PAPER CODE	PAPER – II ELECTRICAL AND ELECTRONICS ENGINEERING (English)
22163	

Held on: 05-03-2023

Question Booklet Number
407650

EA-1622

Duration : 150 Minutes ***Max. Marks : 150***

INSTRUCTIONS TO CANDIDATES

1. Before opening the seal of the Question Booklet check whether the Paper Code printed on it is matching with the Paper Code printed on the Hall Ticket with the respective session. If it is not matching, immediately bring to the notice of the invigilator and obtain the Question Booklet with correct Paper Code.
2. Please check the Question Booklet immediately on opening and ensure that it contains all the 150 multiple choice questions printed on it.
3. Carefully note the Question Booklet No.
4. Separate Optical Mark Reader (OMR) Answer Sheet is supplied to you. The OMR Answer sheet contains boxes for filling Hall Ticket Number, Question Booklet Number, Paper Code, Signature of the Candidate and Invigilator. Fill the boxes with Blue/Black ball point pen only.
5. If there is any defect in the Question Paper Booklet or OMR answer sheet, please ask the invigilator for replacement immediately.
6. Since the answer sheets are to be scanned (valued) with Optical Mark Scanner system, the candidates have to USE BALL POINT PEN (BLUE/BLACK) ONLY for darkening the circles in the OMR Sheet including bubbling the answers. Bubbling with Pencil / Ink Pen /Gel Pen is not permitted in the examination. If any mistake is done by you on the OMR sheet, it will not be replaced.
7. The Question Booklet number is printed on right corner of the cover page of the Test Booklet. Mark your Question Booklet number on side 1 of the OMR Answer Sheet by darkening the appropriate circles with Blue/Black ball point pen.

అభ్యర్థులకు సూచనలు

1. ప్రశ్నా పత్రం యొక్క సీల్‌ను తెరిచే ముందు దాని పైన ముద్రించి ఉన్న పేపర్ కోడ్ ను మీ హాల్‌టికెట్‌లో ముద్రింపబడిన ఆ సెషన్‌కు సంబంధించిన పేపర్ కోడ్‌తో సరిపోల్చుకోండి. ఒక వేళ ఆ రెండూ ఒక దానికొకటి భిన్నంగా ఉన్నచో ఆ విషయాన్ని ఇన్విజిలేటర్ దృష్టికి వెంటనే తీసుకెళ్ళి సరైన పేపర్ కోడ్ ఉన్న ప్రశ్న పత్రాన్ని అడిగి తీసుకోండి.
2. ప్రశ్నా పత్రాన్ని తెరచిన వెంటనే అందులోని 150 ప్రశ్నలు వాటికిచ్చిన ఆప్షన్లు అన్నీ సరిగ్గా ముద్రింపబడ్డాయో లేదో జాగ్రత్తగా పరిశీలించండి.
3. క్వెశ్చన్ బుక్‌లెట్ నంబర్‌ను జాగ్రత్తగా పరిశీలించండి.
4. సమాధానాలను గుర్తించడానికి ప్రత్యేకంగా OMR సమాధాన పత్రాన్ని ఇవ్వడం జరుగుతుంది. అందులో హాల్‌టికెట్ నంబరు, క్వెశ్చన్ బుక్‌లెట్ నంబర్, పేపర్ కోడ్, అభ్యర్థి సంతకం, ఇన్విజిలేటర్ సంతకాలకు సంబంధించిన వివరాలు నింపడానికి గడులు కేటాయింపబడి ఉంటాయి. గడులను నింపటానికి నీలి/నలుపు (బ్లూ/బ్లాక్) బాల్ పాయింట్ పెన్నులను మాత్రమే ఉపయోగించాలి.
5. ప్రశ్నా పత్రంలో కానీ, OMR సమాధాన పత్రంలో కానీ ఏవైనా లోపాలుంటే వాటిని మార్చవలసిందిగా వెంటనే ఇన్విజిలేటర్‌ను కోరవచ్చు.
6. సమాధాన పత్రాలను ఆప్టికల్ మార్క్ స్కానర్ పరీక్షా పద్ధతిలో మూల్యాంకనం చేస్తారు. కాబట్టి దానిపైన ఉన్న వృత్తాలను (జవాబులకు సంబంధించిన వృత్తాలతో సహా) నింపటానికి బ్లూ/బ్లాక్ బాల్ పాయింట్ పెన్నులను మాత్రమే ఉపయోగించాలి . పెన్సిల్ లేదా ఇంకు పెన్ను లేదా జెల్ పెన్నులతో బబ్లింగ్ చేయటం పరీక్షలో అనుమతించబడదు. OMR పత్రంలో అభ్యర్థి తప్పులు రాసిన/దిద్దిన యెడల దానిని మార్చి ఇంకొకటి ఎట్టి పరిస్థితుల్లో ఇవ్వటం జరగదు.
7. ప్రశ్నా పత్రం పై క్వెశ్చన్ బుక్‌లెట్ నంబర్ ముద్రింపబడి ఉంటుంది. ఇది ప్రశ్నా పత్రం కవర్ పేజీ పై కుడి మూలన ముద్రింపబడి ఉంటుంది. ఈ క్వెశ్చన్ బుక్‌లెట్ నంబర్‌ను మీ సమాధాన పత్రం యొక్క సైడ్– 1 లో దానికి కేటాయింపబడిన స్థలంలో బ్లూ/బ్లాక్ బాల్ పాయింట్ పెన్నుతో జాగ్రత్తగా నింపాలి.

Example to fill up the Question Booklet number.

If your Question Booklet number is 102365, please fill as shown below :

Question Booklet No.

1	0	2	3	6	5
●	①	①	①	①	①
②	②	●	②	②	②
③	③	③	●	③	③
④	④	④	④	④	④
⑤	⑤	⑤	⑤	⑤	●
⑥	⑥	⑥	⑥	●	⑥
⑦	⑦	⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨	⑨	⑨
⓪	●	⓪	⓪	⓪	⓪

If you have not darkened the Question Booklet number at side 1 of the OMR Answer Sheet your Answer Sheet will be invalidated without any further notice. If it is darkened in a way that it leads to discrepancy in determining the exact Question Booklet number, then it may lead to wrong result / rejection of the Answer Sheet and candidate himself / herself will be responsible for the same.

8. Each question is followed by 4 answer choices. Of these, you have to select one correct answer and mark it on the Answer sheet by darkening the appropriate circle for the question. If more than one circle is darkened, that answer will not be valued at all. Use Blue/Black Ball point pen to fill the circle completely. Make no other stray marks.

   e.g. : If the answer for Question No. 1 is Answer choice (2), it should be marked as follows :

   ① ● ③ ④

9. Mark your Hall Ticket No. as given in the Hall Ticket with Blue/Black Ball point pen by darkening appropriate circles in side 1 of the OMR Answer Sheet. Incorrect/ not encoding of Hall Ticket no. will lead to invalidation of your Answer Sheet and also will lead to rejection of your candidature without any further notice.

   Example : If the Hall Ticket No. is 1309102001, fill as shown below :

Hall Ticket Number

1	3	0	9	1	0	2	0	0	1
●	①	①	①	●	①	①	①	①	●
②	②	②	②	②	②	●	②	②	②
③	●	③	③	③	③	③	③	③	③
④	④	④	④	④	④	④	④	④	④
⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥
⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧
⑨	⑨	⑨	●	⑨	⑨	⑨	⑨	⑨	⑨
⓪	⓪	●	⓪	⓪	●	⓪	●	●	⓪

10. Get the signature of the Invigilator affixed in the space provided in the answer sheet. Candidate should sign in the space provided in the OMR Answer Sheet.

క్వెశ్చన్ బుక్‌లెట్ నంబర్ నింపడానికి

ఉదా : ఒకవేళ మీ క్వెశ్చన్ బుక్‌లెట్ నంబర్ *102365* అయితే దాన్ని కింది విధంగా నింపాలి.

Question Booklet No.

