) Indicate the zone for each measurement used
   2) Indicate when the B measurement is not needed
   3) Indicate your decision after each measurement or pair to let the process run or to report trouble.

A	B	A	B	A	B
0.531	0.532	0.528	0.530	0.531	0.530
0.530	0.532	0.527	0.527	0.536	0.532
0.529	0.528	0.529	0.530	0.532	0.531
0.532	0.531	0.531	0.530	0.533	0.526
0.530	0.531	0.530	0.529	0.529	0.528
0.527	0.529	0.530	0.529	0.529	0.530
0.531	0.531	0.534	0.533		

Q5. The seven production lines in a company had the following number of defects last month. Make a pareto chart and the cumulative percentage graph. [16]

Line	Number of Defects
1	100
2	350
3	45
4	855
5	920
6	170
7	60

OR

Q5. Comment on the following, [16]

a) Process flow chart
b) Interactive Plots

Q6.

a) If specification limits are 0.01 to 0.02 and SD=0.00191. find out Cp and comment on the same with suitable diagram [9]
b) If specification limits are 850 to 950 and X bar=907 and SD=15.92. Calculate Cpk and comment on the same view suitable diagram. [9]

OR

Q6. Explain in role of DOE in Process Improvement as well as Research & Development with suitable example with reference to printing industry. [18]

UNIVERSITY OF PUNE

[4363]-202

F. E. (Semester - I) Examination - 2009

PRINTING NETWORK TECHNOLOGY AND OPTO ELECTRONICS

(June 2008 Pattern)

Total No. of Questions : 12 **[Total No. of Printed Pages :4]**

[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

*(1) Answer **any three** questions from each section.*

*(2) Answers to the **two sections** should be written in **separate answer-books**.*

(3) Black figures to the right indicate full marks.

(4) Neat diagrams must be drawn wherever necessary.

(5) Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.

(6) Assume suitable data, if necessary.

SECTION-1

Q. 1. A) Explain necessity of modulation. Explain frequency modulation with a suitable diagram. (10)

Q. 1. B) What is pulse modulation? Explain pulse amplitude modulation (PAM) with a suitable diagram. (8)

OR

Q.2. A) Explain data encryption and decryption with neat diagrams. (10)

Q.2.B) Explain quantization and its different types. (8)

Q.3.A)Explain all types of fiber optic cable with neat diagrams. (12)

Q.3.B)Explain working principle of fiber optic cable with a neat diagram. (4)

OR

Q.4.A) Explain any four losses taking place in optical fiber communication. (8)

Q.4.B) Draw and explain block diagram of a basic optical communication system. (8)

Q.5.A) Explain Wi-Fi technology with suitable diagram. (10)

Q.5.B) Explain working of RFID technology with suitable diagram. (6)

OR

Q.6.A) Explain different types of RFID tags with diagrams. Explain Reader to talk first tag and Tag to talk first RFID technology. (10)

Q.6.B) Explain any one applications of RFID. (6)

SECTION-2

Q.7. A) What is operating system? Explain different types of operating systems. (10)

Q.7.B) Explain directory structure of UNIX. (8)

OR

Q. 8. A) Explain following Linux commands (8)

1) mv

2) cp

3) grep

4) head

Q.8.B) Explain different types features of MAC operating system and window operating system. (10)

Q.9.A) Explain different types of computer networks and their network topologies. (10)

Q. 9. B) Explain Hyper text transfer protocol (HTTP) in detail. (6)

OR

Q. 10. A) Explain working of TCP/IP reference model with diagram. (8)

Q. 10. B) Explain file transfer protocol (FTP) in detail. (8)

Q. 11. A) Write short notes on following internetworking devices (Any two) (8)

1) Repeaters

2) Hubs

3) Gateways

Q.11.B) Explain what is ISDN. (8)

OR

Q. 12. A) What is Modem? Explain different types of modem. (8)

Q. 12. B) Explain VOIP and VPN with suitable diagram. (8)

UNIVERSITY OF PUNE

[4363]-204

T. E.(Printing) Examination May– 2013

DESIGN OF PRINTING MACHINE COMPONENTS

(2008 Course)

Total No. Of Questions: 12 **[Total No. Of Printed Pages: 3]**

[Time: 3 Hours] **[Max. Marks: 100]**

*(1) Answer **three questions** from each section.*
(3) Figures to the right indicate full marks.
(5) Use of calculator is allowed.
(6) Assume suitable data, if necessary.

SECTION-1

Q. 1. A) Explain the short the factors to be considered while selecting Material. (8)

B) A belt pulley is keyed to the shaft, midway between the supporting Bearing kept at 1000mm apart. The shaft transmits 29kw power at 400rpm pulley has 400mm dia. Angle of wrap of belt on pulley is 180˚ and belt tension acts vertically downwards. The ratio of belt Tensions=2.5 (10)

The shaft is made of steel having ultimate tensile stress and yield stress Of 400MPa and 240MPa respectively use ASME code to design the Dia. Of shaft with combined fatigue and shock factors in bending as 1.5 and 1.25 respectively.

OR

Q. 2. A) State and explain the significance of the following: (8)

i. Factor of Safety
ii. Service Factor

B) Explain the term 'Creativity' in design (4)

C) Explain the step by step procedure of design of shaft on the basis of ASME code procedure. (6)

Q.3. A) What is the importance of limits, fits in the machine elements. What (8)

Are different of tolerances. Show how to give such tolerance of machine Elements.

B) Draw the sketch knuckle joint. Also design the knuckle joint to carry Axial tension of 1000N. The permissible tensile and shear stress for Knuckle joint are 80MPa & 40MPa respectively. The permissible stress For knuckle pin are 110MPa & 55MPa. (8)

OR

Q. 4. A) State the procedure of designing a shaft as per the following approach. (8)

i. Equivalent bending moments approach.
ii. Rigidity approach.

B) Design a cotter joint to transmit a load of 90KN in tension compression. Assume the following stress for sockets, spigot cotter. (8)

Allowable tensile stress=90MPa
Allowable crushing stress=120MPa.
Allowable shear stress=60MPa

Q. 5. A) What are important consideration in selection of material is design? (8)

B) What is the difference between properties of brittle and ductile in Material. State at least two engineering applications of brittle and Ductile material. (8)

OR

Q. 6. A) Explain the procedure of selecting a type of fit using atleast three examples. (8)

B) Compare bolted with welded joints. (4)

C) What are different methods to make bolt uniform strength. (4)

SECTION-2

Q. 7. A) Explain the important factors in selecting a type of fit using atleast Three examples (6)

B) Design a clamp coupling to transmit 30kW at 100 rpm. The allowable Shear stress and crushing stress for the shaft and key is 34N/mm^2 and 70N/mm^2 and the Number of bolts connecting the two halves are size. The permissibe Tensile stress for the bolts is 70N/mm^2. The coefficient of (10)

friction between the muff and shaft surface may be taken as 0.3 for cast iron allowable shear stress may be taken as 15N/mm$^{2.}$

Q. 8. A) A square is equally strong in crushing and shear. Derive the relation between the stresses. (6)

B) Design and draw a flange coupling for a steel shaft transmitting 15kW at 200rpm and having allowable shear stress of 40MPa. Shearing in bolts should nor exceed 30MPa. Assume that same material is used for shaft and key and a crushing stress is twice the value of Shearing stress. Maximum torque is 25% greater than full load torque. The shear stress for cast iron is 14MPa (10)

Q. 9. A) Prove that maximum efficiency of square threaded screw can be given by $\eta_{max} = (1-\sin\theta)/1+\sin\theta$ Where θ is pressure angle. (10)

B) What are the different types of stresses induced on power screw (6)