1	0	2	3	6	5
●	①	①	①	①	①
②	②	●	②	②	②
③	③	③	●	③	③
④	④	④	④	④	④
⑤	⑤	⑤	⑤	⑤	●
⑥	⑥	⑥	⑥	●	⑥
⑦	⑦	⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨	⑨	⑨
⓪	●	⓪	⓪	⓪	⓪

OMR సమాధాన పత్రం యొక్క సైడ్-1 లో మీ క్వెశ్చన్ బుక్‌లెట్ నంబర్‌ను నింపక పోయినచో ఎటువంటి నోటీసు ఇవ్వకుండానే మీ సమాధాన పత్రం మూల్యాంకనం నిలిపివేయబడును. ఒకవేళ దానిని సరిగ్గా గుర్తించేలా నింపక పోయినచో ఫలితం తప్పుగా వచ్చే అవకాశం లేదా మీ సమాధాన పత్రం తిరస్కరింపబడే అవకాశం వుంటుంది. దానికి అభ్యర్థే పూర్తి బాధ్యత వహించాల్సి వుంటుంది.

8. ప్రతి ప్రశ్నకు నాలుగు ఐచ్చికాలు ఇవ్వబడతాయి. వీటిలో ఒకదానిని సమాధానంగా ఎంచుకోవాలి. సమాధాన పత్రంలో దానికి సంబంధించిన వృత్తాన్ని నింపవలెను. ఒకటి కన్నా ఎక్కువ వృత్తాలను నింపినచో ఆ సమాధానం పరిగణింపబడదు. వృత్తాలను పూర్తిగా నింపటానికి బ్లూ/బ్లాక్ బాల్ పాయింట్ పెన్నులను మాత్రమే ఉపయోగించాలి. మరే విధమైన గీతలు గీయటం గాని మరకలను అంటించటం గాని చేయరాదు.

   ఉదా : 1 వ ప్రశ్నకు సమాధానం (2) అయితే దాన్ని ఈ క్రింది విధంగా నింపాలి.

   ① ● ③ ④

9. హాల్‌టికెట్‌లో ఇవ్వబడిన హాల్‌టికెట్ నంబర్‌ను బ్లూ/బ్లాక్ బాల్ పాయింట్ పెన్నుతో OMR సమాధాన పత్రపు సైడ్-1 లో ఇవ్వబడిన సరియైన వృత్తాలలో నింపాలి. హాల్‌టికెట్ నంబర్‌ను తప్పుగా నింపటం లేదా అస్సలు నింపకపోయినచో మీ సమాధాన పత్రం మూల్యాంకనం చేయబడదు మరియు మీ అభ్యర్థిత్వం ఎటువంటి నోటీస్ ఇవ్వకుండానే తిరస్కరించబడును.

   ఉదా : హాల్‌టికెట్ నంబరు 1309102001 అయితే ఈ క్రింది విధంగా నింపాలి.

Hall Ticket Number

1	3	0	9	1	0	2	0	0	1
●	①	①	①	●	①	①	①	①	●
②	②	②	②	②	②	●	②	②	②
③	●	③	③	③	③	③	③	③	③
④	④	④	④	④	④	④	④	④	④
⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥
⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧
⑨	⑨	⑨	●	⑨	⑨	⑨	⑨	⑨	⑨
⓪	⓪	●	⓪	⓪	●	⓪	●	●	⓪

10. సమాధాన పత్రంలో కేటాయింపబడిన స్థలంలో ఇన్విజిలేటర్ సంతకం తీసుకోవాలి. అభ్యర్థి కూడా OMR సమాధాన పత్రంలో కేటాయించిన స్థలంలో తప్పనిసరిగా సంతకం చేయాలి.

11. Rough work should be done only in the space provided for that purpose in the Question Paper Booklet. No other loose sheet of paper will be allowed into the Examination Hall except Hall Ticket.

12. Do not mark answer choices on the Question Booklet. Violation of this will be viewed seriously.

13. Use of Calculators, Mathematical Tables, Log Books, Pagers, Cell Phones or any other electronic gadgets is strictly prohibited.

14. The candidate should write the Booklet number and Sign in the space provided in the Nominal Rolls while ensuring the Bio-data printed against his/ her name is correct.

15. No candidate should leave the examination hall until completion of examination time.

16. Before leaving the examination hall, the candidate should hand over the OMR Answer Sheet to the Invigilator, failing which action will be taken for malpractice.

17. Candidates are permitted to take away the Question Paper with them after completion of the exam.

18. The OMR Answer Sheet will be invalidated, if the candidate :

    i. writes the Hall Ticket No. in any other place of OMR sheet, except in the space provided for the purpose.

    ii. writes irrelevant matter, including the religious symbols, words, prayers or any communication whatsoever, in any place of the OMR answer sheet.

    iii. uses other than Blue/ Black ball point pen to darken the circles.

    iv. forgets to bubble the Question Booklet number or bubble multiple circles in a row while filling the Question Booklet No. or bubble Hall Ticket No. other than allotted to him/ her.

    v. resorts to wrong/erroneous/incomplete bubbling of circles or using ✔ or ✘ in the circles.

    vi. uses whitener on the answer sheet.

    vii. attempts any type of tampering (rubbing the circles with chalk powder/ scratching the circles with razors etc.) on the OMR Answer Sheet.

    viii. adopts any method of malpractice.

19. No correspondence will be entertained in this matter by the commission, if the Answer Sheet is invalidated or his / her candidature is rejected due to the above reasons.

20. The digital copy of OMR Answer Sheets will be made available in the Commission's website after completion of the Image Scanning.

11. ప్రశ్నా పత్రంలో కేటాయించిన స్థలంలో మాత్రమే చిత్తు పని చేయవలెను. పరీక్ష గదిలోకి హాల్‌టికెట్ తప్ప మరే ఇతర విడి కాగితాలు అనుమతింపబడవు.

12. ప్రశ్నా పత్రాలలో సమాధానాలను గుర్తుపెట్టడం తీవ్రంగా పరిగణింపబడును.

13. పరీక్ష గదిలో కాలిక్యులేటర్లు, మాథమాటికల్ టేబుల్స్, లాగ్ బుక్స్, పేజర్స్, సెల్ ఫోన్స్ లేదా ఏ ఇతర ఎలక్ట్రానిక్ వస్తువులను ఉపయోగించడం నిషిద్ధం.

14. నామినల్ రోల్స్‌లో ముద్రింపబడిన తన వ్యక్తిగత వివరాలు సరియైనవని ధృవీకరించుకున్న తర్వాత అభ్యర్థి తనకివ్వబడిన ప్రశ్నాపత్రం యొక్క క్వెశ్చన్ బుక్‌లెట్ నంబర్‌ను నామినల్ రోల్‌లో దానికై కేటాయింపబడిన స్థలంలో రాసి సంతకం చెయ్యాలి.

15. పరీక్ష పూర్తయ్యే వరకు ఏ ఒక్క అభ్యర్థి కూడా పరీక్ష గదిని విడచి వెళ్ళటానికి అనుమతించబడదు.

16. పరీక్ష అనంతరం పరీక్ష గది నుండి బయటకు వెళ్ళే ముందు ప్రతి అభ్యర్థి OMR సమాధాన పత్రాన్ని ఇన్విజిలేటర్‌కు తప్పనిసరిగా అప్పగించి వెళ్ళాలి. లేనిచో అతని పై మాల్ ప్రాక్టీస్ కింద చర్యలు తీసుకోబడును.

17. పరీక్ష అనంతరం ప్రశ్నా పత్రాన్ని అభ్యర్థులు తమ వెంట తీసుకొని వెళ్ళవచ్చు.