OR

Q. 10. A) Derive the relation for torque required to rise load on square Threaded screw. (10)

B) An electric motor driven power screw moves a nut in a horizontal Plane against a find of 75kN, at a speed of 30cm/min. the screw is A single square threaded of 6mm pitch and has a major diameter of 40mm. It the coefficient at screw thread is 0.1 estimate power of Motor. (6)

Q. 11. A) Derive the load –stress equation of Helical spring. (10)

B) Design a helical compression spring for a maximum load of 1200N For a deflection of 25mm using value of spring index as 5. Assume Maximum permissible shear stress for spring material as 400MPa. Modulus of rigidity can be assumed as 85GN/m$^{2.}$ (8)

OR

Q. 12. A) Derive relation for deflection of Helical spring. (8)

B) Design a spring for balance to measure 0 to 1000N over a scale of Length 80mm. the spring is to be enclosed in a casing of 25mm diameter. The approximate number of turns is 30. The modulus of rigidity 85kN/mm^2. Also calculate the maximum shear stress induced. (10)

[Total No. of Questions: *12*] **[Total No. of Printed Pages:** *3*]

UNIVERSITY OF PUNE

[4363]-208

T. E. (*Printing*) Examination - 2013

Digital Workflow& Image Setting

(2008 Course)(308288)

[Time: *3* **Hours]** **[Max. Marks: 100]**

Instructions:

1 *All Questions are compulsory*

2 *Draw diagrams must be drawn wherever necessary.*

SECTION -I

Q.1	A	What is workflow? What is difference between workflow and jobflow? Give example of each.	16
	B	Draw a workflow for complete magazine work and also explain the same.	

OR

Q.1	A	What is the difference between conventional and digital workflow. State merits of digital over conventional workflow.	16
	B	Draw the workflow for news paper work and explain the same.	

Q. 2	A	What is job ticket? Write in details its purpose and need.	16
	B	What is job archiving? Explain in details. State any case where job archiving is very significant.	

OR

Q. 2	A	Write short notes on:	16
		i) Pre-flight checking	
		ii) Trapping	
	B	Explain the following :	
		i) Imposition: conventional Vs Digital	
		ii) Apr and OPI server	
Q. 3	A	Explain the following modules:	18
		i) Management module	
		ii) Production module	
	B	What is JDF? What are its feature and advantages?	

OR

Q. 3	A	Explain the following:	18
		i) Job administration module	
		ii) Job archiving module	
	B	How is PDF file said to make the workflow more efficient? Explain in details.	

SECTION II

Q. 4		Write notes on:	16
		i) Font emulation	
		ii) PJTF	
		iii) Image setter resolution	
		iv) Postscript as a output format	

OR

Q. 4		What are the different types of PDF exclusive for printing? Explain in details.	16

Q. 5	Explain with neat workflow diagram fundamental steps and elements of digital image processing.	18

OR

Q. 5	Explain in details types of lossless image compression.	18
Q. 6	What are the different types of proofs? Which type of proof is termed as contract proof? Why it is termed so?	16

OR

Q. 6	Explain any type of digital proofing technology with neat principle diagram of working.	16

UNIVERSITY OF PUNE

[4363]-201

T. E. PRINTING Examination - 2013

OFFSET MACHINES - I

(2008 course)

[Total No. of Questions:12] **[Total No. of Printed pages :3]**

[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

*(1) Answer **any three** questions from each section.*
*(2) Answers to the **two sections** should be written in **separate answer-books**.*
(3) Black figures to the right indicate full marks.
(4) Neat diagrams must be drawn wherever necessary.
(5) Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.
(6) Assume suitable data, if necessary.

SECTION I

Q. 1.A] Explain cylinder undercut and bearers drawing neat diagram of cylinder body. [8]

B] Explain with help of near diagram perfecting type design of offset machine [8]

OR

Q.1. Explain the following [16]

A] State packing materials used for plate and blanket cylinder.

B] Explain compressible blanket construction. What is weft and warp direction.

Q.2. A] Explain the steps involved in any CTP platemaking procedure [8]

B] Explain in detail the effects of exposure and development on image reproduction on P.S. platemaking [8]

OR

Q.2 A] Explain factors considered for preparing a layout while taking for print. [8]

B] What is the importance of silver halide in platemaking. Compare CTP and CTCP [8]

Q.3 A] Explain multiroller inking unit [9]

B] Rollers in inking unit have varying diameters. Explain . [5]

C] Explain roller pressure setting by strip method [4]

OR

Q.3 A] Compare EB and UV inks used for sheet fed offset. [9]

B] How does ink dry in offset [9]

SECTION II

Q.4 Explain : [18]

A] Ceramic coated and chrome plated rollers for dampening

B] Explain relation of conductivity and concentration of F.S.

OR

Q.4 A] 1. Explain plate feed dampening system [5]

2. What is the role of alcohol in dampening solution ? [4]

B] What is hot weather scumming and constant operating temperature for dampening systems [9]

Q.5 State working of following: [16]

A] Sheet separation unit

B] No sheet and double detectors

OR

Q.5 A] Why is swing gripper more preferred in offset presses. Explain working. [8]

B] Explain the following: [8]

1. Side lay pull type
2. Front lays from above

Q.6 A] State the make-ready arrangement for a 4 colour job on a 2- colour machine. [8]

B] State method for preparing new blanket [8]

OR

Q.6 Write short notes on: [16]

1. Color control bar
2. Grey balance
3. Star target
4. Register marks

UNIVERSITY OF PUNE

[4363]-203

T. E. (Printing) Examination - 2013

COLOR MANAGEMENT & STANDARDIZATION

(2008 Pattern)

[Total No. of Questions:6] **[Total No. of Printed Pages :2]**

[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

*(1) Answers to the **two sections** should be written in **separate answer-books**.*

(2) Black figures to the right indicate full marks.

(3) Neat diagrams must be drawn wherever necessary.

SECTION-I

Q1 Answer any two [18]

a) Explain the visible spectrum of Electromagnetic spectrum.

b) Draw the spectral graph of Red, Green and Blue by considering ink impurities.

c) Process colors cyan, magenta and yellow are used for printing instead of Red, Green and Blue. Explain this with reflection and absorption of color.

Q2 Solve any two [16]

a) Explain and draw the graph of human eye sensitivity for Red, Green and Blue cones.

b) Explain human vision mechanism with neat diagram.

c) Draw and explain the spectral power distribution graph for D65, D50, C and F12 illuminant.

Q3 Answer any four [16]

a) Natural color system.

b) Draw spectral graph of xbar, ybar and zbar for 2°observer.

c) Calculate chromaticity co-ordinates for D65 and C Illuminants.

d) Write down the Colour Temperature for following Illumimnat D65, D50, C Illuminant, A Illuminant.

e) Explain hue, lightness and chroma of colour.

f) Explain CIE xy Y color system.

SECTION II

Q4 Answer any two [16]

a) Differentiate Densitometer and spectrophotometer.

b) Explain the color difference equation based on Just-Perceptible-Difference Data.

c) Explain Perceptibility and Acceptability used for color difference measurement.

Q5 Answer any two [16]

a) What are different rendering intent, why they need to consider while making profile.

b) Explain Monitor calibration and monitor profiling.

c) How to apply input, output and display profile from photo shop software.

Q6 short note on any four [18]

a) Four C's of colour management

b) Test chart used for profiling.

c) Quality control aids used for color reproduction.

d) Device dependent and Device independent workflow.

e) Types of profiles.