18. ఒక అభ్యర్థి క్రింది ఏ చర్యలకు పాల్పడినను అతని సమాధాన పత్రం మూల్యాంకనం చేయబడదు.

    i. OMR సమాధాన పత్రం పై హాల్‌టికెట్ నంబరును దానికి కేటాయించిన స్థలంలో కాక ఏ ఇతర స్థలంలో రాసినను,

    ii. పరీక్షకు ఏమాత్రం సంబంధం లేని విషయం ఉదా : మత సంబంధ చిహ్నాలు, పదాలు, ప్రార్థనలు లేదా ఏ ఇతర సమాచారాన్నైనా జవాబు పత్రం పై రాసినట్లయితే,

    iii. వృత్తాలను నింపటానికి బ్లూ/బ్లాక్ బాల్ పాయింట్ పెన్నులను కాక ఏ ఇతర పెన్నులను ఉపయోగించిననూ,

    iv. క్వెశ్చన్ బుక్‌లెట్ నంబర్ లేదా హాల్‌టికెట్ నంబర్‌లను బబ్లింగ్ చేయటం మరచిపోయినను లేదా క్వెశ్చన్ బుక్‌లెట్ నంబర్‌ను నింపే సమయంలో ఒక వరసలోని ఒకటి కన్నా ఎక్కువ వృత్తాలను నింపిననూ. అభ్యర్థి తనకు కేటాయించిన హాల్‌టికెట్ నంబర్ కాక ఇతర హాల్‌టికెట్ నంబరును కానీ బబ్లింగ్ చేసినచో,

    v. సమాధాన పత్రం పై వృత్తాలను తప్పుగా/అసంపూర్ణంగా నింపినచో లేక ✔ లేదా ✘ వంటి గుర్తులను వృత్తాలలో గీసినచో,

    vi. సమాధాన పత్రంలో తెల్ల సిరా (వైట్నర్)ను ఉపయోగించినచో,

    vii. సమాధాన పత్రం పై వృత్తాలను చాక్ పీస్ పొడర్‌తో రుద్దటం, బ్లేడ్‌తో గీయటం వంటి చర్యలకు పాల్పడినట్లయితే,

    viii. ఏ విధమైన మాల్ ప్రాక్టీస్ పద్ధతులను అవలంబించినను,

19. పై ఏ కారణంవల్లనైననూ అభ్యర్థుల యొక్క సమాధాన పత్రాలు మూల్యాంకనం చేయబడకపోయినా లేదా వారి అభ్యర్థిత్వం రద్దు చేయబడినా, ఈ విషయంలో కమిషన్‌తో ఏ విధమైన ఉత్తర ప్రత్యుత్తరములకు అనుమతింపబడదు.

20. పరీక్షకు హాజరైన అందరి అభ్యర్థుల OMR సమాధాన పత్రాల యొక్క డిజిటల్ కాపీలు, ఇమేజ్ స్కానింగ్ అయిన తర్వాత కమీషన్ వెబ్‌సైట్‌లో అందుబాటులో ఉంచబడును.

1. Three identical point charges each Q coulombs, are placed at the vertices of an equilateral triangle 10 cm apart. Calculate the force on each charge.
   (1) $27\times10^{11}\times Q^2$ newton
   (2) $9\times10^{11}\times\sqrt{3}\times Q^2$ newton
   (3) $18\times10^{11}\times Q^2$ newton
   (4) $9\times10^{11}\times Q^2$ newton

2. The permanent magnet moving coil (PMMC) instrument have the following advantages :
   A. They have low power consumption
   B. They have high power consumption
   C. They have uniform scale
   D. They have no hysteresis loss
   Choose the correct answer:
   (1) B & C only
   (2) A, C & D only
   (3) A & D only
   (4) B, C & D only

3. In a long transmission line under no load condition
   (1) The receiving end voltage is equal to the sending end voltage
   (2) The sending end voltage is greater than the receiving end voltage
   (3) The receiving end voltage is less than the sending end voltage
   (4) The receiving end voltage is greater than the sending end voltage

4. Read the following statements:
   A. Sumpner test is used to determine the efficiency of transformer.
   B. Sumpner test is used to determine the temperature rise of transformer.
   Choose the correct answer :
   (1) Both A & B
   (2) Neither A nor B
   (3) B only
   (4) A only

5. The time period of a wave is
   (1) Time taken for one half cycle.
   (2) Time taken to reach maximum value.
   (3) Time required to complete one cycle.
   (4) Same as the frequency.

6. In a Transformer
   (1) the e.m.f per turn in secondary winding is always less than e.m.f per turn in primary winding
   (2) the e.m.f induced in secondary winding is always equal e.m.f induced in primary winding
   (3) the e.m.f per turn in secondary winding is always greater than e.m.f per turn in primary winding
   (4) the e.m.f per turn in secondary winding is always equal to e.m.f per turn in primary winding

7. In a string of suspension type insulators the string efficiency can be increased by
   A. By using longer cross arms
   B. By using shorter cross arms
   C. By grading the insulators
   D. By using a guard ring
   Choose the correct statement :
   (1) A,C & D only
   (2) B,C & D only
   (3) B only
   (4) A only

8. An uncharged capacitor of 0.01 F is charged first by a current of 2mA for 30 seconds and then by a current of 4mA for 30 seconds. Find the final voltage on it.
   (1) 18 V
   (2) 24 V
   (3) 12 V
   (4) 6 V

9. A 4-pole wave wound D.C generator with 880 armature conductors supplies a current of 120 ampere. The brushes are given an actual lead of 3°. Calculate the demagnetizing ampere turns per pole.

(1) 840

(2) 940

(3) 440

(4) 6160

10. Match List – I with List – II in respect of synchronous machines.

List – I (Machine characteristics)	List – II (Quantity)
A. Open circuit characteristics	1. Power factor versus field current
B. V-curve	2. I_{sc} versus I_f
C. Short circuit characteristics	3. E_g versus I_f
D. Inverted V-curve	4. I_a versus I_f

Choose the correct answer :

(1) A – 3; B – 4; C – 1; D – 2

(2) A – 3; B – 4; C – 2; D – 1

(3) A – 2; B – 4; C – 3; D – 1

(4) A – 2; B – 4; C – 1; D – 3

11. For High head hydro electric plants the turbine used is

(1) Kaplan turbine

(2) Propeller turbine

(3) Francis turbine

(4) Pelton wheel turbine

12. To limit current chopping in vacuum circuit breakers ,the contact material used has :-

(1) Low vapour pressure and high conductivity properties.

(2) Low vapour pressure and low conductivity properties.

(3) High vapour pressure and high conductivity properties.

(4) High vapour pressure and low conductivity properties.

13. Match the following List – I (Parameter) with List – II (Unit) :

List – I (Parameter)	List – II (Unit)
A. Flux density	1. Ampere Turn/ Weber
B. Reluctance	2. Weber/Ampere Turn
C. Permeance	3. Weber/m^2
D. Magneto motive force (M.M.F)	4. Ampere Turn

Choose the correct answer :

(1) A – 3; B – 1; C – 2; D – 4

(2) A – 2; B – 1; C – 4; D – 3

(3) A – 1; B – 2; C – 4; D – 3

(4) A – 1; B – 2; C – 3; D – 4

14. The torque versus current characteristics of a D.C shunt motor is a

(1) Hyperbola

(2) Circle

(3) Parabola

(4) Straight line passing through the origin

15. The power input to a 500 V, 50 Hz, 6-pole three phase induction motor running at 975 r.p.m is 40 kW. The stator losses are 1 kW and the friction and windage losses are 2 kW. Calculate the rotor copper loss.
(1) 0.975 kW
(2) 36 kW
(3) 1.975 kW
(4) 2.975 kW

16. The length of a short transmission line is up to
(1) 240 km
(2) No length criterion
(3) 160 km
(4) 80 km

17. Read the following statements:
A. Compensating windings are used for small D.C machines.
B. Compensating windings are embedded in slots in the pole shoe.
C. Compensating windings are connected in series with armature.
D. Compensating windings are used for large D.C machines.
Choose the correct answer:
(1) A, B & C only
(2) B, C & D only
(3) B & C only
(4) A & B only

18. In a short transmission line :
A. The effects of line capacitance are neglected.
B. The effects of line resistance and inductance are taken into account.
Choose the correct statements :
(1) Both A & B
(2) Neither A nor B
(3) B only
(4) A only

19. In a transformer the self induced e.m.f E_1 and mutually induced e.m.f E_2 are
(1) In-phase with each other
(2) E_1 lags E_2 by 45°
(3) Antiphase with each other
(4) Perpendicular to each other

20. The commutation used for cycloconverters is
(1) Forced commutation in step-up cycloconverters
(2) Forced commutation in step-down cycloconverters
(3) Forced commutation in both step-up and step-down cycloconverters
(4) Natural commutation in both step-up and step-down cycloconverters