UNIVERSITY OF PUNE

[4363]-205

T. E. (PRINTING) Examination - 2013
MANAGEMENT INFORMATION SYSTEM AND COST ESTIMATION
(2008 Pattern)

[Time : 3 Hours] **[Max. Marks : 100]**
[Total No. of Questions : 06] **[Total No. of Printed Pages :2]**

Instructions :

(1) All question are compulsory.
(2) Assume suitable data, if necessary.
*(3) Answers to the **two sections** should be written in **separate answer-books**.*
(4) Neat diagrams must be drawn wherever necessary.
(5) Black figures to the right indicate full marks

SECTION I

Q1) List down the various types of business organizations and explain Joint stock co. in detail. [16]

OR

Q1) Explain any 4 elements of Competitive Environment with suitable example. [16]

Q2) What is MIS. What is the difference between traditional and today's method of MIS? Explain in brief with suitable examples. [16]

OR

Q2) Explain Heidelberg Prinect in detail. [16]

Q3) Explain various models of decision support system with suitable examples. [18]

OR

Q3) Example the process of decision making n detail and also explain types of decisions with suitable examples. [18]

SECTION II

Q4) Explain various techniques of Information Security in detail with suitable examples. [16]

OR

Q4) Differentiate between Data Warehousing and Data Mining with suitable examples. [16]

Q5) Explain different function of Cost Accounting in detail with suitable examples. [16]

OR

Q5) Explain various functions and purposes of Costing with suitable examples. [16]

OR

Q6) Explain various steps of preparing the estimate for the job by considering assumptions. [18]

OR

Q6) Explain in detail with suitable example the various things to be known by an Estimator. [18]

UNIVERSITY OF PUNE
[4363]-206
T. E. Printing Examination – 2013
OFFSET MACHINES –II (COURSE 2008)

[Total No. of Questions:6] **[Total No. Printed Pages: 2]**
[Time: 3 Hours] **[Max. Marks: 100]**

Instructions :

1) All questions are compulsory
2) Answers to two sections should be written in separate books.

SECTION - I

Q.1) Explain the following [16]
1) Describe parts of reel with help of neat diagram. What care has to be taken of reel before mounting on press.
2) Explain festoon. What is its function. Explain with neat diagram splice cycle in this type of paster

OR

Q.1) Explain the following [16]
1. Reel stands
2. Factors to be considered for splice pattern selection
3. Significance of breaking arrangement
4. CIC configuration for web offset

Q.2)
1. Explain water ink emulsification (8)
2. Explain anilox short inking system used on web offset machines (8)

Q.2) Explain [16]
1. Bruch type dampening system
2. Ink supply through returnable container systems
3. Relationship of conductivity, pH and concentration of fountain solution
4. Cylinder Packing and its importance

Q.3) 1) Explain the importance of chill roll temperature settings. [9]
2) Explain drying of different paper grades on basis of absorption and setting with suitable examples. [9]

OR

Q.3) 1) Explain former folding mechanism, nipping rollers, guide rollers ` [9]

2) Explain slitter, turner bar, tucker blades [9]

SECTION – II

Q.4) Explain the following terms w.r.t. web tension : [18]

1) Stretch and Modulus of Elasticity of paper
2) Draw, Slip and Surface speed

OR

Q.4) Explain [18]

1) Image control elements
2) Fan- out
3) Slur target
4) Star target

Q.5) Explain [16]

1) Silicone applicators
2) Web Break Detectors
3) Sidelay sensors
4) Web Preconditioners

OR

Q.5) 1) With respect to chill roll systems explain the purpose of cleaning (Maintenance) chill roll surface and internal scaling [8]

2) With help of diagram explain plumbing arrangement for 4 roller chill drum [8]

Q.6) Explain troubles due to following : [16]

1) Wet dry tensions
2) Incorrect temperatures of link roller train, dampening solution

OR

Q.6) Explain following paper problems : [16]

1) Loose and dry paper edges
2) Splice pattern bursts open before splice
3) Creasing of web after former folding
4) Wrapping effects: Glue on end.