21. An impedance relay is
(1) Directional restrained over current relay
(2) Directional restrained over voltage relay
(3) Voltage restrained directional relay
(4) Voltage restrained over current relay

22. In D.C Machines lap winding is suitable for
(1) Low voltage, high current
(2) High voltage, low current
(3) High voltage, High current
(4) Low voltage, low current

23. A moving coil instrument used as a voltmeter has a coil of 150 turns with a width of 4 cm and an active length of 4 cm .The gap flux density is 0.12 Wb/m^2. Find the torque exerted by the control spring to read a full scale reading of 300 V. The total resistance of the instrument is 200000 Ω.
(1) 80.2×10^{-6} N-m
(2) 43.2×10^{-6} N-m
(3) 60.2×10^{-6} N-m
(4) 20.2×10^{-6} N-m

24. In a suspension type insulator :
A. The voltage drop across the unit nearest the cross arm is minimum.
B. The voltage drop across the unit nearest the power conductor is maximum.
C. The voltage drop across the unit nearest the cross arm is maximum.
D. The voltage drop across the unit nearest the power conductor is minimum.
Choose the correct statements :
(1) C & D only
(2) B, C & D only
(3) C only
(4) A & B only

25. Read the following statements:
A. Flux control method gives above rated speed in D.C shunt motor
B. Flux control method gives below rated speed in D.C shunt motor
C. Armature control method gives above rated speed in D.C shunt motor
D. Armature control method gives below rated speed in D.C shunt motor
Choose the correct answer:
(1) A & D only
(2) C & D only
(3) B & C only
(4) A & B only

26. The formula for self inductance per conductor per meter of a single phase overhead line in H/m is
(1) $(0.5+2\log_e D/r)\times 10^{-3}$ H/m
(2) $(0.5+2\log_e D/r)\times 10^{7}$ H/m
(3) $(0.5+2\log_e D/r)\times 10^{-4}$ H/m
(4) $(0.5+2\log_e D/r)\times 10^{-7}$ H/m

27. Read the following statements :
A. An ideal transformer has no copper losses.
B. An ideal transformer has no iron losses.
C. An ideal transformer has no magnetic leakage.
D. An ideal transformer has winding resistance.
Choose the correct answer :
(1) C & D only
(2) A & D only
(3) B & C only
(4) A, B & C only

28. For the single phase A.C system of track electrification, low frequency is desirable because :
(1) It reduces the line voltage drop and power factor
(2) It increases the line voltage drop and efficiency
(3) It increases the A.C motor power factor, efficiency and reduces line voltage drop
(4) It increases A.C motor efficiency and line voltage drop

29. Two coils connected in series have an equivalent inductance of 0.4 H when connected in aiding and an equivalent inductance of 0.2 H when the connection is opposing. Calculate the mutual inductance of the coils.
(1) 0.05 H
(2) 0.2 H
(3) 0.03 H
(4) 0.6 H

30. A hydro electric power station is commonly found in
(1) Swamps
(2) Grass lands
(3) Hilly areas
(4) Desert areas

31. SF_6 circuit breakers have the following advantages :

A. Noiseless operation.

B. Less arcing time.

C. No reduction in the dielectric strength of the gas.

D. The circuit breaker performance is affected due to the atmospheric conditions.

Choose the correct statements :

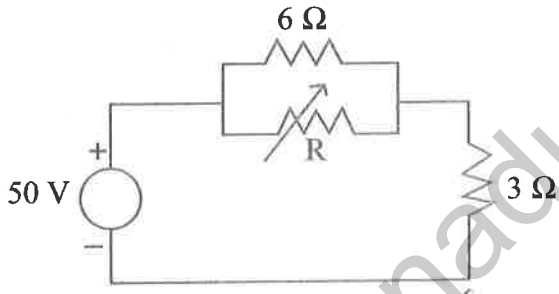
(1) A, C & D only

(2) B & C only

(3) A, B, C, D

(4) A, B & C only

32. What is the value of the resistor R for maximum power dissipation in 3 Ω resistor ?



(1) 16 Ω

(2) 9 Ω

(3) 6 Ω

(4) 3 Ω

33. The rotor slots are slightly skewed in squirrel cage induction motor to

(1) Increase the torque

(2) Save copper

(3) Reduce the magnetic hum and locking tendency of rotor

(4) Increase the strength of rotor bars

34. Making capacity of a circuit breaker is equal to

(1) 3.55 times symmetrical breaking capacity

(2) 4.55 times symmetrical breaking capacity

(3) 2.55 times symmetrical breaking capacity

(4) 1.55 times symmetrical breaking capacity

35. Transformer cores are laminated in order to

(1) Reduce cost

(2) Reduce hysteresis loss

(3) Minimize eddy current loss

(4) Simplify its construction

36. The variable resistance representing the electrical equivalent of mechanical load in the equivalent circuit of a three phase induction motor is

(1) $R_2(\frac{1}{s} - 1)$

(2) $R_2(1 - s)$

(3) $R_2(1 - \frac{1}{s})$

(4) $R_2(s - 1)$

37. The output of a transformer at full load and unity power factor is 400 kW. What is the output at 0.8 power factor and at half load ?

(1) 160 kW

(2) 440 kW

(3) 320 kW

(4) 200 kW

38. A step down chopper has V_S as the source voltage and α as the duty cycle. The output voltage for this chopper is given by.

(1) $V_S(1-\alpha)$

(2) $\frac{V_S}{(1+\alpha)}$

(3) αV_S

(4) $V_S(1+\alpha)$

39. Two inductively coupled coils have self-inductances $L_1 = 50mH$ and $L_2 = 200mH$. What is the maximum possible mutual inductance ?

(1) 150mH

(2) 200mH

(3) 100mH

(4) 50mH

40. The function of dummy coils in a D.C armature winding is to

(1) Provide mechanical balance to the armature.

(2) Maintain constant current.

(3) Decrease the induced e.m.f.

(4) Increase the induced e.m.f.

41. A 2 mA meter with an internal resistance of 100 Ω is to be converted to (0 – 150) mA ammeter. Calculate the value of the shunt resistance required.

(1) 5.51 Ω

(2) 1.351 Ω

(3) 4.51 Ω

(4) 2.51 Ω

42. In a medium length transmission lines using nominal –T method, the consant A is given by :

(1) $A = 1 + \frac{YZ}{2}$

(2) $A = Z\left(1 + \frac{YZ}{4}\right)$

(3) $A = Z$

(4) $A = Y$

43. Read the following statements:

A. Moving iron instrument can be used in D.C circuits

B. Moving iron instrument can be used in A.C circuits

Choose the correct answer:

(1) Both A & B

(2) Neither A nor B

(3) B only

(4) A only

44. Match List – I with List – II :

List – I (D.C Motor quantity)	List – II (Relation)
A. Developed power	1. $\propto N\varnothing$
B. Torque	2. $\propto E_b I_a$
C. Back e.m.f	3. $\propto E_b/\varnothing$
D. Speed	4. $\propto \varnothing I_a$

Choose the correct answer :

(1) A – 2; B – 1; C – 4; D – 3

(2) A – 2; B – 1; C – 3; D – 4

(3) A – 2; B – 4; C – 3; D – 1

(4) A – 2; B – 4; C – 1; D – 3

38. A step down chopper has V_S as the source voltage and α as the duty cycle. The output voltage for this chopper is given by.

(1) $V_S(1-\alpha)$

(2) $\frac{V_S}{(1+\alpha)}$

(3) αV_S

(4) $V_S(1+\alpha)$

39. Two inductively coupled coils have self-inductances $L_1 = 50mH$ and $L_2 = 200mH$. What is the maximum possible mutual inductance ?

(1) 150mH

(2) 200mH

(3) 100mH

(4) 50mH

40. The function of dummy coils in a D.C armature winding is to

(1) Provide mechanical balance to the armature.

(2) Maintain constant current.

(3) Decrease the induced e.m.f.

(4) Increase the induced e.m.f.

41. A 2 mA meter with an internal resistance of 100 Ω is to be converted to (0 – 150) mA ammeter. Calculate the value of the shunt resistance required.

(1) 5.51 Ω

(2) 1.351 Ω

(3) 4.51 Ω

(4) 2.51 Ω

42. In a medium length transmission lines using nominal –T method, the consant A is given by :

(1) $A = 1 + \frac{YZ}{2}$

(2) $A = Z\left(1 + \frac{YZ}{4}\right)$

(3) $A = Z$

(4) $A = Y$

43. Read the following statements:

A. Moving iron instrument can be used in D.C circuits

B. Moving iron instrument can be used in A.C circuits

Choose the correct answer:

(1) Both A & B

(2) Neither A nor B

(3) B only

(4) A only

44. Match List – I with List – II :

List – I (D.C Motor quantity)	List – II (Relation)
A. Developed power	1. $\propto N\varnothing$
B. Torque	2. $\propto E_b I_a$
C. Back e.m.f	3. $\propto E_b/\varnothing$
D. Speed	4. $\propto \varnothing I_a$

Choose the correct answer :

(1) A – 2; B – 1; C – 4; D – 3

(2) A – 2; B – 1; C – 3; D – 4

(3) A – 2; B – 4; C – 3; D – 1

(4) A – 2; B – 4; C – 1; D – 3

45. A piece of silver wire has a resistance of 1 Ω. What will be the resistance of a manganin wire of one-third the length and one third the diameter, if the specific resistance of manganin is 30 times that of silver ?

(1) 90 Ω
(2) 270 Ω
(3) 180 Ω
(4) 30 Ω

46. Match the following in series A.C Circuit :

A. Active Power	1. cosϕ
B. Reactive Power	2. VI Sinϕ
C. Apparent Power	3. VI cosϕ
D. Power factor	4. VI

Choose the correct answer :
(1) A – 2; B – 1; C – 3; D – 4
(2) A – 3; B – 2; C – 4; D – 1
(3) A – 4; B – 3; C – 2; D – 1
(4) A – 1; B – 2; C – 3; D – 4

47. Read the following statements :
A. An auto transformer has one winding only.
B. In step down auto transformer power transformed inductively to the load = input × (1 – K).
C. In step down auto transformer power transformed conductively to the load = K × input.
D. In step down auto transformer power transformed inductively to the load = K × input.

Choose the correct answer :
(1) A, C & D only
(2) A, B & C only
(3) B & C only
(4) A & B only

48. Sag in transmission lines is inversely proportional to
(1) Tension in the conductor
(2) Diameter of the conductor
(3) Length of span
(4) Weight of the conductor

49. The values of A, B, C and D constants for a short transmission line are respectively :
(1) 1, Z, 0 and 1
(2) 1, 1 , Z and 0
(3) 0, 1, 1 and Z
(4) Z, 0, 1 and 1

50. If the two wattmeter readings are equal in three phase circuits the power factor will be
(1) 0.5
(2) 0.6
(3) Unity
(4) Zero

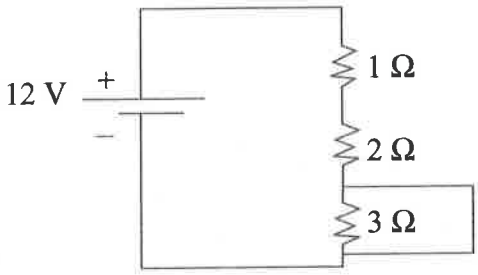
51. In hydro electric power plants
(1) Running cost is high and Initial cost is low
(2) Running cost is low and Initial cost is low
(3) Running cost is high and Initial cost is high
(4) Running cost is low and Initial cost is high

52. In a system of 132 kV, the line to ground capacitance is 0.01 μF and the inductance is 5 henry. Determine the voltage appearing across the pole of a circuit breaker if a magnetizing current of 5 ampere is interrupted.
(1) $4\sqrt{5}\times10^{-4}$ V
(2) $5\sqrt{5}\times10^{4}$ V
(3) $4\sqrt{5}\times10^{4}$ V
(4) $5\sqrt{5}\times10^{-4}$ V

53. A 25 kVA , single phase transformer, 2,200/220 V has a primary resistance of 1 Ω and a secondary resistance of 0.01 Ω. Find the equivalent secondary resistance.

(1) 0.04 Ω
(2) 0.06 Ω
(3) 0.02 Ω
(4) 0.03 Ω

54. Find the power dissipation in 1 Ω resistor in the below figure.



(1) 144 W
(2) 16 W
(3) 48 W
(4) 4 W

55. An R-L series circuit has Z = (6 + j8) ohm. Its susceptance is

(1) 0.1 mho
(2) 0.08 mho
(3) 0.2 mho
(4) 0.06 mho

56. Corona in transmission line produces

(1) No power loss
(2) Ozone gas, violet glow and hissing noise
(3) Hissing noise and Ozone gas only
(4) Violet glow and hissing noise only

57. A 2 –wire D.C distributor 200 meters long is uniformly loaded with 2 A/meter. Resistance of single wire is 0.3 Ω/km. If the distributor is fed at one end, calculate the maximum voltage drop.

(1) 12 V
(2) 22.5 V
(3) 24 V
(4) 48 V

58. The unit of illumination is

(1) lumen/m^2
(2) steradian
(3) candela/m^2
(4) lumen

59. Read the following statements :

A. Reactance voltage in a D.C. generator if commutation is linear = $L \times \frac{I}{T_c}$

B. Reactance voltage in a D.C. generator if commutation is linear = $L \times \frac{2I}{T_c}$

C. Reactance voltage in a D.C. generator if commutation is sinusoidal = $1.11\, L \times \frac{2I}{T_c}$

D. Reactance voltage in a D.C. generator if commutation is sinusoidal = $1.11\ L \times \frac{I}{T_c}$

Choose the correct answer :

(1) A & D only
(2) B & D only
(3) B & C only
(4) A & C only

60. In a transformer no load current is made up of two components ; namely magnetizing current I_m and iron loss current I_w

(1) I_m lags supply voltage by 90° and I_w is in-phase with supply voltage

(2) I_m is in-phase with supply voltage and I_w lags supply voltage by 90°

(3) Both I_m and I_w are in- phase with supply voltage

(4) Both I_m and I_w lag supply voltage by 90°

61. Match List – I with List – II.

List – I (Load power factor)	**List – II (Nature of armature flux in an alternator)**
A. Zero power factor leading	1. Demagnetizing effect
B. Unity power factor	2. Magnetizing effect
C. Zero power factor lagging	3. Cross magnetizing effect
D. 0.7 power factor lagging	4. Partly distortional and partly demagnetizing

Choose the correct answer :

(1) A – 2; B – 1; C – 4; D – 3

(2) A – 2; B – 3; C – 1; D – 4

(3) A – 1; B – 2; C – 4; D – 3

(4) A – 2; B – 1; C – 3; D – 4

62. Feeder is designed mainly from the point of view of

(1) Operating voltage

(2) Its current carrying capacity

(3) Voltage drop on it

(4) Operating frequency

63. The advantages of Bundled conductors in EHV transmission lines are :

A. Reduced reactance.

B. Reduced voltage gradient.

C. Reduced surge impedance.

D. Increased corona loss.

Choose the correct statements :

(1) A, B & C only

(2) D only

(3) A & B only

(4) A only

64. Read the following statements :

A. Practical current source is usually represented by a resistance in parallel with ideal current source.

B. Practical voltage source is usually represented by a resistance in parallel with ideal voltage source .

Choose the correct answer :

(1) Both A and B

(2) Neither A nor B

(3) B only

(4) A only

65. The formula for power factor in series R-L circuit with A.C supply is

(1) $\cos\phi = Z/R$

(2) $\cos\phi = \frac{X_L}{R}$

(3) $\cos\phi = \frac{V_L}{V_S}$

(4) $\cos\phi = \frac{V_R}{V_S}$

66. The D.C series motor should never be switched on at no load because

(1) The speed becomes dangerously high

(2) It will take too long to accelerate

(3) The machine does not pickup

(4) The field current is zero

67. Wattmeter readings during blocked rotor test on a 3-phase induction motor give :

A. Stator copper loss
B. Stator core loss
C. Rotor core loss
D. Rotor copper loss

Choose the correct answer :

(1) A & D only
(2) A & C only
(3) B & C only
(4) A & B only

68. Read the following statements :

A. In a core type transformer, the core surrounds the windings.
B. In a shell type of transformer, the windings surround the core.