[Total No. of Questions: 6] **[Total No. of Printed Pages: 2]**

UNIVERSITY OF PUNE
[4363]-209
T. E. (Printing) Examination - 2013
Technology of Flexography (2008 Course)
[Time: 3 Hours] **[Max. Marks: 100]**

Instructions:

1 *Answers to the two sections should be written in separate answer-books.*

2 *Neat diagrams must be drawn wherever necessary.*

SECTION -I

Q.1	A	Explain the making and properties of rubber plates.	18
		OR	
Q.1	A	Explain the selection criteria for printing a job on flexo press	18
Q. 2	A	Explain the mounting technique for flexo plates	16
		OR	
Q. 2	A	Calculate % shortening and new negative length for 2.84 mm plate thickness having printed length of 30 cm	10
	B	Mention the checks to be performed on a negative for flexo plate making	6
Q. 3	A	Explain in detail the process of making a Photo Polymer plate	10
	B	Mention the effect of Back and Main exposure on plate-making.	6
		OR	
Q. 3	A	Explain the steps to be carried out for standardization of a PP plate.	16

SECTION II

Q. 4	A	Explain in process of making a 1.14 mm flexo photopolymer plate	10
	B	Mention the benefits of digital flexo PP plate	6
		OR	
Q. 4	A	explain the effect of wash out solvents on photopolymer plates	16

Q. 5	A	Explain in detail flexo press configuration	18
		OR	
Q. 5	A	Describe in detail the sections of a flexo press	18
Q. 6	A	Explain in detail fountain roll inking system of a flexo press	16
		OR	
Q. 6		Write notes on:	16
	A	Anilox Cell Geometry	
	B	Ink Puddle	

[Total No. of Questions: *12*] **[Total No. of Printed Pages:** *4*]

UNIVERSITY OF PUNE

[4363]-210

T. E. (*Printing Engg***) Examination - 2013**

Theory of Printing Machines & Machine Design (2008 Course)

[Time: *4* **Hours]** **[Max. Marks: 100]**

Instructions:

1 ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6 from Section I and Q7 or Q8, Q9 or Q10, Q11 or Q12 from Section II***

2 *Answers to the* ***two sections*** *should be written in* ***separate answer-books****.*

3 *Black figures to the right indicate full marks.*

4 *Use of electronic pocket calculator is allowed.*

5 *Assume suitable data, if necessary.*

SECTION -I

Q.1	A	Derive an expression for velocity of sliding in a pair of meshed spur gear.	06
	B	Two spur wheels of pitch circle diameter of 100mm and 350mm have involute teeth of 5mm module and 20º pressure angel. The addenda are equal and it is as large as possible while avoiding the interference. If pinion rotates at 100 rpm, find: 1. The addendum 2. The contact ratio 3. The velocity of sliding (a) At the beginning of path of contact (b) At the end of path of contact.	12
Q.2	A	Draw the sketch for mating bevel gears and define. a. Pitch cone angle b. Back cone angle c. Shaft angle d. Face width	06

	B	Give the comparison between involute and cycloidal profile teeth.	06
	C	What is difference between bevel gear and worm gear with respect to: a. Application b. Loss of power c. Condition for use d. Efficiency e. Self locking properties f. Reduction ratio.	06
Q. 3	A	What is an Epicyclic gear train? Explain the torque analysis.	08
	B	Explain with application reverted gear train.	04
	C	Write advantage and disadvantages of epicyclic gear train over a simple gear train.	04
		OR	
Q. 4	A	A compound gear train consists of four gears. The number of teeth on gear A,B,C and D are 54, 75, 36 and 81 respectively. The gear B and C forms a compound gear. If the gear A transmits 9KW power at 200rpm and the train efficiency is 80% calculate the torque on the output shaft D.	08
	B	Explain the procedure for obtaining the velocity ratio of epicyclic gear train by tabular method.	08
Q. 5	A	Draw the profile of a cam to raise a valve with SHM through 40mm in $1/4^{th}$ of revolution keep it fully raised through and $1/10^{th}$ revolution and to lower it with uniform acceleration and retardation in $1/6^{th}$ revolution. The valve remains closed during the rest of revolution. The diameter of roller is 20mm and minimum radius of cam to be 30mm. The axis of the valve rod passes through the axis of cam shaft. The cam shaft rotates at 360rpm clockwise. Determine the maximum velocity and acceleration of the follower during the outward stroke and return stroke.	16
		OR	
Q. 6	A	The following data relates to a cam operating an oscillating roller follower: Minimum radius of cam= 30mm Radius of roller= 10mm Length of following arm= 45 mm	16