Choose the correct answer :

(1) Both A & B
(2) Neither A nor B
(3) B only
(4) A only

69. The maximum overall efficiency of class-B push-pull amplifier cannot exceed

(1) 50%
(2) 85%
(3) 78.5%
(4) 100%

70. The formula to find the number of mesh currents if a network contains B branches and N nodes would be

(1) B – N – 1
(2) (B + N) – 1
(3) N – (B – 1)
(4) B – (N – 1)

71. Steam power plants work closely on

(1) Rankine cycle
(2) Carnot cycle
(3) Brayton cycle
(4) Binary vapour cycle

72. The mean spherical candle power (M.S.C.P) of a lamp which gives out a total luminous flux of 400 π lumen is

(1) 50 candela
(2) 400 candela
(3) 100 candela
(4) 200 candela

73. The function of moderator in a nuclear reactor is

A. To absorb the excess neutrons.
B. To increase the energy of the neutrons.
C. To slow down the neutrons.

Choose the correct answer :

(1) C only
(2) A & B only
(3) B only
(4) A only

74. While Thevenizing a circuit between two terminals, Thevenin voltage equals to

(1) Net voltage available in the circuit
(2) E.M.F of the battery nearest to the terminals
(3) Open circuit terminal voltage
(4) Short circuit terminal voltage

75. Read the following statements :
A. In D.C shunt generator the shunt field winding has many turns of thin wire.
B. In D.C shunt generator the shunt field winding has many turns of thick wire.
C. In D.C series generator the series field winding has many turns of thin wire.
D. In D.C series generator the series field winding has few turns of thick wire.

Choose the correct answer:
(1) A & C only
(2) B & D only
(3) B & C only
(4) A & D only

76. If one of the resistor in a parallel circuit is removed, what happens to the total resistance ?
(1) Remains constant
(2) Exactly doubles
(3) Increases
(4) Decreases

77. A 4-pole ,three phase induction motor operates from a supply whose frequency is 50 Hz. Calculate the speed at which the magnetic field of the stator is rotating.
(1) 1400 r.p.m
(2) 1000 r.p.m
(3) 1500 r.p.m
(4) 1440 r.p.m

78. The type of earthing used for large installations such as sub stations and transmission towers is
(1) Pipe earthing
(2) Plate earthing
(3) Wire earthing
(4) Rod earthing

79. Read the following statements :
A. Transformer transforms voltage
B. Transformer transforms current
C. Transformer transforms frequency
Choose the correct answer :
(1) C only
(2) B & C only
(3) A & C only
(4) A & B only

80. Buchholz relay is a
(1) Current actuated relay
(2) Oil temperature actuated relay
(3) Gas actuated relay
(4) Oil actuated relay

81. The voltage gain of common emitter amplifier at high frequencies is
(1) Nearly unity
(2) Very high
(3) Moderate
(4) Low

82. What must be the power rating of an induction furnace which is required to melt 200 kg of tin per hour ? Melting point of tin=231°C, Specific heat of tin = 0.055, latent heat of liquifaction = 13.31 k cal/kg , initial metal temperature = 20°C, and thermal efficiency of furnace = 70%.
(1) 16.28 kW
(2) 32.28 kW
(3) 8.28 kW
(4) 4.28 kW

83. Read the following statements :
A. In three phase star connection $V_L = \sqrt{3}$ Vph
B. In three phase star connection $V_L =$ Vph
C. In three phase star connection line voltages are 120° apart
Choose the correct answer :
(1) A only
(2) A & C only
(3) B & C only
(4) B only

84. If the applied voltage to a DC machine is 200 V, then the back e.m.f for maximum power developed.
(1) 400 V
(2) 150 V
(3) 100 V
(4) 200 V

85. A freewheeling diode across inductive load will
(1) Reduce utilization factor.
(2) Improve power factor.
(3) Improve utilization factor.
(4) Reduce efficiency.

86. Read the following statements :
A. The standard form of an alternating voltage is $e = E_m \text{Sin}\theta$
B. The standard form of an alternating voltage is $e = E_m \text{Sin}\omega t$
C. The standard form of an alternating voltage is $e = E_m \text{Sin}2\pi Tt$
D. The standard form of an alternating voltage is $e = E_m \text{Sin}2\pi ft$
Choose the correct answer :
(1) B & C only
(2) A, B & D only
(3) A & B only
(4) A only

87. Read the following statements :
A. Dynamometer type of instrument can be used for D.C measurements.
B. Dynamometer type of instrument can be used for A.C measurements.
Choose the correct answer :
(1) Both A & B
(2) Neither A nor B
(3) B only
(4) A only

88. The number of p-n junctions in a thyristor is
(1) 2 junctions
(2) 1 junction
(3) 3 junctions
(4) 4 junctions

89. The function of the economizer is to
(1) Heat up the incoming air by exhaust gases
(2) Heat up the incoming water by exhaust gases
(3) Heat up the pulverized fuel by exhaust gases
(4) Heat up the incoming water with exhaust steam

90. An AND gate in logic gates
(1) Implements logic subtraction
(2) Is equivalent to a parallel switching circuit
(3) Is equivalent to a series switching circuit
(4) Implements logic addition

91. Peak factor of sinusoidal waveform is
(1) 1.414
(2) 2.414
(3) 2.22
(4) 1.11

92. Find the root mean square value of an A.C current given by $i = 14.14 \sin(\omega t + \pi/6)$.
(1) 1.96A
(2) 7.07A
(3) 14.14A
(4) 10A

93. The principle of operation of a three phase induction motor is most similar to that of a
(1) Transformer with shorted secondary
(2) Capacitor start, capacitor run induction motor
(3) Repulsion start induction motor
(4) Synchronous motor

94. Choose the correct answer regarding sensitivity of relays :

(1) 1 VA and 3 VA relays are equally sensitive.

(2) Sensitivity is independent of rating.

(3) 1 VA relay is more sensitive than 3 VA relay.

(4) 1 VA relay is less sensitive than 3 VA relay.

95. A D.C. shunt generator delivers 450 A at 230 V and the resistances of the shunt field and armature are 50 Ω and 0.03 Ω respectively. Calculate the generated E.M.F.

(1) 243.6 V

(2) 343.6 V

(3) 223 V

(4) 143 V

96. Condition for maximum torque under running condition in three phase induction motor is

(1) $R_2 = X_2$

(2) $X_2 = R_2 S$

(3) $R_2 = S/X_2$

(4) $R_2 = SX_2$

97. In a Kando system of track electrification

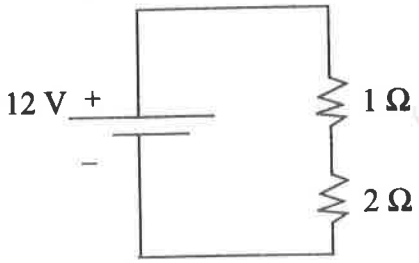
(1) 1-phase A.C is converted to 3-phase A.C

(2) 3-phase A.C is converted to D.C

(3) 3-phase A.C is converted to 1-phase A.C

(4) 1-phase A.C is converted to D.C

98. Find the voltage across 2 Ω resistor in the following figure.



(1) 12 V

(2) 16 V

(3) 8V

(4) 4 V

99. A 220 V D.C shunt motor runs at 500 r.p.m when the armature current is 50 A. Calculate the speed if the torque is doubled. Given that $R_a = 0.2$ Ω.

(1) 476 r.p.m

(2) 676 r.p.m

(3) 376 r.p.m

(4) 576 r.p.m

100. The rotation of disc of an induction relay under the poles is :

(1) It depends upon the magnitude of current.

(2) It depends upon the C.T secondary connection.

(3) From shaded pole to unshaded pole.

(4) From unshaded pole to shaded pole.

101. Read the following statements:

A. At series resonance, the impedance is minimum.

B. At series resonance, the impedance is maximum.

C. At series resonance, the power factor is unity.

D. At series resonance, the current is maximum.

Choose the correct answer:

(1) A, C & D only

(2) B, C & D only

(3) B & C only

(4) A, B & C only

102. The resultant transient voltage which appears across the breaker contacts at the instant of arc extinction is known as
(1) Active recovery voltage.
(2) Rate of rise of restriking voltage.
(3) Restriking voltage.
(4) Recovery voltage.

103. In large transformers tappings are provided on the high voltage side because :
A. It has large number of turns which allow smoother control of output voltage.
B. It carries low values of currents.
C. It is easily accessible for repairs.
D. It provides better voltage regulation.
Choose the correct answer :
(1) A, B, D only
(2) A, B, C, D
(3) B, C, D only
(4) A, C, D only

104. Read the following statements:
A. The function of interpoles in a D.C machine is to neutralize the cross magnetizing effect of armature reaction.
B. The function of interpoles in a D.C machine is to neutralize the demagnetizing effect of armature reaction.
C. The function of interpoles in a D.C machine is to neutralize the reactance voltage.
D. Interpoles in a D.C machine are spaced in between the main poles.
Choose the correct answer:
(1) A & B only
(2) A, C & D only
(3) B & C only
(4) A, B & C only

105. In a single phase induction motor according to double field revolving theory the alternating flux can be represented by :
A. Two revolving fluxes each equal to one half the maximum value of the alternating flux.
B. Two revolving fluxes each equal to the maximum value of the alternating flux.
C. Two revolving fluxes rotating at synchronous speed in opposite directions.
D. Two revolving fluxes rotating at synchronous speed in same directions.
Choose the correct statements :
(1) C & D only
(2) A & C only
(3) B & C only
(4) A & D only

106. The function of snubber circuit connected across a Silicon Controlled Rectifier (SCR) is to
(1) Decrease $\frac{di}{dt}$
(2) Increase $\frac{di}{dt}$
(3) Increase $\frac{dv}{dt}$
(4) Suppress $\frac{dv}{dt}$

107. A wire of resistance 36 Ω is bent in the form of an equilateral triangle. The resistance between two vertices is
(1) 8 Ω
(2) 36 Ω
(3) 16 Ω
(4) 12 Ω

108. Three equal resistance of 3 Ω are connected in star. What is the resistance in one of the arms of an equivalent delta circuit ?
(1) 9 Ω
(2) 27 Ω
(3) 3 Ω
(4) 10 Ω

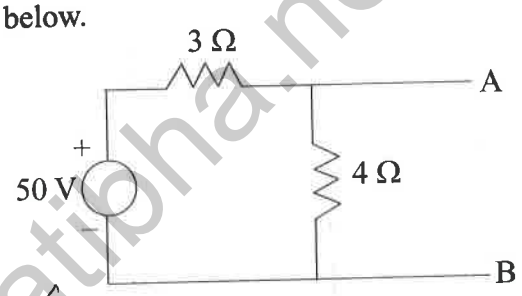
109. In a D.C machine the number of commutator segments must be
(1) Half the number of armature coils.
(2) Thrice the number of armature coils.
(3) Equal to the number of armature coils.
(4) Twice the number of armature coils.

110. Read the following statements :
A. Open circuit test is used to determine the core losses in transformer.
B. Short circuit test is used to determine the copper losses in transformer.
C. Short circuit test is used to determine the equivalent impedance in transformer.
D. Short circuit test is used to determine the iron losses in transformer.
Choose the correct answer :
(1) A, B, C, D
(2) A, B & C only
(3) B & D only
(4) A & C only

111. The relationship between α and β in transistor is
A. $\beta = \frac{\alpha}{1-\alpha}$
B. $\alpha = \frac{\beta}{1-\beta}$
C. $\alpha = \frac{\beta}{1+\beta}$
D. $1-\alpha = \frac{1}{1+\beta}$
Choose the correct answer :
(1) A, B, D only
(2) A, C, D only
(3) B, C, D only
(4) A, B, C only

112. When single line to earth fault occurs on an ungrounded neutral system, the capacitive current in the two healthy phases rises to
(1) $\sqrt{3}$ times the normal value
(2) $\sqrt{2}$ times the normal value
(3) 2 times the normal value
(4) 3 times the normal value

113. Determine Nortons current between the terminals A and B for the circuit shown below.



(1) 16.7 A
(2) 50 A
(3) 25 A
(4) 12.5 A

114. The efficiency of thermal power plant is of the order of
(1) 50%
(2) 60%
(3) 30 %
(4) 15 %

115. For protection of parallel feeders fed from one end the relays required are :
(1) Directional relays at the source end and non-directional relays at the load end.
(2) Directional relays at both the ends.
(3) Non-directional relays at both the ends.
(4) Non-directional relays at the source end and directional relays at the load end.

116. Read the following statements :

A. Series resonant circuit magnifies voltage.

B. Parallel resonant circuit magnifies current.

Choose the correct answer:

(1) Both A & B

(2) Neither A nor B

(3) B only

(4) A only

117. The following conditions must be satisfied for parallel operation of single phase transformers :

A. The transformers should be properly connected with regard to polarity

B. The transformers should have the same turn ratio and same X/R ratio

C. The percentage impedances should be equal in magnitude

D. The transformers should not have the same turns ratio

Choose the correct answer :

(1) A, C, D only

(2) A, B, C only

(3) B, C, D only

(4) A, B, D only

118. The most economical method of finding no load losses of a large D.C shunt motor is

(1) Retardation test

(2) Field's test

(3) Swinburne's test

(4) Hopkinson's test

119. A 100 KVA transformer has an iron losses of 100 W and copper losses at full load are 400 W . Calculate the KVA loading at which the efficiency is maximum.

(1) 110 KVA

(2) 120 KVA

(3) 90 KVA

(4) 50 KVA

120. Read the following statements :

A. With the increase in temperature the resistance of all metals increases.

B. With the increase in temperature the resistance of insulating materials decreases.

Choose the correct answer :

(1) Both A and B

(2) Neither A nor B

(3) B only

(4) A only

121. Read the following statements :

A. A wattmeter consists of a series electromagnet.

B. A wattmeter consists of a shunt electromagnet.

Choose the correct answer :

(1) Both A & B

(2) Neither A nor B

(3) B only

(4) A only

122. The minimum phase-neutral voltage at which corona glow appears all along the line conductors is called

(1) Corona voltage

(2) Skin voltage

(3) Critical disruptive voltage

(4) Visual critical voltage

123. Read the following statements:

A. D.C shunt generators do not need equalizer bar for satisfactory parallel operation.

B. D.C shunt generators need equalizer bar for satisfactory parallel operation.

C. Under compound D.C generators do not need equalizer bar for satisfactory parallel operation.

D. Under compound D.C generators need equalizer bar for satisfactory parallel operation.

Choose the correct answer:

(1) A & D only

(2) B & C only

(3) A & C only

(4) B & D only

124. Transformers are rated in KVA instead of kW because

(1) Total transformer losses depend on volt-ampere

(2) Transformer losses depends on phase angle

(3) kVA is fixed whereas kW depends on load power factor

(4) Load power factor is often not taken

125. In Peterson coil grounding, inductance L of the coil is related to line to earth capacitance C as

(1) $L = \frac{3}{\omega^2 C}$

(2) $L = \frac{\sqrt{3}}{\omega^2 C}$

(3) $L = \frac{1}{3\omega^2 C}$

(4) $L = \frac{1}{\omega^2 C}$

126. The Root mean square value of Half wave rectifier is

(1) $\frac{I_m}{2}$

(2) $\frac{I_m}{3}$

(3) $\frac{I_m}{\pi}$

(4) $\frac{I_m}{\sqrt{2}}$

127. Match List – I with List – II in half wave rectifier circuit :

List – I (parameter)	List – II (Value)
A. Average D.C current	1. 0.287
B. R.M.S current	2. $\frac{I_m}{\pi}$
C. Ripple factor	3. $\frac{I_m}{2}$
D. Transformer utilization factor	4. 1.21

Choose the correct answer :

(1) A – 2; B – 3; C – 4; D – 1

(2) A – 2; B – 3; C – 1; D – 4

(3) A – 3; B – 2; C – 1; D – 4

(4) A – 3; B – 2; C – 4; D – 1

128. Induction watthour meters are free from the following errors

(1) Temperature

(2) Frequency

(3) Creeping

(4) Phase

129. The effects of hunting in synchronous motor are

A. Hunting produces severe mechanical stress

B. Hunting causes great surges in current

C. Hunting increases machine losses

D. Hunting does not cause loss of synchronism

Choose the correct answer :

(1) A, B, D only

(2) A & B only

(3) B, C, D only

(4) A, B, C only

130. A transformer has negative voltage regulation when its load power factor is

(1) Leading

(2) Lagging

(3) Unity

(4) Zero

131. If a uniformly loaded D.C distributor is fed at both ends with equal voltages, then the maximum voltage drop is given by

(where I = The total current fed to the distributor from both ends;

R = The total resistance of the distributor)

(1) $\frac{IR}{4}$

(2) $\frac{IR}{3}$

(3) $\frac{IR}{8}$

(4) $\frac{IR}{2}$

132. A resistance R is connected in series with a parallel combination of two resistances of 12 Ω and 8 Ω . Calculate R if the total power dissipated in the circuit is 70 W when the applied voltage is 20 V.