Distance of fulcrum center from cam centre= 55mm
Angle of ascent= 80º
Angle of descent= 120 º
Angle of dwell at max. lift= 50 º
Angle of oscillation of follower= 28 º
Draw the cam profile.

SECTION II

Q. 7	A	Explain the various factors influencing the fatigue strength of the components.	08
	B	What is Stress concentration? What are its causes and explain the methods of reducing stress concentration.	08

OR

Q. 8	A	A transmission shaft of cold drawn steel 27 Mn2 (S_{ut}=510 N/mm^2 and S_{yt}=320N/mm^2) is subjected to a fluctuating torque which varies from -100 N-mm to +400 N-mm. The factor of safety is 2.5 and the expected reliability is 92%. Neglecting the effect of stress concentration, determine the diameter of the shaft. (Assume K_a=0.8, K_b =0.85,K_c =0.897 with their usual meaning.)	08
	B	Explain the procedure for design the preloaded bolts under fatigue loading? How will you decided the magnitude of preloaded to avoid the separation of joint?	08
Q. 9		It is required to design a pair of spur gear with 20º full-depth involute teeth based on the Lewis equation. The velocity factor is to be used to account for dynamic load. The pinion shaft is connected to a 11KW, 1440 rpm motor. The starting torque of motor is 150% of the rated torque. The speed reduction is 4:1. The pinion is made of plain steel 40C8(S_{ut}=600N/mm^2) while gear is made of gray cast iron (S_{ut}=300N/mm^2). The factor of safety can be taken as 1.5. Design the gears, specify their dimensions and suggest suitable surface hardness for the gears. Take minimum number of teeth=18 Levis form factor for 18 teeth=0.308 b=10m	18

First choice of std. modules in mm recommended by ISO:
1, 1.25, 1.5, 2, 2.5, 3, 4, 5, 6, 8, 10, 12, 16, 20, 25, 32, 40.
$K=0.16[BHN/100]^2$

OR

Q. 10	A	With the help of neat sketch, state and explain the components of forces acting on helical gear tooth.	08
	B	A parallel helical gear pair with a centre distance of 239mm transmits 7.5 kW power from 22 teeth right hand pinion rotating at 1500rpm to a gear rotation at 375 rpm. The pressure angle in the plane of rotation is 21.58º and the helix angle is 23º. The pinion is below the gear and is rotating in clockwise direction when viewed from the left side. Determine the force acting on meshing teeth.	10
Q. 11	A	A radial load acting on a ball bearing is 2500N for the first 5 revolutions, reduces to 1500 N for the next 10 revolutions and no load for the next 5 revolutions. The load variations then repeat. The expected life of the bearing is 10 million revolutions. Determine the basic dynamic capacity of the bearing.	08
	B	Explain the static and dynamic load carrying capacity of rolling contact bearing.	08

OR

Q. 12	A	A deep-groove ball bearing having bore diameter of 60mm and rotating at 1440 rpm is subjected to a radial force of 2500N and an axial force of 1200 N. the radial and thrust factors are 0.56 and 2.0 respectively. The load factor is 1.2. If the expected rating life is 10000 hours, calculate the required basic dynamic capacity of the bearing.	08
	B	Describe with neat sketches, the different kinds of rolling contact bearings.	08