(1) 2.7 Ω

(2) 3.6 Ω

(3) 1.8 Ω

(4) 0.9 Ω

133. A synchronous motor is operating on no load at unity power factor. If the field current is increased, then

(1) Power factor is lagging and armature current will decrease

(2) Power factor is lagging and armature current will increase

(3) Power factor is leading and armature current will decrease

(4) Power factor is leading and armature current will increase

134. In Plugging of D.C motors

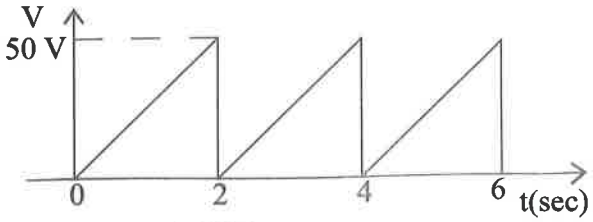
(1) The field terminals are reversed

(2) Both armature and field terminals are reversed

(3) The armature terminals are reversed

(4) The supply terminals are reversed

135. Find the Root mean square value of Saw-tooth waveform shown below.



(1) 40 V

(2) 50 V

(3) 28.9 V

(4) 25 V

P.T.O.

136. Read the following statements about types of rotors used in alternators :
A. Salient pole type rotor is used in low and medium speeds
B. Salient pole type rotor has large diameter and small axial length
C. Salient pole type rotor is used in high speeds
D. Smooth cylindrical type rotor is used in high speeds
Choose the correct answer :
(1) A, B, D only
(2) B, C, D only
(3) A & D only
(4) C & D only

137. The interruption of arc by low resistance method is used in :
(1) Both A.C and D.C circuits
(2) Neither A.C. nor D.C. circuits
(3) D.C circuits only
(4) A.C circuits only

138. A 220 V D.C machine has an armature resistance of 0.5 Ω. If the full load armature current is 20 A, the induced e.m.f when it acts as a motor is
(1) 220 V
(2) 200 V
(3) 210 V
(4) 230 V

139. If a D.C series motor is operated on A.C supply :
A. Excessive eddy current loss in the yoke
B. Excessive Sparking will occur at the brushes
C. Power factor is low
D. Power factor is high
Choose the correct statements :
(1) C only
(2) B & D only
(3) A, B, C only
(4) A, B, D only

140. For the protection of a delta-star power transformers, the current transformers on the two sides of the transformer are connected in
(1) Star-star
(2) Delta-Delta
(3) Star-delta
(4) Delta-star

141. Read the following statements :
A. Superposition theorem is valid only for linear circuits.
B. Superposition theorem is valid only for non linear circuits.
Choose the correct answer :
(1) Both A & B
(2) Neither A nor B
(3) A only
(4) B only

142. Hysteresis loss in a D.C generators depends on :
A. Volume of the core
B. Maximum value of flux density in the core
C. Frequency of magnetic reversals
D. Square of the thickness of laminations.
Choose the correct answer:
(1) A, B, C, D
(2) C & D only
(3) A, B & C only
(4) A & B only

143. Read the following statements :
A. While performing the open circuit test in transformer High voltage winding is open circuited.
B. While performing the open circuit test in transformer low voltage winding is open circuited.
C. While performing the short circuit test in transformer low voltage winding is short circuited.
D. While performing the short circuit test in transformer high voltage winding is short circuited.
Choose the correct answer :
(1) A & D only
(2) B & C only
(3) B & D only
(4) A & C only

144. Two wattmeters used to measure power of a three phase balanced load read W_1 and W_2 the reactive power drawn by the load is

(1) $\sqrt{3}(W_1 - W_2)$

(2) $\sqrt{3}(W_1 + W_2)$

(3) $W_1 + W_2$

(4) $W_1 - W_2$

145. Read the following statements.

A. In a three phase induction motor the resultant flux is of constant value = 1.5 Øm.

B. In a three phase induction motor the resultant flux rotates around the stator at synchronous speed.

Choose the correct answer :

(1) Both A & B

(2) Neither A nor B

(3) B only

(4) A only

146. An R-L-C series circuit consists of a resistance of 10 Ω, an inductance of 100mH and a capacitance of 10μF. Find the quality factor .

(1) 100

(2) 40

(3) 10

(4) 20

147. Read the following statements :

A. D.C potentiometer is used for measuring and comparing the e.m.f's of different cells.

B. D.C Potentiometer is used for calibrating voltmeters, ammeters and wattmeters.

Choose the correct answer :

(1) Both A & B

(2) Neither A nor B

(3) B only

(4) A only

148. Distributors are designed mainly from the point of view of

(1) Operating voltage

(2) Its current carrying capacity

(3) Voltage drop on it

(4) Operating frequency

149. The frequency of rotor currents at standstill in three phase induction motor is

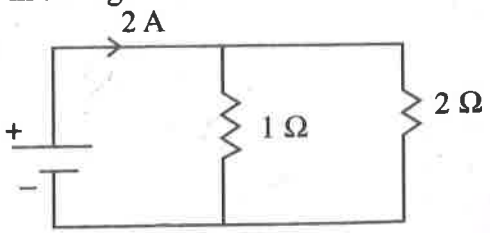
(1) Less than supply frequency

(2) Zero frequency

(3) Greater than supply frequency

(4) Equal to supply frequency

150. Find the current through 1 Ω resistor shown in the figure below.



(1) 1/3 A

(2) 1 A

(3) 2/3 A

(4) 4/3 A

TSPSC-AE(EEE) KEY Paper code:22163

Q.NO	KEY
1	3
2	2
3	4
4	1
5	3
6	4
7	1
8	1
9	3
10	2
11	4
12	4
13	1
14	4
15	1
16	4
17	2
18	1
19	1
20	1

Q.NO	KEY
21	4
22	1
23	2
24	4
25	1
26	4
27	4
28	3
29	1
30	3
31	4
32	4
33	3
34	3
35	3
36	1
37	1
38	3
39	3
40	1

Q.NO	KEY
41	2
42	1
43	1
44	4
45	2
46	2
47	2
48	1
49	1
50	3
51	4
52	2
53	3
54	2
55	2
56	2
57	1
58	1
59	3
60	1

Q.NO	KEY
61	2
62	2
63	1
64	4
65	4
66	1
67	1
68	2
69	3
70	4
71	1
72	3
73	1
74	3
75	4
76	3
77	3
78	4
79	4
80	3

Q.NO	KEY
81	4
82	3
83	2
84	3
85	2
86	1
87	1
88	3
89	2
90	3
91	1
92	4
93	1
94	3
95	1
96	4
97	1
98	3
99	1
100	3

Q.NO	KEY
101	1
102	3
103	2
104	2
105	2
106	4
107	1
108	1
109	3
110	2
111	2
112	1
113	1
114	3
115	4
116	1
117	2
118	3
119	4
120	4

Q.NO	KEY
121	2
122	4
123	3
124	1
125	3
126	1
127	1
128	1
129	4
130	1
131	3
132	4
133	4
134	3
135	3
136	1
137	4
138	3
139	3
140	3

Q.NO	KEY
141	3
142	3
143	4
144	1
145	1
146	3
147	1
148	3
149	4
150	4